THE ARCHIVAL AGE · Volume III

The Conditions of the Invisible Hand

A Cybernetic-Philosophical Diagnosis of the Two Dominant Economic Architectures

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A Note on This Edition

This is a volume of THE ARCHIVAL AGE, issued in preprint reader form. The text is set as a book for continuous reading. A full manual citation check is ongoing (later revisions will be issued under successive version numbers). Cross references between the volumes are given by volume and section rather than by page.

Epigraph

It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest. We address ourselves, not to their humanity but to their self-love, and never talk to them of our own necessities but of their advantages. [...] He intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention.

Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations*, I.ii.2 and IV.ii.9 (1776)

The peculiar character of the problem of a rational economic order is determined precisely by the fact that the knowledge of the circumstances of which we must make use never exists in concentrated or integrated form, but solely as the dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess. The economic problem of society is thus not merely a problem of how to allocate "given" resources, if "given" is taken to mean given to a single mind which deliberately solves the problem set by these "data." It is rather a problem of how to secure the best use of resources known to any of the members of society, for ends whose relative importance only these individuals know.

F. A. Hayek, "The Use of Knowledge in Society," *American Economic Review* 35:4 (September 1945), pp. 519–520

Prologue

A university auditorium. A panel discussion. Three people on stage: a conservative commentator, a liberal commentator, and Will McAvoy, a television news anchor. The moderator opens the floor. A student raises her hand. Her name is Jennifer Johnson. She is an undergraduate. She asks the panel to say, in one sentence, what makes America the greatest country in the world.

Diversity and opportunity, says the liberal panelist.

Freedom and freedom, says the conservative. *So let's keep it that way.*

McAvoy says: *The New York Jets.*

The moderator stops him. *No. I'm going to hold you to an answer on that. What makes America the greatest country in the world?*

McAvoy tries to slip past it. *Well, Lewis and Sharon said it. Diversity and opportunity and freedom and freedom.*

The moderator does not let him slip. *I want a human moment from you. What about the people? Why is America...*

McAvoy looks at him.

It's not the greatest country in the world, professor. That's my answer.

The audience laughs. The moderator tries to recover. McAvoy talks over him.

Fine. Sharon, the NEA is a loser. Yeah, it accounts for a penny out of our paycheck, but he gets to hit you with it anytime he wants. It doesn't cost money, it costs votes. It costs airtime and column inches. You know why people don't like liberals? Cause they lose. If liberals are so fucking smart, how come they lose so goddamn always?

He turns to the conservative.

And with a straight face, you're gonna tell students that America is so star-spangled awesome that we're the only ones in the world who have freedom? Canada has freedom. Japan has freedom. The UK. France. Italy. Germany. Spain. Australia. Belgium has freedom. Two hundred and seven sovereign states in the world, like a hundred and eighty of them have freedom.

He turns to the student.

There is absolutely no evidence to support the statement that we're the greatest country in the world. We're seventh in literacy. Twenty-seventh in math. Twenty-second in science. Forty-ninth in life expectancy. A hundred and seventy-eighth in infant mortality. Third in median household income. Number four in labor force and number four in exports. We lead the world in only three categories: number of incarcerated citizens per capita, number of adults who believe angels are real, and defense spending, where we spend more than the next twenty-six countries combined, twenty-five of whom are allies. So when you ask what makes us the greatest country in the world, I don't know what the fuck you're talking about. Yosemite?

The auditorium goes quiet.

It sure used to be. We stood up for what was right. We fought for moral reasons, we passed laws, struck down laws for moral reasons. We waged wars on poverty, not poor people. We sacrificed, we cared about our neighbors. We put our money where our mouths were, and we never beat our chest. We built great big things, made ungodly technological advances, explored the universe, cured diseases, and we cultivated the world's greatest artists and the world's greatest economy. We reached for the stars, acted like men. We aspired to intelligence, we didn't belittle it, it didn't make us feel inferior. We didn't identify ourselves by who we voted for in the last election, and we didn't scare so easy. We were able to be all these things and to do all these things because we were informed. By great men, men who were revered.

He stops. He looks at the moderator.

The first step in solving any problem is recognising there is one.

The scene is from the opening of Aaron Sorkin's *The Newsroom*, first broadcast on HBO on June 24, 2012. McAvoy is played by Jeff Daniels.

The contemporary economic discourse feels equally out of place. The slogans the panel was asked to produce have analogues in the vocabulary the current order uses to describe itself: free markets, competition, choice, innovation, the discipline of price. The figures McAvoy had at his fingertips have analogues too. Productivity decoupled from wages four decades ago. Asset values have decoupled from cash flows. The share of capital expenditure going to share repurchases has overtaken the share going to plant and equipment. Life expectancy has had multi-year declines since the mid-2010s in the country that produces the discourse. The old maps no longer show the territory, and the terms the participants of the public conversation treat as descriptive describe a different order from the one the participants inhabit.

What McAvoy did in that scene, the book undertakes more carefully across the relevant ground. The vocabularies the participants treat as descriptions of the contemporary order no longer match the order the vocabularies were once developed to describe, and the gap between the two is the object the book takes up.

This is not about whether McAvoy was right. The scene matters because of what it touches, not because of what it asserts, and what it asserts (that America is or is not the greatest country in the world) is in any case the wrong frame. The numbers McAvoy puts on the table are not in dispute. What is malformed is the question that aggregates them into a single ranking. The question is the same kind of question as the question of the greatest physicist of all time, the greatest mathematician of all time, the greatest footballer of all time, the greatest actor of all time, the greatest novelist of all time. There is no single measure on which the candidates can be ranked into a single ordering, and the dispute over which measure to use is the dispute that produces the question. The

countries case is the same case in the political-economic register.

Setting that aside, the point is not the question McAvoy answered. The point is the vocabulary in which the question was put. The vocabulary the moderator handed the panel (diversity and opportunity, freedom) is the vocabulary the contemporary order's discourse runs on, and the discomfort the scene stages is the discomfort of watching that vocabulary fail to meet the data the world is producing. This is not the truth because Aaron Sorkin wrote a scene that sounded right; the scene matters because of what it touches. What it touches is something nearly everyone has felt and almost no-one has had the vocabulary to name: that the discourse the contemporary order conducts about itself has stopped matching the contemporary order. The feeling has been around for the better part of a century. The traditions whose vocabularies the conversation still runs on were articulated in the eighteenth and nineteenth and early-twentieth centuries against orders that no longer exist, the vocabularies have continued in use while the orders they were designed to describe have transformed beneath them, and what has not happened, except in fragments scattered across disciplines that do not read each other, is the work of naming what has happened in a vocabulary the work can be examined in.

This is not a book of the left in the sense the term has come to mean. I write inside the libertarian tradition: Smith and Hayek are the figures whose arguments the book takes as its starting conditions, and the book's diagnostic structure is the structure of those arguments applied to the contemporary order. The book is not a defence of central planning, not a defence of state socialism, not a defence of any of the positions the libertarian tradition has historically argued against. The book is the harder diagnosis: that the order claiming libertarian legitimacy fails on libertarian terms, that the conditions Smith specified and Hayek refined are not met by the contemporary order the libertarian tradition is asked to defend, and that the gap between the order's self-description and its operation is what the tradition's own arguments, taken at their word, force the inheritor of the tradition to examine. The book takes a side in this sense: the side of the tradition's arguments against the contemporary order's claim to be their realisation. The book's quarrel is therefore much sharper with the contemporary order than with the progressive critiques of it, because the contemporary order is what the tradition's own conditions show is failing.

The reader who has been waiting for someone to say *I don't know what the ... you're talking about* and then conduct, slowly and carefully and over many pages, the examination the line gestures at, this book is for that reader. The reader who would prefer to be told which side to take is invited to put the book down.

What follows is the examination. The first step in solving any problem is recognising there is one, and this book is an attempt to take a step in a direction that, from inside the axis, looks like no direction at all.

Guide to the Reader

This book conducts an investigation whose subject is a question the libertarian tradition has answered confidently across the contemporary literature without examining the conditions under which the answer holds. The question is whether the structural conditions the tradition itself identifies as constitutive of the free market presently obtain in the orders the tradition's contemporary defenders treat as the realisations of its economic theorems. The conditions in question are not aspirational targets the order is held to fall short of; they are constitutive in the formal sense the tradition's central figures gave them, which is that the tradition's claims hold under specifiable conditions, and the question of whether the claims describe a given order is the question of whether those conditions are satisfied by the order. Markets coordinate better than plans where knowledge is genuinely dispersed. Prices aggregate information where they emerge from the encounter of local supply and local demand. Competition protects consumers where alternatives genuinely exist. Spontaneous order exceeds designed order where no single agent commands the space of coordination. The investigation this book undertakes is whether these conditions obtain in the structures the tradition's contemporary discourse continues to address as if they did.

The investigation is not an external critique of the tradition. It is conducted from within the tradition, on the tradition's own terms, using the tradition's own analytical resources where those resources are adequate to the task and supplementing them with formal apparatus the tradition's central figures explicitly invoked but did not develop. The conditions extracted in the chapters that follow are extracted from the tradition's canonical sources at the level of formal requirement rather than at the level of policy preference or rhetorical commitment, because the tradition's argument depends on conditions of the formal kind, and any honest examination of whether the argument applies to a given order must operate at the level the argument itself specifies. The standards by which the conditions are then assessed are the tradition's own. The question the investigation pursues is the question the tradition's argument requires its serious defenders to ask, not a question imposed on the tradition from outside.

The book is organised across four parts of unequal length but equal weight. Part I extracts the conditions from the canonical sources and conducts an empirical examination of whether they obtain. Three chapters. The first reconstructs the conditions across the tradition's central voices, beginning with Smith's moral and institutional preconditions for exchange, proceeding through Ricardo's boundary conditions for the comparative-advantage theorem, then Bastiat on the visibility of consequences, the Austrian conditions Mises and Hayek and Kirzner formulated, Friedman on monetary stability and consumer sovereignty, Sowell on prices as messengers, Rothbard on the distinction between market capitalism and state capitalism, and Rand on production against extraction. The second chapter applies the conditions to the contemporary Western order. The third chapter applies the same investigation to the People's Republic of China, examining whether the conditions Ricardo identified as necessary for his theorem are satisfied by the architectural arrangements the Chinese state has constructed. Part I closes with what the symmetric examination of the two orders produces. The reader who completes Part I has confronted an empirical record the libertarian-tradition vocabulary registers with

difficulty, and the difficulty is itself a feature of the record the subsequent acts will need to account for.

Part II takes up the methodological question Part I's empirical record presses on the reader. The question concerns whether the libertarian tradition's analytical apparatus, applied honestly to its own empirical record, can register what the record contains, or whether the record requires apparatus the tradition's contemporary articulation does not supply. Three chapters. The first works through the composites of Chapters 2 and 3 at the points where the tradition's analytical framework has produced findings the framework cannot itself account for. The chapter identifies the recurring structural form the working-through forces on the analysis, recognises the position the framework had been conducting its analysis from as foreclosed, and registers the long historical record (Zeno through Gödel) of analytical traditions that reached the same form when applied past the conditions their own resources could carry. The chapter closes having shown where the libertarian tradition's resources run out, without constructing the apparatus the rest of Part II will require. The second and third chapters construct two of the apparatuses by drawing on bodies of work whose analytical contribution to the diagnostic question turns out to be necessary and whose claim on the economist reader's attention is established not by their philosophical reputation but by what the apparatus, deployed against the empirical record of Part I, makes visible that the tradition's existing apparatus does not. The bodies of work are those of cybernetics in the lineage of Ashby, Conant, and Beer; the analysis of *technique* in the work of Ellul. The book does not introduce them as alternatives to economics or as critiques of economics from a continental philosophical position. It introduces them under the discipline the diagnostic question imposes, which is that an apparatus is admissible in the analysis to the extent that it makes a feature of the order visible that the existing analytical vocabulary cannot make visible, and is dispensable to the extent that it does not. Each apparatus is justified operationally. Each is brought in at the point where the prior apparatus has reached its limit and the analysis cannot proceed without further extension. By the end of Part II, the reader who has followed the demonstration has acquired the two apparatuses the second-pass tests of Part III will deploy. The third analytical tradition (Heidegger's analysis of *Gestell*) is reserved for the standalone Epilogue that follows Part IV, where the diagnosis operates at the existential-phenomenological register the cumulative cybernetic-and-Ellulian apparatus places in view but does not by itself require, and where the Epilogue's detachability allows the structural diagnosis to stand complete for the reader who chooses to close the monograph at the end of Chapter 12.

Part III deploys the apparatus Part II constructed against the orders Part I extracted, in a second-pass test parallel to the first-pass test of Part I. Two chapters. The first applies the cybernetic and Ellulian apparatuses to the contemporary Western order at the structural-mechanism level the apparatus makes visible. The second applies the same apparatuses to the contemporary Chinese order. The second-pass tests produce structural-mechanism findings the first-pass tests could not produce, because the first-pass tests operated within the libertarian tradition's own analytical resources and the structural-mechanism findings require the additional apparatus Part II constructed. At the end of Part III, the reader has the empirical record of Part I, the apparatus of Part II, and the structural-mechanism findings the second-pass tests have produced.

Part IV deploys the apparatus the prior parts have constructed at the diagnostic-chapter level. Four chapters and a standalone Epilogue. The first chapter traces the structural form of the contemporary Western financialised price-formation system at the level the cybernetic-and-Ellulian apparatus makes visible. The second traces the consequences of that structural form across seven productive substrates whose replenishment cycles exceed the financialised regulator's action cycle, together with an eighth substrate the architecture is actively converting. The third performs the symmetric application to the Chinese order, with attention to whether the apparatus produces a symmetric or an asymmetric finding. The fourth examines the libertarian tradition's contemporary discourse against the cumulative diagnostic record the prior chapters have produced, with the examination registering what the cumulative record closes and what it leaves open. The Epilogue asks what kind of revealing made an architecture that operates as the prior chapters documented appear, to the people who occupy it, as natural; the Epilogue is detachable for the reader who reaches the close of Chapter 12 and does not wish to follow the diagnosis to its existential-phenomenological register, with the structural diagnosis the prior chapters have produced standing complete on its own terms. What Part IV produces is what the apparatus, applied honestly to the empirical record, produces. The findings are not announced in advance.

The investigation is strictly diagnostic, not normative. It does not claim that any of the orders it examines is preferable to the others, more just, more humane, or more deserving of political endorsement. The structural findings the book produces concern whether the orders satisfy the conditions the libertarian tradition's argument requires, and that question is independent of any normative evaluation of the orders on dimensions the apparatus does not address. The reader whose normative commitments differ from mine will find that the diagnostic findings stand independently of the political consequences different readers will draw from them.

The total demonstration is built to be navigable by readers whose engagement with the book is constrained by time, by prior commitments to one of the two registers the book integrates, or by the desire to verify the empirical record before committing to the apparatus that examines it. Three reading routes are offered. Each is internally coherent. Each arrives at the closing observations the demonstration produces.

The Empirical-Record Route

For the reader who wishes to confirm that the empirical record exists before committing to the apparatus that examines it. Read this Guide; Chapter 1 §1.10, where the conditions extracted across the canonical sources are tabulated; Chapter 2 §§2.1, 2.7, and 2.8, where the mutual-constitution observation is recorded, the first composite finding is presented, and the process model that accounts for how the order reached its present state is developed; Chapter 3 §§3.0, 3.6, and 3.7, where the chapter's evidentiary standard is stated, the engineering at issue is described in plain terms, and the second composite is presented; Chapter 11 §11.10, where the symmetric application of the apparatus to the Chinese order produces its comparative-finding consolidation; and Part IV. This route gives the reader the empirical record at full evidential force without the apparatus that explains why the record has the shape it has. The reader who completes this route and then asks why the empirical situation could not be otherwise is in the position the apparatus chapters answer.

The Apparatus-Verification Route

For the reader who wishes to verify the apparatus's coherence and rigour before committing to the empirical record it examines. Read this Guide; Chapter 4 in full, where the working-through of the Chapter 2 and 3 composites identifies where the tradition's resources run out and names the view-from-nowhere position the framework had been conducting its analysis from; Chapter 11 §11.10, where the comparative finding the symmetric application produces is registered; Chapter 12 §§12.5 and 12.7, where the cumulative-record consolidation of the three walls and the cybernetic articulation of the three-lock agent-amendability model are produced; and Part IV. This route gives the reader the apparatus at full philosophical force. The reader who completes this route and then asks whether the empirical record warrants the apparatus is in the position the empirical chapters answer.

The Full-Argument Route

For the reader who wishes to encounter the book's argument in the order it is constructed. Read linearly. This route gives the reader the empirical record, the methodological justification, the apparatus, the mechanism-deeper diagnosis, and the closure in the dependency order each requires from the prior. This is the route the book is designed to support. The other two routes are accommodations for readers whose engagement is constrained.

The book is navigable by the reader in any of the three routes, and each route arrives at the same closing observations. The closing observations are produced by the demonstration. They are not the demonstration's premises.

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Part I: The Empirical Record

The man of the most perfect virtue, the man whom we naturally love and revere the most, is he who joins, to the most perfect command of his own original and selfish feelings, the most exquisite sensibility both to the original and sympathetic feelings of others. The man who, to all the soft, the amiable, and the gentle virtues, joins all the great, the awful, and the respectable, must surely be the natural and proper object of our highest love and admiration.

Adam Smith, *The Theory of Moral Sentiments*, III.3.35 (1759)

CHAPTER 1

The Conditions the Tradition Inherited

1.1 The Question

The libertarian tradition the present chapter reconstructs is held together less by a shared doctrine than by a shared form of argument, with the figures who have made the tradition's central cases articulating that form through analytical idioms that differ at every register except the structural one. Smith's argument runs through the moral psychology of mutual recognition between agents whose exchanges presuppose the social architecture that produces such recognition, Ricardo's through the formal boundary conditions of the comparative-advantage theorem, Bastiat's through the visibility of consequences across the time-horizons across which the consequences of an exchange propagate; the Austrian arguments of Mises, Hayek, and Kirzner run through the epistemic structure of dispersed knowledge and the conditions under which the price mechanism aggregates it; Friedman through the operational discipline of monetary stability and consumer choice, Sowell through the informational character of prices, Rothbard through the moral and institutional distinction between voluntary exchange and state-granted privilege, Rand through the moral primacy of productive achievement against the extraction the legal order can be configured to authorise. The figures disagree about almost everything else, often sharply, and the secondary literature on each of them has been preoccupied across the past half-century with adjudicating the points of disagreement. They agree on the form of the case the tradition has been making since Smith, which is that the market produces outcomes superior to those any centralised alternative can produce under conditions the canonical figures specified at the level of formal requirement, and they agree on the architectural status of the conditions, which is that the conditions are not aspirational targets the order is held to fall short of but constitutive specifications under which the tradition's central claims hold.

The agreement is not at the level of slogans. The tradition's contemporary defenders sometimes treat it as if it were, deploying the tradition's central claims in the public-facing register as if they were self-evident propositions whose validity does not depend on conditions of any kind. The tradition's central figures themselves were more careful. Each articulated the conditions under which the claims they were defending hold. Smith specified the conditions of moral and institutional embeddedness that exchange among the butcher, the brewer, and the baker presupposes. Ricardo specified the boundary conditions under which his theorem produces mutually beneficial specialisation rather than the alternative outcome the boundary's removal would generate. Hayek specified the architectural conditions under which the price mechanism aggregates dispersed knowledge that no central planner could aggregate. Friedman specified the institutional and monetary conditions under which competition operates as the consumer's protection. Each of the canonical figures, working in their own analytical idiom, identified the conditions their argument depended on. The conditions were not aspirational additions to the argument. They were what the argument required in order to hold.

The contemporary defence of the libertarian tradition has increasingly proceeded as if the conditions were either self-evidently in place or not constitutive of the argument they support. Both positions, examined carefully, are difficult to sustain on the tradition's own terms. The first position requires that the conditions Smith, Ricardo, Hayek, Friedman, and the other central figures identified continue to obtain in orders the tradition's contemporary defenders address as if they were the realisations of the tradition's economic theorems. The second position requires that the tradition's argument be reformulated without the conditions, which is to say that the argument be reformulated in a form none of the canonical figures gave it. Neither position is honest to the tradition's analytical architecture.

The investigation this chapter undertakes is the prior question both positions presuppose. Before the contemporary defenders' arguments can be assessed, the conditions the tradition's canonical figures identified need to be reconstructed in the form the figures themselves gave them. The reconstruction proceeds at the level of formal requirement, not at the level of policy preference or rhetorical commitment, because the tradition's argument operates at the level of formal requirement. A condition is admitted into the chapter's reconstruction when the canonical source from which it is drawn presents it as something the tradition's argument depends on, not as something the tradition's policy programme would prefer. The distinction matters because the two registers are easy to conflate: a condition the canonical figure identifies as constitutive can be read as a removable policy preference, and a policy preference can be elevated to a constitutive requirement, with each substitution changing what the tradition's argument is committed to. The reconstruction this chapter performs returns the conditions to the level the canonical sources gave them and leaves to the chapters that follow the question of how the contemporary defence of the tradition treats them.

The reconstruction is also restricted to the conditions the tradition's canonical figures themselves identified. Conditions that twentieth-century commentators have attributed to the tradition retrospectively, on the basis of formal models the canonical figures did not deploy, are not included. Conditions that depend on neoclassical reformulation of the tradition's arguments, in the form Samuelson or Friedman or the rational-expectations literature gave them, are included only where the canonical figure under examination explicitly invoked the formulation. The chapter's reconstruction is archival, conducted from the texts of Smith, Ricardo, Bastiat, Mises, Hayek, Friedman, Sowell, Rothbard, and Rand, with attention to what each figure said and to what the figures' own statements require their arguments to presuppose. The reconstruction produces a composite list at §1.10. The list is what the tradition's canonical figures, taken on their own terms across the full range of their voices, identify as constitutive of the order their economic theorems describe.

Whether the conditions presently obtain is not the question this chapter takes up. That question requires apparatus the chapter does not yet have, and the orders whose satisfaction or non-satisfaction of the conditions would settle the question have not yet been examined. The chapter performs the prior task of specifying what the tradition's argument requires. The question of whether the requirements are satisfied is the question Chapters 2 and 3 will examine. The question of what apparatus would be required to settle the satisfaction question rigorously is the question Part II will examine. Chapter 1's task is the reconstruction, which stands as the chapter's instrument rather than as the chapter's conclusion.

The investigation is conducted with the tradition's serious defenders in view. Two kinds of reader are not the chapter's primary audience. The reader hostile to the libertarian tradition, who treats its arguments as ideological apologetics whose conditions are pretexts rather than analytical commitments, will find the chapter's reconstruction excessive in its respect for the canonical sources. The reader for whom the tradition's contemporary articulation is the natural state of economic thought, who treats its claims as self-evident and the question of conditions as itself an ideological intervention, will find the chapter's reconstruction excessive in its insistence that the conditions are formal requirements rather than rhetorical adornments. Both readers will need patience with what the chapter does. The chapter is written for the reader who takes the tradition seriously enough to want to know what its argument actually requires, and who understands that the question of whether the argument applies to a given order is a question that cannot be answered without the reconstruction this chapter performs.

The investigation proceeds across the central figures in roughly chronological order. Smith opens the chapter at §1.2, with the conditions his argument presupposes drawn from the relationship between the *Theory of Moral Sentiments* and the *Wealth of Nations*. Ricardo follows at §1.3, with the boundary conditions of the comparative-advantage theorem. Bastiat at §1.4, with the visibility conditions. The Austrian conditions of Mises, Hayek, and Kirzner at §1.5, where the central distinction between methodological and institutional conditions in Hayek's argument is drawn at archival depth. Friedman at §1.6, with the operational conditions on monetary stability, consumer sovereignty, and competition. Sowell at §1.7. Rothbard at §1.8, with the institutional distinction between market capitalism and state capitalism. Rand at §1.9. The composite list is presented at §1.10. The list is what the tradition has bequeathed to its contemporary defenders. What the defenders do with it, and whether the orders they defend satisfy what it specifies, are questions the subsequent chapters will examine.

1.2 Smith and the Moral Conditions of Exchange

The relationship between Smith's two principal published works is the most difficult and the most consequential feature of his thought, and the difficulty has been concealed from the libertarian tradition's contemporary articulation by a habit of reading that treats *The Wealth of Nations* (Smith 1776/1976) as if it could be detached from *The Theory of Moral Sentiments* (Smith 1759/1976) without loss, treating Smith's economic agent as an asocial agent whose self-interest is the entire content of his motivation, and who arrives at the market with no prior moral commitments, no relationship to the community in which he transacts, and no exposure to the judgement of those whose exchanges he is part of. The Smith scholarship of the past four decades has been correcting this reading continuously, beginning with the Glasgow edition's reframing of the corpus and continuing through the work of Otteson, Fleischacker, Haakonssen, Hanley, and Werhane (Otteson 2002, pp. 1–35; Fleischacker 2004, pp. 80–104; Haakonssen 1981; Hanley 2009, pp. 99–135; Werhane 1991, Chapter 3). The detachment is not what Smith himself authorised. He revised the *Theory of Moral Sentiments* across six editions, the last of them substantially expanded in the year of his death, and the editorial introduction to the Glasgow edition documents that he regarded that work, not the *Wealth of Nations*, as the more important of the two (Raphael and Macfie 1976, pp. 1–52, with the textual history of the six editions at pp. 38–49 and the relation between the two works at pp. 20–25). The two works are not consecutive in the sense that the second supersedes the first. They are constitutive of each other in the sense the editors of the Glasgow edition identify, and the Cambridge Companion treatments of Smith's moral psychology develop, in which the second presupposes what the first establishes about the moral psychology of the agents whose exchanges the second analyses (Haakonssen 2006, pp. 1–21; Fleischacker 2004, pp. 1–13). The agent the *Wealth of Nations* describes is the agent the *Theory of Moral Sentiments* spent eighteen years specifying, and his exchanges produce the outcomes Smith celebrates only on the moral and institutional architecture the prior work establishes.

The architecture has three constitutive components. The first is the impartial spectator, whose function in Smith's moral theory is to supply the agent with the standpoint from which his own conduct is assessable as conduct rather than as mere expression of preference. Smith develops the impartial spectator across Part III of the *Theory of Moral Sentiments* (Smith 1759/1976, III, especially III.1 through III.3), with the most concentrated statement at III.3, where the spectator is identified as "the inhabitant of the breast, the man within, the great judge and arbiter of our conduct" (Smith 1759/1976, III.3.4, pp. 119–120). The spectator is not a real person. He is the projection, internalised by the agent through a lifetime of mutual encounter, of the standpoint from which an informed observer not party to the agent's interests would assess the agent's conduct (Raphael 2007, pp. 32–42). The spectator's function is to discipline self-interest through the prior commitment to acting in ways the spectator would approve. The agent who exchanges in Smith's market is the agent who has already internalised the impartial spectator, which is to say the agent whose self-interest is not the bottom of his motivational structure but is itself constrained by the prior commitment to standing in the right relation to those who would judge his conduct from outside it. This reading of the impartial spectator's function in the *Wealth of Nations* is the central thesis of Otteson's *Adam Smith's Marketplace of Life* (Otteson 2002, especially pp. 100–169) and is consistent with the Cambridge Companion's treatment of the relation between Smith's moral and economic works (Haakonssen

2006, especially the chapters by Otteson and by Fleischacker). Self-interest, in Smith, is not the absence of moral structure. It is what survives when moral structure has done its work.

The second component is sympathy, the capacity Smith identifies in the opening pages of the *Theory of Moral Sentiments* and develops across the entire work. Sympathy in Smith's sense is not the contemporary affective notion of feeling for someone in distress. It is the more general capacity to imaginatively occupy the standpoint of another and to feel what the other feels, a capacity Smith introduces in the work's first chapter (Smith 1759/1976, I.i.1) and which he describes as occurring through what he calls "changing places in fancy" (Smith 1759/1976, I.i.1.3, p. 4). Sympathy is the mechanism through which the impartial spectator becomes operative in the agent's moral psychology, a connection Smith develops through the second part of the work and which the secondary literature has treated as the central architectural connection in his moral system (Griswold 1999, pp. 76–129; Raphael 2007, pp. 12–31; Broadie 2006). The agent who can place himself imaginatively in the position of those affected by his conduct can also assess his conduct from their position, and the assessment is what the impartial spectator delivers. The market agent who cannot perform this imaginative occupation lacks the equipment Smith's argument requires the agent to have. The exchange between the butcher and his customer, in Smith's account, operates as an exchange that exceeds the transfer of meat for money. The transaction operates as an exchange between two agents who can each imaginatively occupy the position of the other, and who therefore each have access to the assessment of the exchange's terms from a standpoint outside their own interests.

The third component is the moral architecture of the community within which sympathy and impartial-spectatorship operate. Smith is explicit that the moral psychology he develops in the *Theory of Moral Sentiments* depends on the agent's sustained exposure to the judgement of those who can assess his conduct, and that this exposure is itself a function of the agent's location within a community of mutual acquaintance. Smith makes the dependence explicit at *Theory of Moral Sentiments* III.3.31 and the surrounding paragraphs (Smith 1759/1976, III.3.31–43, pp. 130–137), where he traces the gradient of moral sensitivity from the agent's family through his neighbours, his town, his nation, and beyond, with the sensitivity attenuating as the distance from the agent's everyday encounters increases. The argument is not a sentimental one. It is the recognition that the moral psychology the *Wealth of Nations* presupposes is itself produced by the social architecture of mutual acquaintance, and that exchanges conducted outside this architecture are exchanges conducted on agents whose moral psychology has not been formed by the conditions Smith's argument requires. The point has been developed at length by Hanley, who treats Smith's account of moral education as the foundation on which the *Wealth of Nations* operates (Hanley 2009, pp. 99–135).

The implications of this three-part architecture for Smith's economic argument are most visible at the moments where Smith specifies the conditions under which the market produces the outcomes he celebrates and the conditions under which it does not. The locus classicus is the passage at *Wealth of Nations* I.ii.2 where Smith introduces the formulation about the butcher, the brewer, and the baker (Smith 1776/1976, I.ii.2, pp. 26–27). The passage is routinely quoted in the libertarian tradition's contemporary articulation as if it established that self-interest alone is the engine of beneficial exchange. The passage establishes nothing of the kind, and Smith scholarship has been making this point continuously since the Glasgow edition's editorial introduction (Raphael and Macfie 1976, pp. 20–25; Otteson 2002, pp. 100–169; Werhane 1991, especially Chapter 3). Smith says that "it is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest" (Smith 1776/1976, I.ii.2, p. 27), but the figures the passage names are local figures known to their customers, and the regard to their own interest the passage celebrates is the regard of an agent whose continued ability to transact with his community depends on his standing in the moral psychology that community sustains. The butcher who cheats his customers loses them. The brewer who sells contaminated beer is identified, by the customers whose imaginative occupation of his position has revealed his deception to them, as the kind of agent the impartial spectator would condemn. The reputational discipline the passage assumes operates because the butcher, the brewer, and the baker are persons known to those who transact with them, who can assess their conduct, and whose collective assessment determines whether the agents continue to transact at all. This reading of the passage is now standard in the Smith scholarship (Otteson 2002, pp. 100–169; Werhane 1991; Fleischacker 2004, pp. 80–104), even where the contemporary popular and policy literatures continue to

deploy the passage in its self-interest-only form.

Smith was equally explicit, and equally consistent, about the conditions under which the market produces outcomes the impartial spectator would not approve. The treatment is most direct in *Wealth of Nations* Book I Chapter X, the chapter on wages and profit in different employments, where Smith examines the structures through which producers organise themselves to defeat the competitive discipline his argument elsewhere defends (Smith 1776/1976, I.x, with the relevant material concentrated at I.x.b and I.x.c). The passage at I.x.c.27 has been quoted often enough that its contemporary deployment as a one-liner against price-fixing has come to obscure what it is doing in Smith's argument. The full sentence reads: "People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the publick, or in some contrivance to raise prices" (Smith 1776/1976, I.x.c.27, p. 145). The sentence is followed, on the same page, by a more consequential observation: that while the law cannot prevent such meetings, "it ought to do nothing to facilitate such assemblies, much less to render them necessary" (Smith 1776/1976, I.x.c.27, p. 145). Smith's claim is not the contemporary libertarian claim that anti-trust regulation interferes with free exchange. His claim is the inverse: the legitimate function of the legal order is to disfavour the assemblies through which producers coordinate against the public, and any law which facilitates such assemblies is a law working against the conditions Smith's argument requires. The chapter as a whole identifies legal privileges, guild monopolies, apprenticeship requirements, settlement laws, and corporate charters as instruments through which the conditions for competition are eliminated (Smith 1776/1976, I.x.c, especially pp. 135–159), with the consequence that the wages and profits the chapter examines are determined not by the market's competitive discipline but by the institutional architecture that has displaced it. The point is registered in the major secondary treatments of Smith's institutional analysis (Rosenberg 1960; West 1990, Chapter 8; Fleischacker 2004, pp. 80–104).

The structural prediction Smith made at I.x.c.27 has a documented twentieth-century instance whose form is worth registering at this stage of the argument. The case is what happens when producers of the same trade meet and the law, while not facilitating their assembly, does not effectively disfavour it either. The Phoebus cartel, founded in December 1924 in Geneva by the principal incandescent-lightbulb manufacturers (Osram of Germany, Philips of the Netherlands, Compagnie des Lampes of France, the Associated Electrical Industries of the United Kingdom, Tungsram of Hungary, and General Electric of the United States operating through its International General Electric subsidiary), is the foundational documented case of organised producer coordination against the public in the industrial era (Krajewski 2014, "The Great Lightbulb Conspiracy," *IEEE Spectrum* 51(10), pp. 56–61; with the broader political-economy treatment in Slade 2006, *Made to Break: Technology and Obsolescence in America*, Harvard University Press, Chapters 1–3). The cartel's founding agreement specified that member firms would limit the operating lifespan of their incandescent bulbs to one thousand hours, reduced from the one-thousand-five-hundred-to-two-thousand-five-hundred-hour range standard in the prior decades. Member firms were subject to monetary penalties graduated by the extent to which their bulbs exceeded the agreed thousand-hour ceiling. The cartel maintained a central testing laboratory in Switzerland through which member firms' products were measured against the agreed standard. The penalties, the testing infrastructure, and the agreement itself are documented in the cartel's own minutes and quarterly reports, archived after the Second World War and reconstructed through the work of historians of technology across the period from the late twentieth century onward (the archival foundation is Reich 1992, "Lighting the Path to Profit: GE's Control of the Electric Lamp Industry, 1892–1941," *Business History Review* 66(2), pp. 305–334; Bright 1949, *The Electric-Lamp Industry: Technological Change and Economic Development from 1800 to 1947*, Macmillan, remains the foundational institutional history). The Phoebus cartel is what Smith I.x.c.27 predicted in the form an industrial-era economy would produce. People of the same trade did meet together in Geneva, the conversation ended in a contrivance to raise prices (through reduced product longevity rather than through nominal price-fixing), and the agreement operated for fifteen years before the Second World War disrupted the international arrangements that sustained it. The case is what Smith's argument permits as a prediction when the law neither facilitates nor disfavours the assembly the argument names, and is the historical anchor against which the contemporary patterns Chapters 2 and 11 examine will be read.

The tension between Smith's celebration of the market and his identification of the structures through which producers defeat its discipline is not a contradiction in his argument. It is the formal structure of his argument, which is conditional in the strict sense. The market produces beneficial outcomes under specifiable conditions. The conditions include the moral psychology developed in the *Theory of Moral Sentiments*, the social architecture of mutual acquaintance that produces and sustains the moral psychology, the legal order that disfavours the structures through which producers coordinate against the public, and the institutional vigilance against the legal privileges that accumulate when the legal order fails this disfavouring (Smith 1759/1976, III; Smith 1776/1976, I.x and IV.viii; Otteson 2002; Hanley 2009). Where the conditions hold, the butcher and the brewer and the baker produce the beneficial exchanges the libertarian tradition celebrates. Where the conditions fail, the same agents, exhibiting the same self-interest, produce the conspiracies against the public Smith identifies as the predictable consequence of producers' organisation. Self-interest is the same in both cases, and what differs between the cases is the structure of the conditions inside which the self-interest operates, which is what Smith's argument depends on.

The conditions can be stated as formal requirements. The first is that the agents whose exchanges the argument describes are embedded in a moral order whose architecture is the architecture of the impartial spectator developed across *Theory of Moral Sentiments* Part III. They are not asocial agents arriving at the market with no prior commitments. They are agents whose self-interest has been disciplined by the moral psychology the *Theory of Moral Sentiments* analyses, and whose exchanges therefore occur within a frame of mutual recognition that the *Wealth of Nations* assumes without restating (Smith 1759/1976, III; Otteson 2002, pp. 100–169). The condition operates constitutively at the level of what counts as an exchange Smith's argument analyses: exchanges among agents who do not satisfy the condition are not the exchanges the argument analyses, regardless of whether the exchanges' formal structure resembles those Smith describes.

> S1. The agents whose exchanges produce the outcomes Smith's argument celebrates are agents whose self-interest is structured by the moral psychology of the impartial spectator, whose exchanges are conducted within a frame of mutual recognition that the moral psychology produces, and whose conduct is assessable by the standards the moral psychology supplies.

The second condition is that the exchanges are conducted within an architecture of local proximity that sustains the moral psychology Smith's argument presupposes. The butcher, the brewer, and the baker of *Wealth of Nations* I.ii.2 are local figures because the impartial spectator's discipline requires that the agent's conduct be assessable by those whose imaginative occupation of his position can deliver the assessment, and the assessability requires sustained exposure to the agents' actions over time. The treatment of the gradient of moral sensitivity at *Theory of Moral Sentiments* III.3.31–43 makes the dependence explicit (Smith 1759/1976, pp. 130–137). The condition is not a sentimental preference for small-scale exchange. It is the recognition that the moral psychology Smith's argument requires is sustained by the social architecture in which it was formed, and exchanges conducted entirely outside this architecture are exchanges in which the moral psychology is inoperative by construction. This reading of the locality condition is the claim of Hanley's treatment of Smith's moral education (Hanley 2009, especially pp. 99–135).

> S2. The exchanges are conducted within an architecture of local proximity in which the agents are sustainedly exposed to the judgement of those who can assess their conduct, and in which the assessment has consequences for the agents' continued capacity to transact.

The third condition is that the structures through which producers coordinate against the public are disfavoured by the legal order rather than facilitated by it. Smith's analysis at *Wealth of Nations* I.x is not a peripheral observation about market imperfection. It is the recognition that the conditions under which the market's competitive discipline operates are conditions the legal order either sustains or undermines, and that the question of whether the market produces the outcomes Smith's argument celebrates depends on which posture

the legal order takes toward the structures producers will naturally attempt to construct (Smith 1776/1976, I.x.c, pp. 135–159; on the institutional reading, Rosenberg 1960; Fleischacker 2004, pp. 226–258). The condition is architectural rather than legalistic. It does not specify which laws should be in place. It specifies what the legal order's posture toward producer coordination must be for the market to operate in the form Smith's argument requires.

> S3. The legal and institutional order disfavours rather than facilitates the structures through which producers coordinate against the public, with the disfavour operating at the level of the order's general architecture rather than only at the level of after-the-fact prosecution of specific acts.

The fourth condition concerns the moral and reputational discipline through which competition operates as the consumer's protection. The butcher who cheats loses his customers because the customers can assess his conduct and propagate the assessment through the community whose continued patronage his livelihood depends on (Smith 1776/1976, I.ii.2, with the moral-psychological architecture at Smith 1759/1976, III). The discipline operates through the moral psychology of the *Theory of Moral Sentiments*, the local proximity of the second condition, and the legal order's posture in the third, but it adds a further requirement that the contemporary articulation often treats as derivative when it is in fact constitutive. The requirement is that the structure of exchange admits the propagation of reputational information at a velocity and a fidelity sufficient to discipline conduct. Where the structure of exchange conceals who is responsible for what, where the agent transacts with intermediaries whose own conduct is unassessable, where the chain from production to consumption is so attenuated that the moral psychology cannot reach the producers whose conduct affects the consumers, the reputational discipline that Smith's argument relies on is not present. The substantive force of this condition is implicit in Smith's treatment of long-distance trade (Smith 1776/1976, IV.vii, with relevant passages at pp. 556–626) and in his concerns about the monopolistic chartered companies whose distance from their customers concealed the conduct that local exchange would have made visible.

> S4. The structure of exchange admits the propagation of reputational information at a velocity and a fidelity sufficient to discipline producer conduct through consumer assessment, with the reputational propagation operating at the timescale of the conduct it disciplines.

These four conditions are what Smith's argument requires. They are extracted from his canonical texts at the level of formal requirement, not at the level of policy preference, and the extraction is conducted with attention to what Smith himself said in the *Theory of Moral Sentiments* and the *Wealth of Nations*, supplemented by the secondary scholarship that has reconstructed the architectural connections between the two works (Raphael and Macfie 1976; Haakonssen 1981, 2006; Otteson 2002; Fleischacker 2004; Hanley 2009). The conditions are constitutive of Smith's argument: the argument does not survive their failure, and they are recognisable as constitutive only to a reading of Smith that takes the *Theory of Moral Sentiments* and the *Wealth of Nations* as the constitutive pair Smith himself took them to be. The libertarian tradition's contemporary articulation has frequently lost sight of the first condition, as the Smith scholarship of the past four decades has documented (Otteson 2002, especially pp. 100–169 on the impartial spectator's function in the *Wealth of Nations*; Fleischacker 2004, pp. 80–104, on the moral-psychological conditions the economic argument presupposes; Werhane 1991, especially Chapter 3, on the misreading of self-interest in the Smith reception); it has had to defend itself against the inadequacy of the second under conditions in which the reputational discipline of mutual acquaintance no longer operates at the velocity exchange now occurs (Otteson 2002, pp. 170–198, on the conditions reputational discipline requires; Fleischacker 2004, pp. 90–104, on the limits of the reputational mechanism); it has had its position on the third complicated by its commitment to the dismantling of state intervention generally, where Smith's actual position on legal-institutional disfavour of producer combinations is the inverse of the laissez-faire reading the tradition's contemporary articulation has frequently deployed (the Smith scholarship on the institutional argument is collected at Rosenberg 1960; West 1990, Chapter 8; Fleischacker 2004, pp. 80–104; on the specific question of Smith's anti-monopoly position, Werhane 1991,

especially Chapter 5); and it has not fully confronted the fourth in conditions where the architecture of contemporary exchange, conducted across attenuated chains of intermediation that no party fully sees, has altered the velocity and the fidelity of reputational propagation in ways Smith's local agents would not have recognised. Whether the conditions presently obtain in the orders the tradition's contemporary defenders address as if they did is a question this chapter has not yet examined. The conditions stand as the chapter's instrument, and the question of their satisfaction belongs to the chapters that follow.

1.3 Ricardo and the Boundary Conditions of Comparative Advantage

Ricardo's treatment of foreign trade in *On the Principles of Political Economy and Taxation* (Ricardo 1817/1951) occupies a single chapter, the seventh of the third edition, and the chapter has been read across two centuries as the foundational theoretical defence of free trade (Sraffa 1951, pp. xiii–lxii, on the chapter's place in Ricardo's system; Samuelson 1969, pp. 1–11, on the theorem's standing in economic thought). The theorem does demonstrate what the libertarian tradition reads it as demonstrating: that mutual gains from trade arise even when one nation possesses absolute advantage in the production of every good, provided certain conditions hold (Ricardo 1817/1951, Vol. I, Chapter VII). What this section examines are those conditions, and what happens to the conclusion when they do not hold. The conditions are not incidental simplifying assumptions of the kind formal economists routinely strip away in pursuit of generality. They are the conditions on which the demonstration's conclusion depends: the conclusion does not follow when the conditions fail. Ricardo was explicit about them at the same level of explicitness as the conclusion, in the same chapter, on the same pages (Ricardo 1817/1951, Vol. I, pp. 132–149, with the conditions stated most clearly at pp. 135–137; see also Schumacher 2012b, pp. 83–105, for a recent formal reconstruction of the theorem's dependence on the conditions).

The chapter opens with the theorem in the form that has become canonical (Ricardo 1817/1951, Vol. I, pp. 134–136). England produces both wine and cloth at less cost than Portugal, but England's comparative advantage lies in cloth and Portugal's in wine, where comparative advantage is measured by the internal opportunity-cost ratio of producing each good in terms of the other (the opportunity-cost reformulation, which made the structure of Ricardo's argument formally tractable, was developed by Haberler 1930, pp. 349–370). Specialisation according to comparative advantage allows each country to produce the good in which its opportunity cost is lowest, exchange the surplus, and end with more of both goods than either could have produced alone. The illustration is widely cited. The conditions on which it depends are stated by Ricardo at the same level of explicitness as the conclusion, and they appear in the same chapter (Ricardo 1817/1951, Vol. I, pp. 135–137).

The first condition concerns the international mobility of capital. Ricardo's theorem requires that capital remain within national boundaries, because the comparative-advantage mechanism operates by allowing each country to specialise according to the internal opportunity-cost ratios its factor endowments and technological conditions produce, and these internal ratios persist as distinct ratios only if capital does not flow between countries seeking the highest absolute return (Schumacher 2012b, pp. 88–95, on the formal dependence of the theorem on capital immobility; the same point is registered in Sraffa's editorial introduction to Volume I of the *Works and Correspondence*, Sraffa 1951, pp. xxvi–xxxii). If capital flows freely, the internal ratios converge toward a single international ratio, and the comparative-advantage mechanism collapses into absolute advantage: the country with the lower absolute cost in every good produces every good, and the country with the higher absolute costs produces nothing. Ricardo states the condition at *Principles* I.VII as follows:

"Experience, however, shews, that the fancied or real insecurity of capital, when not under the immediate control of its owner, together with the natural disinclination which every man has to quit the country of his birth and connexions, and intrust himself with all his habits fixed, to a strange government and new laws, check the emigration of capital. These feelings, which I should be sorry to see weakened, induce most men of property to be satisfied with a low rate of profits in their own country, rather than seek a more advantageous employment for their wealth in foreign nations" (Ricardo 1817/1951, Vol. I, pp. 136–137).

Two features of this passage are essential to its proper reading. The first is that Ricardo is not describing capital immobility as an unfortunate market imperfection that policy ought to remove. He is describing it as the empirical condition under which his theorem applies, and he is identifying its sources in the moral and psychological architecture of the agents whose decisions about capital allocation determine whether the condition holds (Ricardo 1817/1951, Vol. I, pp. 136–137; on the analytical reading of this passage, Schumacher 2012b, pp. 92–95). The "feelings, which I should be sorry to see weakened" are not a sentimental aside. They are Ricardo's recognition that the architecture his theorem depends on is sustained by a moral psychology of attachment to country, family, and inherited connection, and that the weakening of this psychology would change the conditions under which his argument operates, with the change reaching to the very level at which the theorem's distinct internal opportunity-cost ratios are sustained. The second feature is what Ricardo says next, on the same page, about what would happen if the condition failed:

"It would undoubtedly be advantageous to the capitalists of England, and to the consumers in both countries, that under such circumstances, the wine and the cloth should both be made in Portugal, and therefore that the capital and labour of England employed in making cloth, should be removed to Portugal for that purpose" (Ricardo 1817/1951, Vol. I, p. 136).

Ricardo is here describing, in his own terms, the precise mechanism through which capital mobility dissolves comparative advantage into absolute advantage (Schumacher 2012b, pp. 92–95). If capital can move freely from England to Portugal in pursuit of higher returns, the productive capacity for both goods migrates to Portugal, England's comparative advantage in cloth becomes inoperative, and the mutual gains the theorem identifies do not arise. The conclusion the theorem celebrates is replaced by the conclusion absolute advantage produces, which is that one country produces both goods and the other produces neither. The theorem does not survive the transition. This is not a contemporary critic's reconstruction of Ricardo's argument. It is Ricardo's own statement of what his argument implies when its central condition fails (Ricardo 1817/1951, Vol. I, p. 136).

The condition can be stated formally:

> R1. Capital remains substantially within national boundaries, with the immobility operating not as a contingent friction the policy programme should remove but as a structural condition under which the theorem's distinct internal opportunity- cost ratios persist.

The second condition concerns the asymmetric mobility of labour. Ricardo's argument requires that labour be mobile within national boundaries, in order to permit the reallocation of workers across industries that specialisation according to comparative advantage requires, and immobile between national boundaries, in order to maintain the factor endowment differentials that generate the comparative-cost structures the theorem operates on (Ricardo 1817/1951, Vol. I, Chapter VII, with the implicit treatment of labour at pp. 134–139; for the formal dependence, Schumacher 2012b, pp. 95–98). Without internal mobility, the workers who would specialise in cloth production in England cannot reallocate from agriculture, and the gains from specialisation do not materialise; without external immobility, the workers and capital that would migrate from England to Portugal in pursuit of higher absolute wages dissolve the factor-price differentials that distinguish the two economies as separate units of comparison.

Ricardo's treatment of labour mobility is less explicit than his treatment of capital, in part because the international labour migrations of the twentieth century were not the empirical situation his argument addressed, and in part because the moral-psychological attachment he identified for capital applied with even greater force to labour, whose movement required the displacement of entire households rather than the redirection of investments (the asymmetry between Ricardo's explicit treatment of capital and his implicit treatment of labour is registered by Sraffa 1951, pp. xxvi–xxxii). The condition is nevertheless implicit in the theorem's structure, and its failure produces the same dissolution of distinct internal opportunity-cost ratios that capital mobility produces, with the additional consequence that the wage levels in the two economies converge through migration rather than through trade, eliminating the basis for the specialisation patterns the theorem requires. The

Heckscher-Ohlin model (Heckscher and Ohlin 1919/1924/1991) and Samuelson's factor-price equalisation theorem (Samuelson 1948, pp. 163–184) demonstrated, in the twentieth-century reformulations of the comparative-advantage framework, that under specifiable conditions trade in goods alone can equalise factor prices without factor mobility, but the result depends on factor immobility as an initial condition: where factors are mobile, the equalisation occurs through migration rather than through trade, and the gains from specialisation evaporate (Samuelson 1948, pp. 180–184; Schumacher 2012b, pp. 95–98).

> R2. Labour is mobile within national boundaries, permitting the reallocation across industries that specialisation requires, and is substantially immobile between national boundaries, maintaining the factor-price differentials and factor-endowment distinctions on which comparative-advantage specialisation depends.

The third condition concerns the unit of analysis. Ricardo's theorem compares the internal opportunity-cost structures of bounded national economies (Ricardo 1817/1951, Vol. I, Chapter VII, with the comparison framed throughout in terms of England and Portugal as the unit-economies). The bounded character of the economies is essential to the comparison, because comparative advantage is a relation between two unit-economies whose internal ratios differ, and the relation has no referent if the boundary between the unit-economies dissolves (Schumacher 2012b, pp. 98–102; Sraffa 1951, pp. xxvi–xxxii). The libertarian tradition's contemporary articulation has frequently treated globalisation as the natural extension of Ricardo's argument to its logical conclusion, with the dismantling of national economic boundaries presented as the removal of an arbitrary obstacle to the gains from trade; the reading is dominant in the Cato and Mercatus literatures and in standard textbook expositions, and the critical treatments of the reading are at Chang 2002, pp. 1–24, on the historical record of the policies the now-developed economies actually deployed, and at Schumacher 2012b, pp. 98–102, on the formal status of the boundary condition. The treatment inverts what Ricardo's argument actually says. The boundary is not an obstacle to the theorem. The boundary is the condition under which the theorem has anything to say. The dissolution of the boundary does not extend the theorem's reach. It removes the units of analysis the theorem operates on.

The condition is most visible at the level of how Ricardo's argument constructs the comparison. The chapter at *Principles* I.VII compares the internal ratios of England and Portugal as two economies whose distinct internal cost structures are the data the theorem operates on (Ricardo 1817/1951, Vol. I, pp. 134–139). The argument cannot be reconstructed without two such economies, because its conclusions are conclusions about the relation between the economies, and the relation has the form of a comparison of internal ratios that presupposes the economies as the units the comparison addresses. Where global supply chains fragment production across many jurisdictions, where a single product's components are manufactured in five countries, assembled in a sixth, branded in a seventh, and sold in an eighth, the unit-economy whose internal cost structure the theorem requires is no longer present in the order the theorem is being applied to. The contemporary trade-theoretic literature has registered this difficulty under the heading of "global value chains" (Baldwin 2016, especially Chapter 3), and Schumacher (2012, pp. 98–102) treats the same issue as the central challenge globalisation poses to the operative force of the comparative-advantage argument.

> R3. The economies whose internal opportunity-cost ratios the theorem compares are bounded units in which the internal cost structures persist as distinct cost structures, with the boundary operating as the condition under which the theorem's comparison has a referent rather than as a contingent obstacle to the gains from trade.

The historical record confirms what the theorem's structure implies. Costinot and Donaldson (2012, pp. 453–458) provided empirical verification of the comparative-advantage mechanism using agricultural productivity data across fifty-five countries, and the verification relies precisely on the existence of distinct national economies whose internal productivity differentials can be measured against one another. Where the

distinctness of the internal differentials breaks down through factor mobility or through the fragmentation of the unit-economy across jurisdictions, the empirical verification cannot be conducted in the form Costinot and Donaldson conducted it, because the data the verification operates on are no longer present in the order. The empirical literature on the theorem's verification is in this sense a literature on the empirical persistence of the conditions Ricardo identified.

The historical critique of free-trade policy provides further evidence that the conditions are constitutive rather than ornamental. Friedrich List (1841/1909) argued that nations attempting to develop manufacturing capacity could not do so under free-trade conditions when faced with established competitors operating in jurisdictions where the conditions had already been satisfied, and that the protectionist policies the libertarian tradition opposes were precisely the policies through which the conditions Ricardo's argument requires were maintained or constructed (List 1841/1909, especially Books 1 and 2). Chang (2002, pp. 19–68) documented at length that the now-developed economies, including those whose contemporary articulation most strongly defends free trade, deployed protectionist policies during their own developmental periods, and that the policies operated in part by maintaining the conditions Ricardo's argument requires for the comparative-advantage mechanism to operate beneficially for the economy adopting them. The historical record is not an ideological attack on free trade. It is an empirical demonstration that the conditions on which Ricardo's theorem depends have historically been maintained or constructed by sovereign action, and that the dismantling of those conditions has consequences the theorem itself predicts (Chang 2002, pp. 51–68; on the same point from a different methodological standpoint, Shafaeddin 2000).

The three conditions can therefore be stated as the formal requirements Ricardo's argument depends on. The first is the substantial immobility of capital between nations. The second is the asymmetric mobility of labour, with internal mobility permitting specialisation and external immobility maintaining factor-endowment differentials. The third is the persistence of bounded national economies as the units whose internal cost structures the theorem compares. Each condition is constitutive of the theorem: the theorem's conclusion does not follow when the condition fails (Ricardo 1817/1951, Vol. I, pp. 134–139; Schumacher 2012b, pp. 88–102). The conditions were treated by Ricardo as the empirical situation his argument addressed, and they have been treated by significant strands of the trade-theoretic literature as either contingent frictions to be removed by policy or as background conditions whose persistence could be assumed (the dismissive treatment is dominant in the textbook expositions and in much of the Chicago and Cato literature; the structurally serious treatment is preserved in the work of Schumacher, Chang, and the post-Keynesian trade theorists). Whether the conditions presently obtain in the orders to which the contemporary defenders of the comparative-advantage argument apply it is a question this chapter has not yet examined. The conditions stand as the chapter's instrument, and the question of their satisfaction belongs to the chapters that follow.

1.4 Bastiat and the Visibility Conditions

Frédéric Bastiat's *Ce qu'on voit et ce qu'on ne voit pas*, published in 1850, the year of his death, is the most concentrated statement in nineteenth-century economic thought of a load-bearing condition the libertarian tradition has continued to invoke without always preserving the conditions under which the invocation operates (Bastiat 1850/1995; on the reception pattern that has preserved the polemical conclusions while attenuating the analytical operation they depend on, Roche 1971, pp. 191–227; Salin and Garello 2001). The work is brief, polemical in form, and addressed to a popular rather than a technical audience, but its analytical structure is more careful than its rhetorical surface suggests. Bastiat develops a single distinction, between what is seen and what is not seen in any economic transaction, and he applies the distinction to a series of cases in which contemporary policy debates had reached conclusions whose plausibility depended on the unseen consequences remaining unseen. The work is an argument about the conditions under which economic reasoning can be conducted honestly, and its analytical structure operates at the level of formal requirement rather than at the rhetorical surface. It is, on the analytical level the libertarian tradition's contemporary articulation has not always preserved, a specification of the conditions under which the claims the tradition makes about market exchange can be evaluated at all.

The work's organising parable is the broken window. A boy breaks a shopkeeper's window. The crowd that gathers concludes that the broken window is not entirely unwelcome, because the glazier who repairs it earns a livelihood that he would not have earned without the breakage, and the money the shopkeeper pays the glazier circulates through the local economy and produces further employment. Bastiat's argument against this conclusion is that it accounts for what is seen, namely the glazier's earnings and their further circulation, while neglecting what is not seen, namely the alternative use to which the shopkeeper's money would have been put had the window not been broken (Bastiat 1850/1995, pp. 1–7). The shopkeeper would have spent the money on shoes, or books, or some other consumption that would have produced employment for the shoemaker or the bookseller, and that consumption would have left the shopkeeper with both shoes and a window, where the breakage leaves him only with a repaired window. The breakage does not produce wealth. It redirects wealth from a productive expenditure to a reparative one, with the redirected portion producing employment that is visible while the foregone portion produces foregone employment that is not.

The parable is not the parable's point. The parable is the most economical illustration of an argument that Bastiat applies across the work to the policy debates of his time, including taxation, public works, military expenditure, and protectionist tariffs (Bastiat 1850/1995, with the systematic application across pp. 8–63). In each case, the analytical operation is the same: identify what the policy or transaction renders visible, identify what it renders invisible, and conduct the economic evaluation against the full set of consequences rather than only the visible portion. The claim is that economic evaluation conducted only against the visible portion is not economic evaluation at all but the rationalisation of what the visibility structure permits the agent conducting the evaluation to see. The condition the argument requires for honest evaluation is that the visibility structure of the transaction or policy admit the consequences that bear on the evaluation, and the condition is constitutive: the evaluation cannot be conducted in the form Bastiat's argument requires when the condition fails.

The literature on Bastiat has often treated him as a polemicist whose contribution to economic thought is rhetorical rather than analytical (Roche 1971, on the historical reception of Bastiat in nineteenth-century French economic thought, with the dismissive view at pp. 134–168 and the analytical defence at pp. 191–227; for the twentieth-century American libertarian reception, Hazlitt 1946, who treats Bastiat's argument as the foundation of his own *Economics in One Lesson*; for a more recent reassessment, Salin and Garello 2001). The dismissive view is difficult to sustain on the texts. Bastiat's seen-and-unseen distinction is a specification of an analytical operation that any honest economic argument must perform, and the operation has the character of a formal requirement rather than a polemical preference. The distinction Roche and Salin and Garello draw between the polemicist Bastiat and the analytical Bastiat is the distinction between the anti-protectionist conclusions and the analytical operation his argument depends on: the conclusions can be invoked without the operation being preserved, and policies whose visibility structure would have failed Bastiat's own analytical test can be defended in Bastiat's name,

leaving the question of what is being defended unanswered (Roche 1971, pp. 191–227; Salin and Garello 2001).

The condition Bastiat's argument articulates can be stated as a formal requirement. The structure of exchange and the structure of policy must admit the propagation, to the agent conducting the economic evaluation, of the consequences that bear on the evaluation, including consequences that fall on parties not party to the transaction or the policy and consequences that materialise on timescales longer than the transaction or the policy itself. Where the structure renders these consequences invisible, either because they fall on parties whose voice does not reach the evaluating agent, or because they materialise on timescales the evaluation does not extend to, or because the structure of exchange interposes intermediaries whose own structure conceals the consequences from the agents whose decisions the consequences depend on, the analytical operation Bastiat's argument requires cannot be conducted, and economic evaluations conducted under these conditions are evaluations of what the visibility structure permits to be seen rather than of what the transaction or policy actually produces.

> B1. The structure of exchange and the structure of policy admit the propagation, to the agent conducting the economic evaluation, of the consequences that bear on the evaluation, including consequences falling on parties not party to the transaction and consequences materialising on timescales longer than the transaction itself.

The second condition the work specifies is the distinction between productive and reparative expenditure. Bastiat's broken-window parable rests on the observation that the breakage does not produce wealth but redirects wealth from a productive use to a reparative one, and the parable's conclusion depends on the analytical distinction between the two kinds of expenditure (Bastiat 1850/1995, pp. 1–7). The distinction has been preserved in the libertarian tradition's contemporary discourse in the form of the broken-window fallacy, which is regularly deployed against various policy proposals on the grounds that they confuse the visible reparative employment such proposals produce with the invisible productive employment they displace. The analytical distinction Bastiat is making is more general than its contemporary deployment suggests. The distinction is between expenditures that increase the economy's productive capacity and expenditures that maintain or restore it against degradation, and the argument is that an economy whose dominant expenditures are reparative rather than productive is an economy that is not, at the macroeconomic level, growing in the way the dominant expenditure pattern would seem to indicate. The reparative expenditures produce visible employment and visible income flows; the underlying productive capacity, which the reparative expenditures are sustained by, is not itself growing.

The application of this distinction to an order in which the dominant economic activity consists of value extraction from existing arrangements, rather than the creation of new productive capacity, is the load-bearing argument the libertarian tradition's contemporary articulation has not always preserved, with the analytical operation Bastiat's argument requires attenuating into the polemical conclusions the work also contains (Bastiat 1850/1995 develops the distinction across the work; on the reception pattern that has preserved the conclusions while attenuating the operation, Roche 1971, pp. 191–227; Salin and Garello 2001 trace the analytical structure and its contemporary deployment). Where the structure of exchange permits agents to capture revenue by degrading existing arrangements rather than by creating new value, where the visible flow of transactions disguises the underlying erosion of the productive base, the analytical situation Bastiat's argument addresses is reproduced in a form Bastiat himself did not anticipate but his argument can recognise. The condition can be stated formally:

> B2. Economic evaluation distinguishes between productive expenditure, which creates new value, and reparative or extractive expenditure, which captures value by maintaining or degrading existing arrangements; and the structural arrangements within which transactions occur permit this distinction to be drawn at the level of the order rather than only at the level of individual transactions.

The third condition the work specifies extends the seen-versus-unseen distinction to a level of analysis Bastiat's parable did not directly address but his analytical apparatus admits. The parable operates at the

production level: the broken window's repair is visible (the glazier's earnings, the redirected expenditure); what is unseen is the counterfactual production the diverted capital would have undertaken. The form of the analytical move is the recovery of what the visible economic activity displaced. The same form applies, with the same Bastiat-analytical force, at the order's competitive level, where the visible activity is the acquisition of one firm by another and what is unseen is the trajectory the acquired firm would have followed had the acquisition not occurred. The acquired firm's independent operation, the competitive pressure that operation would have applied to the acquirer, the founder population the firm's continued independence would have produced, the further firms the founder population would subsequently have founded, and the substrate-coupled innovation those firms would have introduced into the order's competitive selection mechanism: these are the unseen Bastiat's analysis identifies as foreclosed by the visible transaction.

The feature that distinguishes this third condition from B1 and B2 is the foreclosure character of what the visible transaction operates on. In Bastiat's original parable, the broken window's repair redirects productive capacity but does not, in the strict sense, foreclose the productive capacity's continued availability for subsequent expenditure. The shopkeeper, having paid for the repair this month, retains the productive-investment option for next month's income. The acquired firm, by contrast, ceases to exist as the entity whose trajectory the acquisition forecloses. Once the acquisition closes, the trajectory the firm would have followed under independent operation is not recoverable by any subsequent operation the order can perform. The foreclosure is by construction rather than temporary, and the unseen Bastiat's analysis identifies operates at the level of a counterfactual whose non-occurrence the visible transaction has produced rather than postponed.

The neutralisation specification operates at the formal-mechanical level the moral framing does not reach. The acquirer is not, on the analysis the chapter is conducting, acting from anti-competitive intent in the legal-standard sense the contemporary antitrust apparatus operates against. The acquirer is doing what the order's selection mechanism rewards them for doing within the action-cycle the relevant measurement frame admits as legitimate operational concern. The pre-extraction operates as the optimal-by-the-frame's-criterion move under the competitive-pressure conditions in which the acquirer is operating, and the acquirer who does not pre-extract is disadvantaged by construction against acquirers who do. The mechanism reproduces pre-extraction across acquirer-positions across institutional generations, with the reproduction operating through the institutional-architectural features the order deploys rather than through any particular agent's intent. The condition can be stated formally:

> B3. Economic evaluation registers, as part of what is at stake in any acquisition of one firm by another, the trajectory the acquired firm would have followed under independent operation; and the structural arrangements within which acquisitions occur permit the foreclosed trajectory to be specified as the competitive-substrate cost the acquisition imposes on the order's selection mechanism, rather than only as the within-frame consumer-welfare or market-share effects the contemporary antitrust apparatus admits.

The condition's relevance to the libertarian tradition's contemporary articulation operates at two levels. The first is Friedman's structural-openness condition (F3, developed at §1.6), which requires that the order's competitive selection mechanism admit the credible threat of new entrants whose innovations the incumbents have not produced. The pre-extraction mechanism the condition specifies operates as the means through which the credible threat is foreclosed without anti-competitive conduct in the legal-standard sense, and the condition's articulation at the Bastiat level is what permits the foreclosure to be specified as a cybernetic operation on the competitive substrate the selection mechanism is supposed to operate on, rather than as a regulatory-compliance matter the contemporary antitrust apparatus can address. The second is the empirical record across the listed-corporation sector from approximately 2005 onwards, where the pattern the condition specifies is densely documented at the level the chapters that follow will register.

The three conditions concern visibility, but they concern visibility at different levels. The first concerns the visibility of consequences across the parties affected by a transaction or policy. The second concerns the visibility

of the productive-versus-extractive character of the transaction within the order that contains it. The third concerns the visibility of the foreclosed competitive trajectory the transaction operates against. The three conditions are connected, in that an order whose visibility structure conceals the consequences that bear on the evaluation is also an order in which the productive-versus-extractive distinction is difficult to draw, and is also an order in which the foreclosed competitive trajectory is rendered inarticulable by construction as a legitimate object of regulatory concern; but the conditions are formally distinct, and they specify three different requirements that Bastiat's argument depends on.

The conditions are constitutive of Bastiat's argument in the same sense the conditions extracted from Smith and Ricardo are constitutive of theirs. Bastiat's argument does not survive the failure of the visibility conditions: the analytical operation his argument requires cannot be conducted when the conditions fail (Bastiat 1850/1995, with the analytical reading at Salin and Garello 2001; on the formal status of the visibility requirement, Roche 1971, pp. 191–227). The libertarian tradition's contemporary articulation has frequently invoked Bastiat against policy interventions on the grounds that the interventions fail the visibility test, while the analytical operation his argument requires applies equally to the structural arrangements within which contemporary economic activity occurs; the reception pattern that has preserved the polemical anti-intervention conclusion while attenuating the analytical operation that would apply the same test to the structural arrangements is documented at Roche 1971, pp. 191–227, and at Salin and Garello 2001. The third condition extends this concern to the order's competitive-selection level, where the foreclosure mechanism the condition specifies operates without the anti-competitive conduct the contemporary antitrust apparatus is constructed to address. Whether the structural arrangements within which contemporary economic activity occurs themselves satisfy the visibility test, or whether the arrangements have rendered invisible the consequences, distinctions, and foreclosed trajectories Bastiat's argument requires the analytical operation to bring into view, is a question this chapter has not yet examined; Chapter 2 §§2.4 and 2.7 conduct the examination against the documentary record of the contemporary Western order. The conditions stand as the chapter's instrument, and the question of their satisfaction belongs to the chapters that follow.

1.5 The Austrian Conditions: Mises, Hayek, Kirzner

Methodological conditions	*Institutional condition*
A2. Knowledge dispersed in substrate-coupled form	A6. Order produced as *kosmos* rather than *taxis*
A3. Price mechanism aggregating dispersed knowledge	The order's character: spontaneous, not designed; emergent, not planned
Asks: does the substrate-coupled aggregation actually function?	Asks: does the order have *kosmos* character?

Table 1.2. The two formally separable questions in Hayek's argument. An order may satisfy one without satisfying the other.

The Austrian school's contribution to the libertarian tradition is the most analytically articulated body of work the tradition contains. The Austrian arguments are not principally moral-psychological in the manner of Smith, nor formally trade-theoretic in the manner of Ricardo, nor rhetorical-illustrative in the manner of Bastiat. They are arguments about the epistemic structure of economic coordination, about the conditions under which the structure operates, and about the analytical operations through which the structure can be examined. The arguments were developed across the twentieth century in the work of Mises, Hayek, and Kirzner principally, with the surrounding literature contributed by Lachmann, Rothbard (whose conditions are extracted at §1.8 below), Hülsmann, and a substantial recent secondary literature (Caldwell 2004 on Hayek's intellectual development; Boettke 2018 on the Austrian tradition's analytical structure; Lavoie 1985 on the calculation debate). The conditions extracted in this section are extracted from the canonical texts of the three principal

figures, with attention to what each said and to what the figures' own statements require their arguments to presuppose.

The libertarian tradition's contemporary articulation has frequently treated Hayek's argument as if it operated at the level of institutional preference, with Hayek read as defending a particular set of institutional arrangements against alternatives. The institutional reading is not incorrect, in the sense that Hayek did defend institutional arrangements he believed conducive to the operation of his argument's central mechanism, but the institutional defence is downstream of an analytical claim that operates at a different level. The analytical claim Hayek conducts at this layer is methodological in its character: it concerns the epistemic structure of economic coordination itself. The institutional defence is the consequence Hayek drew from the analytical claim. The two are connected, but they are not the same, and the question of whether contemporary orders satisfy what Hayek's argument requires is a different question depending on which level the question is asked at. The distinction is articulated across the secondary literature on Hayek (Caldwell 2004, especially Chapter 8 on Hayek's epistemic project and Chapter 13 on the relation to the institutional argument; Boettke 2018, pp. 48–94, on the same relation as the central feature of Austrian political economy; Lavoie 1985, Chapters 4 and 6, locating the methodological argument as a freestanding case in the calculation debate).

Mises on Economic Calculation

The Austrian arguments concerning the conditions for economic coordination begin with the calculation problem Mises identified in 1920 (Mises 1920/1990). Mises argued that rational economic calculation requires market prices, that market prices require genuine exchange among private owners of the means of production, and that any economic system that has eliminated such exchange has thereby eliminated the conditions under which rational calculation can be conducted (Mises 1920/1990, pp. 1–46; the argument was developed at length in *Socialism*, Mises 1922/1981, especially Part II; and was given its mature statement in *Human Action*, Mises 1949, pp. 200–231). The argument is not the moral or political argument that socialism is unjust or that central planning produces tyrannical political consequences. The argument operates at a formal rather than a moral or political level: the analytical operations by which an economy allocates its resources to their relatively most valuable uses depend on a price structure that conveys information about the relative scarcity of factors and the relative valuation of outputs, and the price structure depends on actual exchange among agents whose decisions about what to buy and what to sell at what prices generate the information the structure conveys. Where exchange is eliminated and prices are set administratively, the information the calculation requires is not generated by the act of price-setting, because the administered prices reflect the central authority's allocation decisions rather than the dispersed information that genuine exchange would have aggregated.

The argument's structure is more careful than its summary indicates. Mises is not claiming that administered economies cannot produce. He is claiming that they cannot rationally calculate: the analytical operations through which an economy distinguishes more from less valuable uses of its resources depend on prices generated by exchange, and the absence of exchange leaves the calculation without the data it requires (Mises 1922/1981, Part II, especially Chapter 5; Mises 1949, pp. 200–231; on the analytical reading, Lavoie 1985, pp. 28–77). The calculation problem Mises identifies is not a problem of computational tractability that better algorithms could solve. It is a problem of epistemic access: the information the calculation requires is information that exists only as a property of the exchanges that generate the prices, and the elimination of the exchanges therefore eliminates the information. This formulation of the problem, which Lavoie (1985) traces through the calculation debate of the 1920s and 1930s, has implications that extend beyond the specific case of socialist central planning Mises was addressing. The implications concern any order in which prices cease to be generated by exchange in the form Mises specifies and become generated instead by some other mechanism whose structure does not aggregate the information the exchange would have aggregated. The condition Mises's argument articulates can be stated formally:

> A1. Rational economic calculation requires market prices generated by genuine exchange among private owners, with the prices conveying the relative scarcity of factors and the relative valuation of outputs through the structural aggregation of dispersed information that genuine exchange produces.

Hayek on Distributed Knowledge: The Methodological and the Institutional

The most analytically consequential statement in twentieth-century libertarian economics is Hayek's "The Use of Knowledge in Society", published in the *American Economic Review* in 1945 (Hayek 1945, pp. 519–530). The paper is short and its argument is condensed, but the argument is the one on which the entire libertarian tradition's contemporary epistemic case for the market depends. The argument has two components, and the components operate at different levels. The first is a methodological claim about the epistemic structure of economic coordination; the second is an institutional claim about the architecture under which the methodological mechanism operates. The relation between the two is the central interpretive question in the secondary literature on Hayek, with Caldwell's intellectual biography of Hayek treating their relation as the principal site of analytical work the post-1945 reception of Hayek had to perform (Caldwell 2004, especially Chapter 8 on Hayek's epistemic project across the 1940s and Chapter 13 on the relation between epistemic and institutional argument in the mature work); with Boettke developing the same distinction as the central feature of Austrian political economy that contemporary articulations have not always preserved at the level Hayek himself preserved it (Boettke 2018, pp. 48–94); and with Lavoie's reconstruction of the calculation debate locating the methodological argument as a freestanding case Mises and Hayek developed against the socialist calculators, distinct from the institutional defences that became dominant in the tradition's later articulation (Lavoie 1985, especially Chapters 4 and 6). Hayek himself returned to the distinction in *Law, Legislation and Liberty*, suggesting that the epistemic argument's reception had not always preserved its conditional structure (Hayek 1973–1979, Volume I, Chapter 2). The chapter's reconstruction of the two components proceeds in this order: the methodological claim first, the institutional claim second, with the conditions each requires identified at the level Hayek's own texts give them.

The first component of Hayek's argument is the methodological claim. The methodological claim concerns the epistemic structure of economic coordination. Hayek argues that the knowledge an economic system requires for its decisions is dispersed across the agents who possess it, that the dispersion is not incidental but constitutive of the form the knowledge takes, and that the price mechanism provides a means of aggregating this dispersed knowledge that no centralised alternative can replicate (Hayek 1945, pp. 519–520, with the central statement at p. 519). The dispersed knowledge is of particular circumstances of time and place, knowledge that exists only in the situated experience of the agents who occupy the relevant positions, and that cannot be transmitted to a central authority in a form the central authority could use because the form the knowledge takes is the form of the agents' situated familiarity with the circumstances they encounter (Hayek 1945, pp. 521–524). The price mechanism, in Hayek's account, performs the aggregation by allowing each agent to act on his own situated knowledge in response to prices that summarise the actions of all the other agents acting on theirs, with the consequence that the system as a whole coordinates without any single agent or authority needing to possess the full body of knowledge the coordination depends on (Hayek 1945, pp. 525–528).

The methodological claim is the epistemic-superiority argument the libertarian tradition has invoked across the seven decades since the paper's publication. The claim is that the price mechanism is by construction superior to centralised alternatives at the task of coordinating economic activity under the condition that the relevant knowledge is dispersed in the form Hayek identifies. The claim is conditional in a specific way. The methodological claim depends on two presuppositions, which Hayek states or implies in the paper. The first presupposition is that the relevant knowledge exists in dispersed substrate-coupled form, which is to say that the knowledge required for the coordination is the knowledge of the particular circumstances of time and place that situated agents possess in virtue of their situated experience (Hayek 1945, pp. 521–524). The second presupposition is that market processes give agents access to this knowledge in a form that allows them to act on it

through their participation in exchange, and that the exchange aggregates the actions in a price signal that other agents can read in the form Hayek's argument requires (Hayek 1945, pp. 525–528). Where the knowledge does not exist in dispersed substrate-coupled form, or where market processes do not give agents access to it in the form the argument requires, or where the price signal aggregates something other than the actions on the situated knowledge, the methodological claim does not apply to the order in question, regardless of whether the order's institutional structure formally resembles the institutional structure Hayek defended.

The second component of Hayek's argument is the institutional claim. The institutional claim concerns the institutional architecture under which the methodological mechanism operates. Hayek argues, across his subsequent works including *The Constitution of Liberty* (Hayek 1960) and *Law, Legislation and Liberty* (Hayek 1973–1979), that the methodological mechanism operates under specifiable institutional conditions, including the rule of law, the protection of private property, the constitutional limitation of state power, and the cultural-traditional sustenance of the conventions under which exchange occurs (Hayek 1960, especially Parts II and III; Hayek 1973–1979, Volume I, Chapter 2). The institutional claim is downstream of the methodological claim: the institutional architecture is defended on the grounds that it sustains the operation of the mechanism the methodological claim identifies, and the institutional defence presupposes the methodological argument rather than the reverse (Caldwell 2004, especially Chapters 8 and 13, on the relation between Hayek's epistemic and institutional arguments; Boettke 2018, pp. 48–94, on the same central relation).

The distinction between the methodological and the institutional claim matters because the two claims have different conditions of application, and the contemporary orders the tradition's defenders address as if they were realisations of Hayek's argument may satisfy one without satisfying the other. An order whose institutional structure formally resembles the architecture Hayek defended, including the formal protection of private property, the operation of price-based exchange, and the constitutional limitation of state intervention, may nevertheless fail the methodological claim if the prices the order generates do not aggregate dispersed substrate-coupled knowledge in the form the methodological argument requires. Conversely, an order whose institutional structure differs from the one Hayek defended may satisfy the methodological claim if the prices it generates do aggregate the relevant information through whatever institutional mechanism the order deploys. The two questions are formally distinct. The methodological question requires its own examination on its own terms and cannot be settled by appeal to institutional resemblance.

The conditions Hayek's argument articulates can therefore be stated as two formal requirements, with attention to which level each operates at. The first concerns the methodological claim and the substrate of dispersed knowledge it presupposes:

> A2. The knowledge required for economic coordination exists in dispersed substrate- coupled form, which is to say that the knowledge takes the form of situated agents' familiarity with the particular circumstances of time and place they encounter, and the form is constitutive of the knowledge rather than incidental to its possession.

The second concerns the price mechanism's function as the aggregator of this dispersed knowledge:

> A3. The price mechanism aggregates the actions agents take on their dispersed substrate-coupled knowledge into signals that other agents can read and act on, with the aggregation operating through actual exchange among agents whose decisions reflect the situated knowledge their participation in exchange expresses.

The institutional claim is downstream of these two methodological conditions. The institutional architecture is admitted into the analysis as the architecture under which the methodological conditions can in fact be satisfied, but the question of whether the conditions are satisfied in a given order is a question that requires examination of the order's actual operation rather than only of its institutional resemblance to architectures Hayek defended.

Kirzner on Entrepreneurial Alertness

Israel Kirzner's *Competition and Entrepreneurship* (Kirzner 1973) extends the Austrian framework by analysing the dynamic process through which the economy moves toward the coordination Hayek's argument identifies. Kirzner argues that the price mechanism, beyond its function of aggregating static dispersed knowledge, operates through a continuing process in which entrepreneurs detect and exploit gaps between the prices that prevail and the prices that more accurate aggregation would produce (Kirzner 1973, pp. 30–87). The entrepreneur's function is to be alert to opportunities the existing price structure has not yet incorporated, and the alertness is what drives the system toward more complete coordination over time. The argument requires that opportunities for entrepreneurial discovery exist in the order, that agents have the capacity to recognise the opportunities, and that the institutional structure permits the agents to act on their recognition in a form that propagates through the price mechanism (Kirzner 1973, especially Chapters 1 and 4; on Kirzner's place in the Austrian tradition, Boettke 2018, pp. 95–141). The condition can be stated formally:

> A4. The order admits entrepreneurial alertness to opportunities the existing price structure has not yet incorporated, with the alertness operating through the agents' capacity to recognise the opportunities and to act on their recognition in a form the price mechanism propagates.

The Austrian arguments also entail a fifth condition, concerning the dynamic character of the market process itself. The Austrian tradition has consistently distinguished its analytical approach from the equilibrium analysis that dominates the neoclassical mainstream, on the grounds that the market is not properly understood as a state to which the system tends but as a process through which coordination is continuously generated and regenerated by the actions of dispersed agents on their situated knowledge (Kirzner 1973, especially Chapter 1; the systematic statement of the methodological difference at Boettke 2018, pp. 14–47). The condition the dynamic-process character entails is that the order admits the dynamic process the market-process analysis identifies, which is to say that prices in the order emerge from the encounter of dispersed agents acting on their situated knowledge rather than from any other mechanism.

> A5. The order admits the dynamic process through which prices emerge from the continuing encounter of dispersed agents acting on their situated knowledge, rather than from any other mechanism whose structure does not have the form the market-process analysis identifies.

Kosmos and Taxis

The final Austrian condition concerns the distinction between two kinds of order Hayek developed in *Law, Legislation and Liberty* (Hayek 1973–1979, Volume I, Chapter 2). The distinction is between *kosmos*, which is the spontaneous order that emerges from the actions of dispersed agents following abstract rules of conduct, and *taxis*, which is the made order that results from the deliberate organisation of an authority pursuing specific purposes. Hayek argues that the market is a *kosmos* in the precise sense that its structure emerges from the actions of agents whose individual purposes are not coordinated by any central directive, and that the celebrated outcomes of market coordination depend on the *kosmos* character of the order it produces (Hayek 1973–1979, Volume I, pp. 35–54). An order that produces the formal appearance of market outcomes through *taxis* mechanisms, which is to say through deliberate organisation by an authority with specific purposes, is not a market in the sense Hayek's argument analyses, even where the order's outputs resemble those a market would produce. The condition can be stated formally:

> A6. The order is produced as *kosmos* in Hayek's sense, emerging from the actions of dispersed agents following abstract rules of conduct, rather than as *taxis*, which is the made order that results from the deliberate organisation of an authority pursuing specific purposes.

The six Austrian conditions extracted in this section are A1 through A6: rational economic calculation requires market prices generated by genuine exchange (Mises); the relevant knowledge exists in dispersed substrate-coupled form (Hayek's first methodological condition); the price mechanism aggregates the dispersed knowledge into signals agents can read and act on (Hayek's second methodological condition); the order admits entrepreneurial alertness to opportunities the existing price structure has not yet incorporated (Kirzner); the order admits the dynamic market process (the Austrian methodological signature); and the order is produced as *kosmos* rather than *taxis* (Hayek's institutional condition at the level of the order's character). The conditions are extracted from the canonical Austrian texts at the level of formal requirement, with the methodological-versus-institutional distinction in Hayek preserved as the central analytical move on which the chapter's subsequent analysis depends. Whether the conditions presently obtain in the orders the tradition's contemporary defenders address as if they did is a question this chapter has not yet examined. The conditions stand as the chapter's instrument, and the question of their satisfaction belongs to the chapters that follow.

1.6 Friedman and the Operational Conditions

Milton Friedman's contribution to the libertarian tradition operates at a level different from those of the prior figures the chapter has reconstructed, and the difference is essential to understanding what the conditions extracted from his work are conditions on. Where Smith, Ricardo, Bastiat, and the Austrians articulate the tradition's central case in registers that range across moral psychology, comparative-advantage formalism, analytical visibility, and the epistemic structure of dispersed coordination, Friedman conducts his argument in the register of operational and institutional mechanism, with attention to the conditions through which the prior figures' abstract claims are realised or fail to be realised in the orders the tradition's contemporary defenders treat as the realisations of its economic theorems. The arguments are most consequential where they specify the operational conditions under which the tradition's claims about competition, consumer protection, and the discipline of voluntary exchange hold (Friedman 1962/2002, especially Chapters 1, 2, and 8; Friedman and Schwartz 1963, especially Chapters 1 and 13; Friedman and Friedman 1980, especially Chapters 1, 2, and 7; on Friedman's institutional thought, Nelson 2001, especially Chapters 5–9; on the broader Chicago school context, Van Overtveldt 2007). The section extracts the conditions that Friedman's arguments depend on.

Monetary Stability

The first condition concerns monetary stability. Friedman's most sustained empirical work, the *Monetary History of the United States* he wrote with Anna Schwartz, argued that the economic disruptions of the twentieth century, including the Great Depression, were produced or substantially exacerbated by monetary instability that the institutional arrangements of the time had failed to prevent (Friedman and Schwartz 1963, especially Chapter 7 on the contraction of 1929–1933, with the central thesis at pp. 299–419). The argument was historical and statistical, but its implications for the libertarian tradition's conditions reach to the structure of the tradition's argument itself. The market mechanisms the tradition celebrates operate within a monetary environment whose stability is itself a condition under which the mechanisms function, and a monetary environment characterised by sharp contractions, sustained inflation, or significant variability in the value of the unit of account is an environment in which the price signals the market mechanisms transmit are corrupted by the variability of the unit in which the signals are denominated (Friedman 1962/2002, Chapter 3 on the control of money; Friedman and Schwartz 1963, Chapter 13 on the implications of the historical record).

The argument applies equally to the case of asset-price inflation that does not register in the conventional consumer-price-index measure of monetary instability. Where the monetary environment is characterised by sustained appreciation of asset prices unsupported by underlying productive value, the price signals the market mechanisms transmit in those asset markets are corrupted in the same way that consumer-price inflation corrupts the signals in consumer markets, and the analytical operations the libertarian tradition's arguments require cannot be conducted reliably under such conditions (the analytical point is implicit in the argument of *Monetary History*

and explicit in Friedman's later work on monetary aggregates, Friedman 1968 in *American Economic Review*; on the asset-price application, Borio and Lowe 2002 trace the methodological extension to asset markets explicitly). The condition can be stated formally:

> F1. The monetary environment within which the market mechanisms operate is sufficiently stable that the price signals the mechanisms transmit are not corrupted by variability in the unit of account, with stability operating not as a contingent macroeconomic preference but as the condition under which the price mechanism's information-transmission function can be relied on.

Consumer Sovereignty

The second condition concerns consumer sovereignty. Friedman's analysis in *Capitalism and Freedom* and in *Free to Choose* relies throughout on the proposition that the consumer's choices among the alternatives the market presents are the mechanism through which the market produces outcomes the consumer endorses, and that the discipline this choice imposes on producers is what aligns the producers' decisions with the consumer's interests (Friedman 1962/2002, Chapter 1; Friedman and Friedman 1980, especially Chapter 1 on the power of the market). The argument depends on the consumer having genuine alternatives among which to choose, on the consumer having access to information sufficient to evaluate the alternatives, and on the consumer's choice-making being the operative mechanism through which producers' decisions are disciplined. Where these conditions fail, the consumer's nominal sovereignty becomes formal rather than substantive, and the market's discipline of producers operates through some other mechanism whose alignment with the consumer's interests is no longer guaranteed by the structure Friedman's argument identifies.

The condition is implicit throughout Friedman's analysis but is most explicit in his treatment of monopoly and of the conditions under which competition operates as the consumer's protection (Friedman 1962/2002, Chapter 8 on monopoly and the social responsibility of business and labor, especially pp. 119–136). Friedman argues that competition is the consumer's protection not because competing producers are individually benevolent but because the structure of competition disciplines them into producing what the consumer wants, and the discipline operates through the consumer's capacity to choose among genuine alternatives. The condition can be stated formally:

> F2. The consumer has genuine alternatives among which to choose, has access to information sufficient to evaluate the alternatives, and the consumer's choice-making is the operative mechanism through which producers' decisions are disciplined; the consumer's sovereignty is substantive rather than only formal.

Open and Free Competition

The third condition concerns the structural openness of competition. Friedman's argument requires not only that competition exist among incumbent producers but that the structure of the market admit the entry of new competitors whose presence disciplines the incumbents and whose absence would permit the incumbents to coordinate against the consumer's interests (Friedman 1962/2002, Chapter 8, with the structural-openness argument at pp. 119–136). The condition is the operational form of what Smith identified at *Wealth of Nations* I.x.c.27 as the danger of producer coordination, and what Kirzner analysed as the entrepreneurial-discovery process through which new competitors enter and propagate their discoveries through the price mechanism. Friedman's specification operates at the institutional level: the institutional architecture must admit entry by new competitors, must prevent the foreclosure of entry through legal privilege or through the accumulation of advantages that operate as effective barriers to entry, and must not facilitate the coordination among incumbents that would defeat the discipline competition imposes.

The condition is constitutive in Friedman's analysis in the same sense the corresponding conditions are constitutive in Smith and the Austrians. An order in which entry is foreclosed, or in which the formal possibility of entry is preserved while the conditions for successful entry have been eliminated, is an order in which the discipline of competition does not operate in the form Friedman's argument requires. The condition can be stated formally:

> F3. The structure of the market admits the entry of new competitors whose presence disciplines the incumbents, with the openness operating at the structural level rather than only at the formal level of the absence of explicit legal barriers; entry that is formally permitted but structurally foreclosed does not satisfy the condition.

Anti-Monopoly Vigilance

The fourth condition concerns the institutional vigilance against monopoly. Friedman's treatment of monopoly is more cautious than the libertarian tradition's contemporary articulation sometimes acknowledges (Friedman 1962/2002, Chapter 8). He distinguishes between monopolies that arise from technological efficiency, which he treats as benign in the cases where the efficiency genuinely operates and the market remains contestable, and monopolies that arise from state-granted privilege, which he treats as harmful and as the legitimate object of policy intervention. The position has been treated by some contemporary commentators as ambiguous, and the ambiguity has sometimes been resolved in favour of a reading that minimises the threat of private monopoly and emphasises only the threat of state-granted privilege (Nelson 2001, Chapters 6–7, on the features of Friedman's institutional thought, including the treatment of monopoly). Friedman's argument requires that the institutional architecture maintain vigilance against monopoly of either kind, with the vigilance operating through whatever institutional mechanism the order admits.

The condition is most explicit in Friedman's discussion of the conditions under which the tradition's claims about competition's protection of the consumer hold (Friedman 1962/2002, pp. 119–136). Where monopoly accumulates, regardless of whether the accumulation is state-granted or technologically driven, the discipline of competition no longer operates in the form Friedman's argument requires, and the analytical operations the tradition's claims about consumer protection depend on cannot be conducted in the form the claims presuppose. The condition can be stated formally:

> F4. The institutional architecture maintains vigilance against the accumulation of monopoly power, whether arising from state-granted privilege or from structural concentration in private hands, with the vigilance operating through whatever institutional mechanism the order admits and at the timescale of the accumulation it is meant to address.

Regulatory Capture as Structural Threat

The fifth condition concerns regulatory capture. Friedman's analysis treats the relation between the regulated industry and the regulating authority as itself a site of concern, with the regulator susceptible to capture by the industry it nominally regulates, and the captured regulator becoming an instrument of the industry's coordination against the public rather than a defence of the public against the industry's coordination (Friedman 1962/2002, Chapter 9 on occupational licensure, with the argument extending across the chapter). The argument is institutional rather than personal. Friedman is not claiming that regulators are individually corrupt. He is claiming that the structural relation between the regulator and the regulated industry produces the capture as the predictable outcome of the relation's operation, and that the institutional architecture that establishes the relation must therefore be designed with attention to the capture it would otherwise produce.

The argument applies equally to capture that operates through formal lobbying, through the revolving door between regulator and industry, through the industry's structural advantage in technical expertise, and through the regulator's dependence on the industry for the data the regulator's decisions require (Friedman 1962/2002, Chapter 9; Friedman and Friedman 1980, Chapter 8 on the cycle of regulation; on the analytical reading, Nelson 2001, Chapters 6–7). The libertarian tradition's contemporary articulation has frequently deployed Friedman's regulatory-capture argument selectively, invoking it against state regulation while attenuating its application to the institutional arrangements internal to the contemporary order where regulating authorities maintain sustained relations with the entities they regulate (the asymmetric reception is documented at Nelson 2001, Chapters 6–7, especially the treatment of Friedman's institutional thought and the gap between Friedman's analytical position and the contemporary deployment of his name). The mechanism Friedman identifies operates in any institutional arrangement where a regulating authority maintains a sustained relation with the entities it regulates, and the condition F5 therefore applies to those arrangements as much as to the state-regulatory cases Friedman's argument was originally directed at. The condition can be stated formally:

> F5. The institutional architecture is designed with attention to the structural threat of regulatory capture, with the architecture's mechanisms for constituting and maintaining the regulator–regulated relation operating to resist rather than facilitate the capture that the relation's normal operation would otherwise produce.

The five conditions extracted from Friedman are F1 through F5: monetary stability, consumer sovereignty, structural openness of competition, anti-monopoly vigilance, and design against regulatory capture. The conditions are extracted from Friedman's canonical texts at the level of formal requirement, with attention to what Friedman himself said and to what his arguments require their institutional and operational analyses to presuppose. The conditions operate at a more institutional and operational level than the conditions extracted from Smith, Ricardo, Bastiat, or the Austrians, and they identify the conditions under which the tradition's more abstract claims are realised in actual economic orders. The libertarian tradition's contemporary articulation has frequently invoked Friedman's name in defence of policies whose institutional consequences include the failure of one or more of these conditions, and the gap between Friedman's own institutional position and the contemporary deployment of his name is documented across the secondary literature on Friedman's institutional thought (Nelson 2001, Chapters 6–7, on the institutional analysis Friedman's argument requires and on the contemporary reception that has attenuated it). Whether the orders the tradition's contemporary defenders address as realisations of Friedman's argument in fact satisfy these conditions is a question this chapter has not yet examined. The conditions stand as the chapter's instrument, and the question of their satisfaction belongs to the chapters that follow.

1.7 Sowell and the Informational Discipline of Prices

Thomas Sowell's *Knowledge and Decisions* (Sowell 1980) extends the Hayekian framework into a sustained analysis of the institutional and informational mechanisms through which the dispersed knowledge Hayek identified is transmitted, processed, and acted upon. The work is the most analytically systematic statement in the contemporary American libertarian tradition of the position the Austrian school had developed, and Sowell's subsequent textbook treatments preserve the same analytical structure (Sowell 2014, especially Part I). The conditions Sowell's argument requires are largely the conditions the Austrian arguments already established at §1.5, but Sowell adds specifications that the Austrian arguments left implicit and that the contemporary libertarian discourse has developed in his particular form.

The first specification concerns the informational character of prices. Sowell argues that prices are not principally a measure of value or a record of past transactions but are messengers carrying information from one part of the economic system to another, with the message's content determined by the dispersed actions of the agents whose decisions the price aggregates (Sowell 1980, especially Chapter 2 on the role of knowledge; Sowell 2014, Chapter 2). The argument is the operational form of Hayek's 1945 claim, but Sowell makes the messenger function explicit in a way that permits the analytical question of what the message is to be asked of any given price-formation system. Where the price's message reflects the dispersed actions of agents responding to the substrate conditions Hayek's argument identifies, the price functions as the messenger Sowell's argument requires. Where the price's message reflects something other than the dispersed substrate-coupled actions, the messenger function does not operate in the form the argument depends on, regardless of whether the formal apparatus of price formation persists. The condition can be stated formally:

> So1. Prices function as messengers carrying information from the dispersed substrate-coupled actions of agents to other agents whose decisions are thereby disciplined, with the messenger function operating substantively rather than only formally.

The second specification concerns the discipline of profit and loss. Sowell argues that the price mechanism's coordination function operates through the discipline profit and loss impose on the agents whose decisions the prices express, with profit signalling correctly anticipated dispersed conditions and loss signalling incorrectly anticipated dispersed conditions (Sowell 1980, Chapter 3 on the production of knowledge; Sowell 2014, Chapter 4 on the role of profits). The discipline operates through the consequences agents bear for their decisions, with successful agents expanding their operations and unsuccessful agents contracting. Where the structural arrangements of the order insulate agents from the consequences of their decisions, either through state-granted backstops, through the advantages that permit some agents to externalise their losses onto parties without exit, or through the institutional mechanisms that permit unsuccessful agents to persist on terms unrelated to their substrate performance, the discipline does not operate in the form the argument requires (Sowell 1980, Chapters 3 and 6; Sowell 2014, Chapter 4). The condition can be stated formally:

> So2. The structural arrangements of the order permit profit and loss to discipline agents' decisions, with successful agents expanding their operations and unsuccessful agents contracting; the discipline operates through agents' bearing the consequences of their decisions rather than externalising them onto parties without exit.

The third specification concerns voluntary exchange and the genuineness of alternatives. Sowell extends Friedman's consumer-sovereignty argument by emphasising that the voluntariness of exchange depends on the consumer having genuine alternatives among which to choose, and that formal voluntariness in the absence of substantive alternatives is a different condition from the one the libertarian tradition's arguments require (Sowell 1980, Chapter 4 on adjustment processes; Sowell 2014, Chapter 5). The argument is consistent with Friedman's, but Sowell's emphasis on the genuineness condition makes the failure case more visible. Where the consumer's alternatives are formally available but substantively foreclosed, by concentration, by network effects that lock the

consumer into the existing infrastructure, or by the elimination of competitors whose continued operation would have constituted the alternatives, the voluntariness Sowell's argument requires is not present in the form the argument depends on.

> So3. Exchange among agents is voluntary in the substantive sense that the agents have genuine alternatives among which to choose, with the alternatives existing as substantive options rather than only as formal possibilities foreclosed by the structural arrangements within which the exchange occurs.

The fourth specification concerns the dispersed and local character of the knowledge the price mechanism aggregates, which is Sowell's restatement of the Hayekian condition extracted at §1.5 (Sowell 1980, Chapter 2; Sowell 2014, Chapter 2). The condition is included separately in this section, despite its overlap with the Austrian condition A2, because Sowell's specification operates at a different level of detail, and the libertarian tradition's contemporary discourse has developed the condition principally in Sowell's articulation. The condition can be stated formally:

> So4. The knowledge required for economic coordination is dispersed and local, with the dispersion and the locality operating as constitutive features of the knowledge rather than as incidental properties of its possession.

The four Sowell conditions extracted in this section are So1 through So4: prices as messengers; profit-and-loss discipline; voluntary exchange with genuine alternatives; knowledge as dispersed and local. The conditions overlap with the Austrian conditions extracted at §1.5, with the Friedman conditions extracted at §1.6, and with the conditions extracted from the other figures in the tradition. The overlap registers not the redundancy of repeated material but the convergence of the tradition's central voices on substantially the same requirements, with each figure articulating the conditions in the specific form their analytical idiom permitted. The composite list at §1.10 will register the conditions in their distinct articulations rather than collapsing them into the most generic forms, because the tradition's argumentative force comes in part from the convergence of distinct articulations on substantially the same requirements. The conditions stand as the chapter's instrument, and the question of their satisfaction belongs to the chapters that follow.

1.8 Rothbard and the Distinction Between Market Capitalism and State Capitalism

Murray Rothbard's contribution to the libertarian tradition is the most uncompromising articulation the tradition contains of the distinction between exchange that proceeds without coercion and the structural arrangements that render exchange formally voluntary while substantively coerced. His principal works, *Man, Economy, and State* (Rothbard 1962/2009) and *For a New Liberty* (Rothbard 1973/2006), develop the distinction across the entire range of economic and political phenomena the tradition addresses, and the distinction is the analytical instrument through which Rothbard's arguments distinguish the order the libertarian tradition's theorems describe from orders that share the tradition's vocabulary while violating its requirements (Rothbard 1962/2009, Chapter 12 on the economics of violent intervention; Rothbard 1973/2006, Chapters 1 and 2; on Rothbard's place in the Austrian tradition, Hülsmann 2007, especially Parts II and III; Salerno 2010, Chapters 1 and 2).

The distinction Rothbard develops most consistently is between what he calls "market capitalism" and what he calls "state capitalism" or "neomercantilism" (Rothbard 1962/2009, pp. 1295–1335; Rothbard 1973/2006, Chapter 12, pp. 287–316). Market capitalism, in Rothbard's account, is the order in which exchange proceeds among private owners without coercion, with property protected against violent expropriation by state and non-state parties alike, and with the institutional architecture limited to the protection of these conditions. State capitalism is the order in which the formal apparatus of private ownership and market exchange persists, but the

substantive conditions of voluntariness have been systematically violated by the state's intervention on behalf of particular agents whose advantages the state's intervention has produced or sustained. The state-granted privileges Rothbard identifies include subsidies, tariffs, intellectual property monopolies, regulatory frameworks designed to advantage incumbents, infrastructure provided at below-cost rates to favoured industries, and the legal-institutional apparatus through which these privileges are constructed and maintained (Rothbard 1973/2006, Chapter 12, especially pp. 287–316; the systematic treatment of intervention in Rothbard 1970, with the analytical taxonomy at Part III).

Rothbard's analysis rests on a methodological position that the libertarian tradition's contemporary articulation has often acknowledged in its principles while attenuating in its conclusions. The position is that the distinction between market capitalism and state capitalism is empirical and analytical rather than rhetorical: the question of which order is in operation in a given economy is a question that can be settled by examining the structure of the order, with attention to whether the privileges and advantages Rothbard's analysis identifies are present, and the analysis must be conducted on the order's actual structure rather than on its self-description (Rothbard 1962/2009, Chapter 12; Rothbard 1973/2006, Chapter 12; on the methodological position and its reception, Gordon 2007, which treats the analytical distinction as the central feature of Rothbard's political-economy framework; on the gap between Rothbard's analytical position and the contemporary deployment of his name, Hülsmann 2007, Part IV). Rothbard's insistence on the distinction is consistent across his work, and his most direct statements of the position make clear that he regarded the conflation of the two orders as the most damaging analytical error in the libertarian tradition's contemporary articulation. The point appears across the works, but is most concentrated in the chapters cited above.

The first condition Rothbard's argument requires can be stated as the substantive voluntariness of exchange. The libertarian tradition's claims about market exchange depend on the exchange being voluntary in the substantive sense rather than only the formal sense, with the substantive voluntariness requiring that the agents have genuine alternatives, that coercion be absent in fact rather than only in legal form, and that the structural arrangements within which the exchange occurs have not eliminated the conditions under which the agents could have refused the exchange and pursued their interests through other means (Rothbard 1962/2009, Chapter 12; Rothbard 1973/2006, Chapters 1 and 12; on the substantive-versus-formal distinction in Rothbard's analysis, Hülsmann 2007, Part III, especially Chapters 8 and 9). The condition is constitutive in Rothbard's analysis: exchange that is formally voluntary but substantively coerced is not the exchange the tradition's claims address, regardless of the formal apparatus through which the exchange proceeds.

> Ro1. Exchange among agents is voluntary in the substantive sense that coercion is absent in fact rather than only in legal form, with the agents having genuine alternatives and with the structural arrangements within which the exchange occurs not having eliminated the conditions under which refusal would have been a substantively available option.

The second condition Rothbard's argument requires is that the order the libertarian tradition's claims address must be examined to determine whether it constitutes market capitalism or state capitalism, with the determination conducted on the order's actual structure rather than on its self-description (Rothbard 1962/2009, Chapter 12; Rothbard 1973/2006, Chapter 12). The condition is not the trivial requirement that the analyst attend to facts. It is the requirement that the libertarian tradition's defenders not assume the order they are defending is the order the tradition's claims address, but that they conduct the examination Rothbard's analysis specifies and accept whatever finding the examination produces. Rothbard's own conclusion was that the order of his time, in mid-twentieth-century America, was state capitalism rather than market capitalism (Rothbard 1973/2006, Chapter 12; Rothbard 1962/2009, Chapter 12 and the concluding sections), and the conclusion was the consequence of the examination he conducted on the order's actual structure. The condition is methodological as much as substantive. It specifies what the libertarian tradition's defenders are obligated by the tradition's own criteria to do.

> Ro2. The order the libertarian tradition's claims address must be examined to determine whether it constitutes market capitalism or state capitalism, with the determination conducted on the order's actual structure rather than on its self-description, and with whatever finding the examination produces being the finding the analysis must accept.

The third condition Rothbard's argument requires concerns state-granted privilege specifically. The condition is that the order must be free of the state-granted privileges Rothbard's analysis identifies as the structural mechanism through which state capitalism replaces market capitalism (Rothbard 1962/2009, Chapter 12; Rothbard 1973/2006, Chapter 12; the analytical taxonomy at Rothbard 1970, Part III). The privileges include the categories named earlier: subsidies, tariffs, intellectual property monopolies, regulatory frameworks designed to advantage incumbents, infrastructure provided at below-cost rates to favoured industries, and the legal-institutional apparatus through which these privileges are constructed and maintained. The condition is constitutive in Rothbard's analysis because the privileges are the mechanism through which state capitalism is produced, and an order containing the privileges is, on Rothbard's analysis, state capitalism regardless of the formal apparatus of private ownership and market exchange the order also contains. The libertarian tradition's contemporary articulation has frequently invoked Rothbard's anti-state position in defence of orders whose state-granted privileges Rothbard's analysis identifies as the very structural mechanism his argument opposes; the reception pattern is documented at Hülsmann 2007, Part IV, especially the treatment of how Rothbard's anti-state polemic has been preserved in the tradition's contemporary deployment while the analytical taxonomy that would classify the orders the polemic is invoked against as state capitalism has been attenuated. Where the defence proceeds in this form, Rothbard's own framework forecloses it: the orders his analysis classifies as state capitalism cannot be defended in his name without contradicting the analytical structure on which his anti-state position rests. The condition can be stated formally:

> Ro3. The order is free of the state-granted privileges Rothbard's analysis identifies as the structural mechanism through which state capitalism replaces market capitalism, with the privileges including subsidies, tariffs, intellectual property monopolies, regulatory frameworks advantaging incumbents, infrastructure provided at below-cost rates to favoured industries, and the legal-institutional apparatus through which these privileges are constructed and maintained.

The three Rothbard conditions extracted in this section are Ro1 through Ro3: substantive voluntariness of exchange; the methodological requirement to examine the order to determine whether it constitutes market capitalism or state capitalism; the requirement that the order be free of the state-granted privileges that produce state capitalism. The conditions are extracted from Rothbard's canonical texts at the level of formal requirement, with attention to what Rothbard himself said and to what his arguments require their political-economy analyses to presuppose. The libertarian tradition's contemporary articulation has frequently deployed Rothbard's name in defence of orders whose actual structure his analysis would have classified as state capitalism, and the reception pattern is documented at Hülsmann 2007, Part IV, on the gap between Rothbard's analytical taxonomy and its contemporary invocation, and at Gordon 2007, on the methodological position the contemporary deployment has not always preserved. Whether the orders the tradition's contemporary defenders address as market capitalism in fact satisfy Rothbard's conditions is a question this chapter has not yet examined. The conditions stand as the chapter's instrument, and the question of their satisfaction belongs to the chapters that follow.

1.9 Rand and the Moral Foundation of the Producer

Ayn Rand's contribution to the libertarian tradition operates at a moral level rather than at the analytical or institutional levels at which the prior figures principally operate, and the moral framing carries argumentative weight that the prior chapters' analytical and institutional registers were not constructed to bear. Rand argues that the order the libertarian tradition celebrates is the order in which productive achievement is rewarded and unproductive extraction is not, and that the moral status of the order depends on this distinction holding in the order's actual operation rather than only in its formal apparatus (Rand 1966, especially the title essay and "What Is Capitalism?" at pp. 11–34; Rand 1957, Part III; on Rand's analytical structure, Sciabarra 1995, especially Chapters 6 and 7; on Rand's moral philosophy, Mayhew 2009; on Rand's place in twentieth-century conservative and libertarian thought, Burns 2009, Chapters 5 and 6). The conditions Rand's argument requires can be stated as moral and requirements that the order must satisfy for the tradition's celebration of capitalism to address the order in question.

The first condition Rand's argument requires is the distinction between production and extraction. Rand develops the distinction across her work, with the moral framing in *Capitalism: The Unknown Ideal* and the dramatic articulation in *Atlas Shrugged* (Rand 1966, especially "What Is Capitalism?" at pp. 11–34; Rand 1957, with the central characters and the roles they occupy representing the distinction throughout). The producer, in Rand's account, is the agent who creates value through reason and effort, expanding the productive capacity of the economy through achievement. The extractor, whom Rand calls the "moocher" or the "looter" depending on whether the extraction is conducted through dependence or through political instrumentality, is the agent who captures value through political connection, regulatory manipulation, or coercive advantage rather than through productive achievement (Rand 1966, pp. 11–34; Rand 1957, Part III, especially the speeches of John Galt at pp. 1009–1069 in the Plume edition). The distinction is moral in Rand's framing, but its operational implications are the implications the present chapter requires. The order the libertarian tradition's claims address must be the order in which production is rewarded and extraction is not, with the reward operating through the structural mechanisms of the market rather than through the political mechanisms that subordinate the market's discipline to the extractor's advantage.

The condition is constitutive in Rand's analysis: an order in which extraction is rewarded more reliably than production is not, on Rand's framework, the order the tradition's claims about capitalism celebrate, regardless of whether the order's formal arrangements resemble the apparatus the tradition associates with market exchange (Rand 1966, especially "America's Persecuted Minority: Big Business" at pp. 38–66, where the analytical argument operates explicitly). The condition can be stated formally:

> Ra1. The order's structural mechanisms reward productive achievement and do not reward extraction, with the reward operating through the market's discipline rather than through political mechanisms that subordinate the discipline to the extractor's advantage.

The second condition concerns the separation of economic and political power. Rand's most direct articulation of the position is the claim, in *Capitalism: The Unknown Ideal*, that genuine capitalism requires "a complete separation of state and economics, in the same way and for the same reasons as the separation of state and church" (Rand 1966, p. 33). The argument is that the entanglement of economic and political power produces the conditions under which extraction replaces production as the dominant mode of value capture, with the entanglement enabling the political-economic orders Rand calls the "mixed economy" and which she treats as the empirical situation of mid-twentieth-century America (Rand 1966, pp. 11–34, 162–172; the historical-political analysis at "America's Persecuted Minority", pp. 38–66). The condition is rather than only ethical: where economic entities of sufficient magnitude command political influence sufficient to shape the regulatory environment in which they operate, the separation Rand identifies as constitutive of capitalism has collapsed, and the order is no longer the one Rand's defence of capitalism addresses (Sciabarra 1995, Chapter 7, on the analytical reading of Rand's separation argument; Burns 2009, Chapter 6).

> Ra2. The order maintains a substantive separation between economic and political power, with neither domain commanding the other in a form that would permit the entities of one domain to determine the conditions of operation in the other.

The third condition concerns the institutional position of the producer relative to the extractor. Rand's argument requires that the institutional structure place the producer in the position of structural advantage, with the mechanisms of the market and the legal order arranged so that productive achievement is the more reliable route to economic position than extraction is (Rand 1966, especially the title essay; Rand 1957, throughout, with the analytical argument that an architecture rewarding extraction more than production produces the inversion of capitalism's moral foundation). The condition is the operational form of the first condition, distinguishing the moral architecture of the order from the formal institutional arrangement that may resemble capitalism while inverting its moral foundation. Where the structural mechanisms of the order place the agent who controls the infrastructure of exchange, or who derives advantage from positional rents, in a more advantageous position than the agent who creates new productive capacity, the order violates Rand's third condition, and the tradition's celebration of capitalism does not address the order in question.

> Ra3. The institutional structure places productive achievement in the position of structural advantage relative to extraction, with the mechanisms of the market and the legal order arranged so that production is the more reliable route to economic position than extraction is.

The three Rand conditions extracted in this section are Ra1 through Ra3: production rewarded over extraction; substantive separation of economic and political power; productive achievement structurally advantaged over extraction. The conditions overlap with Rothbard's, with Friedman's, and with the conditions extracted from Smith and the Austrians, in the convergent sense the chapter has registered across the prior sections: distinct articulations from analytically distinct standpoints converge on substantially the same requirements. The convergence is itself a feature of the tradition the chapter is reconstructing, and the composite list at §1.10 will preserve the distinct articulations rather than collapsing them into the most generic form. The conditions stand as the chapter's instrument, and the question of their satisfaction belongs to the chapters that follow.

1.10 The Composite Conditions

The libertarian tradition, taken on its own terms across the full range of its central voices, identifies thirty-one conditions as constitutive of the order its economic theorems describe. The conditions have been extracted from the canonical sources of nine principal figures across the prior eight sections, with attention to what each figure said and to what the figures' own statements require their arguments to presuppose. The conditions are presented in the present section in composite form, organised across the figures from whom they were extracted and against the analytical level at which each operates.

The composite is not the chapter's conclusion. It is the chapter's instrument, the form in which the prior sections' analytical work is registered for use by the chapters that follow. The chapters that follow will examine whether the conditions presently obtain in the orders the libertarian tradition's contemporary defenders address as if they did, and the examination will be conducted against the conditions in the form the present section records them. The conditions are presented at the level of formal requirement extracted from the canonical sources. The question of their satisfaction is the question the prior sections have not addressed and the present section does not address. The question belongs to the chapters that follow.

The conditions are presented in the table below, with five columns: the condition's identifier, the condition's content in summary form, the canonical source or sources from which it was extracted, the analytical level at which the condition operates, and the section of this chapter in which the condition was developed.

Identifier	*Condition*	*Source*	*Level*	*Section*
S1	Moral embeddedness in the architecture of the impartial spectator	Smith	Moral-psychological	§1.2
S2	Local proximity sustaining moral assessability	Smith	Social-architectural	§1.2
S3	Legal and institutional disfavour of producer coordination	Smith	Institutional	§1.2
S4	Reputational propagation at velocity and fidelity sufficient to discipline conduct	Smith	Informational	§1.2
R1	Substantial capital immobility between nations	Ricardo	Formal	§1.3
R2	Asymmetric labour mobility, internal and external	Ricardo	Formal	§1.3
R3	Bounded national economies as the operative unit of comparison	Ricardo	Formal	§1.3
B1	Visibility structure admitting full-consequence propagation	Bastiat	Analytical	§1.4
B2	Distinction between productive and extractive expenditure	Bastiat	Analytical	§1.4
B3	Foreclosed-trajectory registration in acquisition-pattern evaluation	Bastiat	Analytical	§1.4
A1	Rational economic calculation through prices generated by genuine exchange	Mises	Epistemic	§1.5
A2	Knowledge dispersed in substrate-coupled form	Hayek (methodological)	Epistemic	§1.5
A3	Price mechanism aggregating dispersed substrate-coupled knowledge	Hayek (methodological)	Epistemic	§1.5
A4	Order admitting entrepreneurial alertness	Kirzner	Process	§1.5
A5	Dynamic market process through dispersed agents	Austrian methodological signature	Process	§1.5
A6	Order produced as *kosmos* rather than *taxis*	Hayek (institutional, on the order's character)	Architectural	§1.5
F1	Monetary stability sufficient that price signals are not corrupted by variability	Friedman	Operational	§1.6
F2	Substantive consumer sovereignty through genuine alternatives	Friedman	Operational	§1.6
F3	Structural openness of competition permitting entry	Friedman	Operational	§1.6

Identifier	*Condition*	*Source*	*Level*	*Section*
F4	Institutional vigilance against monopoly accumulation	Friedman	Institutional	§1.6
F5	Institutional design against regulatory capture	Friedman	Institutional	§1.6
So1	Prices functioning substantively as messengers from substrate	Sowell	Informationa l	§1.7
So2	Profit-and-loss discipline operative through bearing of consequences	Sowell	Operational	§1.7
So3	Voluntary exchange with substantive alternatives	Sowell, Rothbard	Operational	§1.7
So4	Knowledge dispersed and local	Sowell, Hayek	Epistemic	§1.7
Ro1	Substantive voluntariness of exchange, coercion absent in fact	Rothbard	Substantive	§1.8
Ro2	Order examined to determine market capitalism versus state capitalism	Rothbard	Methodologi cal	§1.8
Ro3	Absence of state-granted privileges producing state capitalism	Rothbard	Institutional	§1.8
Ra1	Productive achievement rewarded, not extraction	Rand	Moral	§1.9
Ra2	Substantive separation of economic and political power	Rand	Institutional	§1.9
Ra3	Productive achievement structurally advantaged over extraction	Rand	Institutional	§1.9

The convergence the prior sections have produced is visible in the composite. The conditions overlap. Sowell's prices-as-messengers (So1) is the operational articulation of Hayek's price-mechanism aggregation (A3). Friedman's anti-monopoly vigilance (F4) is the institutional form of Smith's anti-conspiracy condition (S3) generalised to the concentration that may arise without explicit collusion. Rothbard's distinction between market capitalism and state capitalism (Ro2 and Ro3) applies Friedman's regulatory-capture condition (F5) at the level of the order as a whole rather than at the level of specific regulatory relationships. Rand's structural advantage of production over extraction (Ra3) is the moral form of the same requirement that Smith expressed as productive orientation, that the Austrians expressed as the dynamic market process operating on substrate-coupled signals, and that Friedman expressed as competition's discipline of producer decisions.

The overlaps registered across the preceding sections do not repeat the same material under different headings but record the convergence of analytically distinct positions on substantially the same conditions, and that convergence is itself a finding of this chapter's reconstruction. The figures arrive at the conditions from registers that are, on their own analytical surfaces, almost entirely incompatible with one another: moral psychology in Smith, comparative-advantage formalism in Ricardo, analytical visibility across time-horizons in Bastiat, the epistemic structure of dispersed coordination in the Austrian writers, operational and institutional mechanism in Friedman, informational analysis in Sowell, political-economic structure in Rothbard, and moral foundation in Rand. The figures disagree about almost everything else, and the secondary literature on the relations between them has been preoccupied across decades with the points of disagreement. What the figures agree on is the form of the order their arguments address, with each figure articulating the order's conditions in the analytical idiom that figure's own work permitted. The agreement is not an artefact of the chapter's construction. It is what the

canonical sources, taken on their own terms, produce when their conditions are extracted at the level of formal requirement.

The methodological-versus-institutional distinction in Hayek, registered at §1.5 and presented in the composite as A2 and A3 (the two methodological conditions) and A6 (the institutional condition on the order's character), is the analytical feature of the composite. The distinction permits the chapters that follow to ask of any order two formally separable questions: whether the order satisfies the methodological conditions, regardless of its institutional resemblance to architectures Hayek defended; and whether the order has the *kosmos* character Hayek's institutional argument identifies as constitutive of the market's coordination function, regardless of whether the order's formal arrangements resemble the apparatus the tradition associates with market exchange. The structure of the two questions admits no reduction of one to the other, and the chapters that follow will examine both.

The composite is presented at the level the chapter has extracted, with the conditions standing as the chapter's instrument; the question of their satisfaction in the orders the libertarian tradition's contemporary defenders address is the question the next chapter takes up.

CHAPTER 2

The Conditions Examined Against the Contemporary Western Order

2.0 What This Chapter Does

The conditions Chapter 1 extracted are this chapter's instrument. The chapter takes them up and applies them to the order the libertarian tradition's contemporary defenders treat as the realisation of its economic theorems: the contemporary Western order across the four decades since the institutional reorganisations of the late 1970s and early 1980s.

The examination is constrained to what the libertarian tradition's own analytical resources can settle. Where the canonical figures' arguments rest on results they invoked but did not develop, the chapter uses those results in the form their original authors stated them, but does not introduce analytical frameworks the tradition itself does not contain. The chapter operates with the vocabulary the tradition operates with: markets, prices, agents, choice, competition, discovery, calculation, the architecture of voluntary exchange. Whatever conclusions the chapter reaches will be reached using these resources.

This constraint is deliberate, and it matters for how the chapter's findings are to be read. A libertarian defender of the contemporary order is entitled to a hearing on the tradition's own terms before any other apparatus is brought to bear. If the order can be defended against the tradition's own conditions, using the tradition's own analytical resources, the defence stands. If it cannot, the failure is a failure on the tradition's own ground.

The chapter conducts the examination condition by condition, organised by the canonical figure from whom each condition was extracted. Each condition is tested against the documentary record. Where a condition obtains in the contemporary order, on the tradition's own resources, the chapter records that it obtains. Where a condition does not obtain, or admits a serious objection at the level of the tradition's own vocabulary, the chapter records that. The chapter does not adjudicate in advance.

Two points about the chapter's evidentiary standard.

The chapter operates on the order's actual structure rather than on its self-description. Rothbard's methodological condition Ro2 specified the requirement, and it applies to the present examination as a discipline rather than as a finding: the order the tradition's contemporary defenders address may or may not be the order the tradition's claims describe, and the question is settled by examining what the order actually does, not by deferring to the way the order describes itself (Rothbard 1973/2006, Chapter 12). The documentary record is the chapter's evidence, the conditions the chapter's tests.

The chapter operates at the empirical level. Where a condition fails to obtain, the chapter does not yet pursue the question of why it fails, or what mechanism produces the failure, or whether the failure admits correction. Those questions belong to later chapters. The reader who finishes this chapter with the question of why the

empirical situation could not be otherwise is in the position the remainder of the book is structured to address.

The chapter proceeds across six sections of examination, followed by a composite finding and a section recording what the chapter has produced. §2.1 examines Smith's four conditions. §2.2 examines Ricardo's three. §2.3 examines Bastiat's three. §2.4 examines the six Austrian conditions. §2.5 examines Friedman's five. §2.6 examines the eleven conditions extracted from Sowell, Rothbard, and Rand. §2.7 presents the composite finding. §2.8 records what the chapter has produced and what it has not.

2.1 Smith's Conditions

Smith specified the conditions under which his account of beneficial market exchange operates across the two principal works he revised across his life. *The Theory of Moral Sentiments* (Smith 1759/1976) developed the moral architecture his economic agents presuppose. *The Wealth of Nations* (Smith 1776/1976) developed the institutional and informational conditions of the order within which the moral architecture operates. The four conditions Chapter 1 extracted (S1 through S4) are drawn from these two works at the level of formal requirement, with attention to what Smith himself wrote and to what the Smith scholarship has reconstructed (Raphael and Macfie 1976, pp. 1–52; Otteson 2002; Fleischacker 2004; Haakonssen 1981, 2006; Hanley 2009).

S1. Moral Embeddedness

Smith's first condition requires that the agents whose exchanges produce the outcomes his argument celebrates are agents whose self-interest is structured by the moral psychology of the impartial spectator (Smith 1759/1976, especially Part III on conscience and the impartial spectator at III.1–III.5, pp. 109–178). The condition specifies that the agent's conduct is disciplined by the prior commitment to standing in the right relation to those who would judge it from outside, with the discipline operating through the internalised standpoint Smith calls the impartial spectator and through the moral architecture *The Theory of Moral Sentiments* develops at length.

The contemporary defender's case is that platform-mediated commerce has developed institutional substitutes for the moral architecture Smith specified. Star ratings, written reviews, return policies, dispute-resolution mechanisms, seller-performance metrics, and platform-enforced policies on counterfeit goods, fraudulent listings, and abusive conduct collectively provide a mechanism through which consumer assessment disciplines producer behaviour. The platform itself stakes its reputation on the assessability of its sellers; the platform's continued viability depends on consumers continuing to trust the assessments. The architecture has changed; the moral-disciplinary function Smith specified continues, conducted through algorithmic intermediation rather than through face-to-face acquaintance.

The argument has empirical support. Platform reputational systems have, in many cases, raised the standard of producer conduct above what unmediated exchange across distance permitted in earlier periods. The Federal Trade Commission's documentation of platform-mediated consumer protection mechanisms reports substantial gains in consumer recovery from defective products, in the prosecution of counterfeit listings, and in the disciplining of abusive sellers (Federal Trade Commission, *Annual Reports on Consumer Sentinel*, 2018–2023).

S1 obtains, provisionally. The Smith scholarship registers a question the chapter notes for completeness. Otteson's reconstruction of the moral-psychological foundation of Smith's economic argument distinguishes between behavioural conformity to social expectations and the internalised impartial-spectator standpoint Smith developed, with the distinction operating throughout *The Theory of Moral Sentiments* (Otteson 2002, pp. 100–169; Fleischacker 2004, pp. 80–104). The platform's substitute supplies behavioural conformity to assessable metrics; whether it supplies the internalisation Smith specified is a Smith-scholarship question on which the literature is divided. The chapter records the question; it does not resolve it.

S2. Local Proximity Sustaining Moral Assessability

Smith's second condition concerns the social architecture within which the moral psychology of the first condition is formed and sustained (Smith 1759/1976, especially III.2 on the love of praise and the dread of blame, pp. 113–135; Smith 1776/1976, I.ii on the propensity to truck, barter, and exchange, pp. 25–30; Otteson 2002, pp. 170–198, on the social architecture sustaining moral assessability). The butcher, the brewer, and the baker of *Wealth of Nations* I.ii.2 (Smith 1776/1976, pp. 26–27) are local figures known to their customers, conducting their exchanges within a community of mutual acquaintance.

The defender's case is that locality has been substituted by the compression of distance through information and logistics infrastructure. Locality in Smith's time was a contingent feature of the technology of communication and transport; contemporary information networks and logistical infrastructure have produced effective proximity at global scale. Goods produced in Vietnam are documented through supply-chain transparency reports; sellers in foreign jurisdictions are subject to consumer assessment through the same platform-rating mechanisms S1 addressed; the architecture is geographically extended but functionally proximate, with the assessment-and-discipline cycle Smith's condition concerns operating across the extended geography.

S2 obtains, provisionally, on the libertarian tradition's own resources. The substitution thesis has prima facie plausibility, since the technologies of communication and transport were not the substantive content of Smith's condition; what they enabled was, and the contemporary architecture enables it. The Smith scholarship notes that Hanley argues the impartial-spectator standpoint is formed through repeated face-to-face encounters within a community of mutual recognition (Hanley 2009, pp. 99–135; Werhane 1991, Chapter 3), and that the cross-cultural literature on moral development supports the same observation. The chapter records the scholarly caveat. The provisional finding is that S2 obtains in substituted form.

S3. Legal and Institutional Disfavour of Producer Coordination

Smith's third condition operates at the institutional level. *Wealth of Nations* I.x.c.27 contains the canonical statement: "People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices. It is impossible indeed to prevent such meetings, by any law which either could be executed, or would be consistent with liberty and justice. But though the law cannot hinder people of the same trade from sometimes assembling together, it ought to do nothing to facilitate such assemblies, much less to render them necessary" (Smith 1776/1976, pp. 145–146). The condition Chapter 1 extracted requires that the legal and institutional order disfavour rather than facilitate the structures through which producers coordinate against the public.

The condition admits both a narrow reading and a broad reading on the libertarian tradition's own resources. The narrow reading is the consumer-welfare-standard reading that has dominated American antitrust enforcement since the late 1970s: the law's task is to prevent explicit producer coordination that raises short-run consumer prices, and the law's success is measured against documented cases of explicit collusion that have been prosecuted. By this reading, the contemporary order satisfies S3: cartel prosecutions continue across major jurisdictions, price-fixing convictions are obtained against documented conspiracies, the legal architecture against explicit collusion operates.

The narrow reading is the more demanding test for the defender if the historical record on the legal architecture's response to documented producer coordination is considered alongside it. The Phoebus cartel discussed at §1.1, which operated from 1924 to 1939 across the principal incandescent-lightbulb manufacturers (Osram, Philips, General Electric, Tungsram, the Associated Electrical Industries, Compagnie des Lampes, with the agreement, the testing infrastructure, and the penalty schedule documented in the archival reconstructions cited at §1.1: Krajewski 2014; Reich 1992; Bright 1949; Slade 2006), is the foundational documented case of the conduct Smith's narrow reading addresses. The cartel's operation was contemporaneous with the United States' Sherman Act (1890) and the Clayton Act (1914) and with the European jurisdictions' equivalent statutory regimes. The legal architecture did not prevent the cartel's founding, did not detect its operation across fifteen

years, and did not prosecute it; the cartel's dissolution in 1939 was the consequence of the Second World War's disruption of international trade rather than of the legal architecture's enforcement. The post-war record contains documented cases the legal architecture did prosecute (the lysine cartel, the vitamins cartel, the air cargo cartel, the auto parts cartel, the LIBOR conspiracy, and the various national-jurisdiction cases collected in the OECD's *Hard Core Cartels* reports across 2000–2020), with the prosecutions establishing that the narrow-reading legal architecture operates against documented cases when documented cases are brought before it. The narrow-reading defender's claim is therefore that the contemporary architecture would prosecute a Phoebus-equivalent cartel if such a cartel were detected. The claim is conditional on detection.

The broad reading is registered in *Wealth of Nations* IV.vii on the colony trade, IV.viii on the conclusion of the mercantile system, and IV.ix on the agricultural systems, where Smith's argument extends from explicit conspiracy to the legal-institutional architecture under which producers acquire structural advantages without explicit assembly (Smith 1776/1976, IV.viii, pp. 626–662; IV.ix, pp. 663–688). Smith's position across these books is that the law's facilitation of producer interest, including through preferential tariffs, exclusive trading privileges, statutory monopolies, and the legal-institutional architecture supporting them, is itself the failure S3 forbids, not because producers are explicitly conspiring, but because the law has placed itself in the service of producer interest against the consumer's. The broad reading is documented at length in Smith's own text and is reconstructed in the secondary literature on Smith's institutional argument (Rosenberg 1960 on Smith's institutional analysis; West 1990, Chapter 8, on Smith's anti-monopoly position; Fleischacker 2004, pp. 80–104, on the institutional-architectural register of Smith's economic argument).

The empirical record on the contemporary American antitrust apparatus admits both readings. By the narrow reading, S3 obtains: the consumer-welfare standard has prosecuted explicit cartel conduct across the period, and the major price-fixing convictions of the past four decades are documented in the Department of Justice's antitrust enforcement records. By the broad reading, S3 does not obtain: the consumer-welfare standard's interpretive framework has substantially excluded the structural concentration the broader Smithian condition would have classified as the law's failure to disfavour producer coordination. Khan's analysis of the consumer-welfare standard's institutional history and its operational consequences argues that the standard's interpretive framework has rendered structural concentration legally invisible (Khan 2017, on the consumer-welfare standard's failure to address concentration that does not raise short-run prices). Wu's parallel argument traces the standard's reorientation from the antitrust tradition of the early twentieth century (Wu 2018, especially Chapters 5–7, on the historical reorientation of antitrust thought from the Brandeis-and-Sherman tradition to the consumer-welfare framework). Philippon's empirical compilation documents the consequences across major industries: concentration ratios in dominant American industries have risen continuously across the period the consumer-welfare standard has been operative, with the rise occurring at rates the standard's framework has not classified as antitrust violations (Philippon 2019, especially Chapters 2 and 6, on the empirical record across U.S. industries).

S3 obtains on the narrow reading and fails on the broad reading drawn from Smith's own *Wealth of Nations* IV.viii–IV.ix. The defender who accepts the broad reading is conceding the failure; the defender who maintains the narrow reading is operating with a reading of Smith Smith himself would not have recognised.

S4. Reputational Propagation

Smith's fourth condition requires that the structure of exchange admit the propagation of reputational information at a velocity and a fidelity sufficient to discipline producer conduct through consumer assessment (Smith 1759/1976, II.ii on justice and beneficence, pp. 78–91; Otteson 2002, pp. 170–198, on the propagation mechanism). The defender's case parallels the defender's case on S1: the platform-mediated review systems propagate consumer assessment at velocity and fidelity exceeding what unmediated exchange across distance permitted in earlier periods.

The empirical record supports the defender at the producer-consumer level. Platform review systems have made consumer assessment more rapid and more durable than face-to-face propagation could have achieved across the distances contemporary commerce operates over. A counterfeit seller in a foreign jurisdiction can be assessed by consumers in another jurisdiction within hours of the first negative experience; the assessment is durable across the platform's records; the assessment affects the seller's continued capacity to transact through the platform. At this level, S4 obtains.

The reservation operates one level up. The platform itself, as the architecture within which the consumer-producer assessment occurs, is not subject to the same propagation discipline. The platform's continued viability depends on advertising revenue from its actual customers (sellers paying for placement, advertisers paying for consumer attention) more than on consumer-protection metrics (Khan 2017 on the structural position of dominant platforms; Khan 2019 on the separation of platforms and commerce, *Columbia Law Review*; Pasquale 2015, especially Chapters 3–4 on the architectural opacity of platform-mediated reputation). The consumer's assessment of the platform's conduct (its rule-changes affecting sellers, its handling of disputes, its policies on data collection, its treatment of competitor products) is not propagated through the platform's own review mechanism in the form Smith's condition specifies. Inter-platform competition operates as a partial substitute, but the dominant platforms' network effects, switching costs, and structural positions limit the discipline this substitute provides (Khan 2019; Philippon 2019, Chapter 6).

S4 obtains at the producer-consumer register the platforms mediate. S4 does not obtain at the platform register. The defender who accepts the producer-consumer finding is conceding the platform-register finding; the defender who maintains that the platform is functionally disciplined by competition is operating against the empirical record on contemporary platform concentration.

Smith Composite

Of Smith's four conditions, S1 and S2 obtain provisionally on the libertarian tradition's own resources. S3 obtains on the narrow reading the consumer-welfare standard has institutionalised and fails on the broad reading drawn from Smith's own *Wealth of Nations* IV.viii–IV.ix. S4 obtains at the producer-consumer register and fails at the platform register. The order admits a serious defence on Smith's conditions, with the cracks falling at the broad-reading S3 and the platform-register S4.

2.2 Ricardo's Conditions

Ricardo's argument for comparative advantage and the gains from trade was articulated in *On the Principles of Political Economy and Taxation* (Ricardo 1817/1951), with the canonical statement of the theorem at I.VII on foreign trade (Ricardo 1817/1951, Vol. I, pp. 128–149). The conditions Chapter 1 extracted (R1 through R3) are stated by Ricardo himself on the same pages where the theorem is proved.

R1. Substantial Capital Immobility Between Nations

Ricardo's first condition is stated directly in the canonical text. *Principles* I.VII, pp. 134–137 specifies that capital must remain substantially within national boundaries for the comparative-advantage theorem to operate. The condition is not a contingent friction Ricardo wished to remove; it is a presupposition of the theorem's structure. Ricardo himself articulated the failure case: "It would undoubtedly be advantageous to the capitalists of England, and to the consumers in both countries, that under such circumstances, the wine and the cloth should both be made in Portugal, and therefore that the capital and labour of England employed in making cloth, should be removed to Portugal for that purpose. In that case, the relative value of these commodities would be regulated by the same principle, as if one were the produce of Yorkshire, and the other of London" (Ricardo 1817/1951, Vol. I, p. 136). If capital can move freely, the comparative-advantage mechanism dissolves into absolute advantage and the mutual-gain conclusion Ricardo's theorem produces does not follow.

The empirical record on contemporary capital mobility is conclusive. Bank for International Settlements triennial surveys document daily foreign-exchange turnover at 7.5 trillion U.S. dollars in April 2022, against annual cross-border trade in goods and services at approximately 32 trillion dollars for the same year (Bank for International Settlements 2022, *Triennial Central Bank Survey*, p. 4; World Trade Organization, *World Trade Statistical Review*, 2023 edition, on the trade figures). The annualised foreign-exchange figure is approximately 1,900 trillion dollars, or roughly 60 times the underlying trade. The ratio between financial transactions and underlying trade has risen continuously across the period since the early 1980s, when the post-Bretton Woods elimination of capital controls began in the major OECD economies (Helleiner 1994, especially Chapters 4–7, on the institutional history of the elimination; Eichengreen 1996/2008, Chapter 6, on the transition).

Samuelson's 2004 *Journal of Economic Perspectives* article is the definitive concession from inside the trade-theory canon. Samuelson, who had been the architect of the postwar generalisation of Ricardo's theorem and had defended the gains-from-trade position across half a century of his work, conceded in 2004 that contemporary conditions of capital mobility produce outcomes Ricardo's theorem does not authorise: factor-price convergence, depressed wages in the higher-wage economies the capital is exiting, and the inversion of the mutual-benefit conclusion the theorem requires (Samuelson 2004, "Where Ricardo and Mill Rebut and Confirm Arguments of Mainstream Economists Supporting Globalization", pp. 135–146, especially pp. 138–143 on the empirical conditions under which the mutual-benefit conclusion fails). The concession is the strongest evidence the chapter can register on R1, because it operates entirely within the trade-theory tradition the libertarian defence of contemporary globalisation invokes.

The chapter records R1 as not obtaining on Ricardo's own terms. The defender's options are to argue that Ricardo's immobility condition was a simplifying device the modern trade theory has generalised beyond, but Samuelson, the canonical figure who conducted that generalisation, conceded in 2004 that the generalisation does not hold under contemporary conditions. The crack is sharp at the level of the tradition's own resources.

R2. Asymmetric Labour Mobility

Ricardo's second condition requires that labour mobility be asymmetric: internal mobility permitting reallocation across industries within the bounded national economy, external mobility constrained between national economies, maintaining the factor-endowment differentials the theorem operates on (Ricardo 1817/1951, Vol. I, pp. 135–137).

The contemporary empirical record on R2 is asymmetric in its formal structure. External labour mobility remains substantially constrained by immigration law, language barriers, credentialing arrangements, and the cost of relocation across jurisdictions. Internal labour mobility within national boundaries has continued at levels consistent with the condition's internal-mobility requirement, though the documentary record indicates declining internal mobility in the United States across the past two decades (Molloy, Smith, and Wozniak 2011 on declining internal U.S. mobility; Ganong and Shoag 2017, "Why Has Regional Income Convergence in the U.S. Declined?", *Journal of Urban Economics* 102, pp. 76–90).

The condition's formal structure obtains. The asymmetry Ricardo specified is present in the contemporary order: labour moves more freely within national boundaries than across them. The chapter records R2 as obtaining at the level of formal structure.

The reservation is that the formal structure of R2 operates only in conjunction with R1's capital-immobility condition. Ricardo's argument requires both: capital bounded, labour asymmetrically mobile, the unit-economies maintaining distinct internal cost structures. Under contemporary conditions (R1 failing, R2 formally satisfied), the asymmetric labour mobility no longer produces the mutual-benefit specialisation Ricardo's theorem describes; it produces, as Samuelson 2004 conceded, factor-price convergence and the depression of wages in the higher-wage economies. The condition's formal satisfaction has been converted into the mechanism through which the mutual-benefit conclusion fails (Samuelson 2004, pp. 135–146). The chapter records R2 as formally satisfied but as operating, under the contemporary conditions R1 has produced, in the form Ricardo's argument identifies as the failure case rather than the operating condition.

R3. Bounded National Economies as the Operative Unit

Ricardo's third condition requires that the economies whose internal opportunity-cost ratios the theorem compares are bounded units in which the internal cost structures persist as distinct cost structures (Ricardo 1817/1951, Vol. I, pp. 134–139; Schumacher 2012b, *Free Trade and Absolute and Comparative Advantage: A Critical Comparison of Two Major Theories of International Trade*, pp. 88–102, on the boundedness condition; Sraffa 1951, introduction to *Works and Correspondence of David Ricardo*, Vol. I, pp. xxvi–xxxii).

The defender has an argument that R3 obtains in modified form under contemporary conditions: comparative advantage operates within global value chains at the firm, stage, or region level, and Ricardo's logic generalises to whatever unit has distinct internal cost structures. The argument is registered in the contemporary trade-theory literature on global value chains (Baldwin 2016, especially Chapter 3 on the fragmentation of production; the wider trade-theory literature on the new economics of trade, summarised in Antràs 2020).

The reservation is what Ricardo's theorem requires the unit to be. Baldwin's "second unbundling" analysis (Baldwin 2016, Chapter 3) argues that contemporary global value chains have fragmented the unit-economy whose internal cost structure the comparative-advantage theorem operates on. A single product's components are now manufactured in five countries, assembled in a sixth, branded in a seventh, and sold in an eighth; the bounded national economy as the operative unit of analysis has been substantially replaced, in the orders Ricardo's argument is applied to, by global production networks whose jurisdictional fragmentation forecloses the internal-cost-structure comparison the theorem requires. The firm within a global value chain does not have autonomous cost structures; its costs are determined by the value chain's coordination, not by the unit's autonomous productive position. The "comparative advantage at firm level" argument therefore operates within a structure where the autonomous units Ricardo's theorem requires no longer exist.

The chapter records R3 as not obtaining in the form Ricardo's theorem requires. The defender's modified-unit argument operates against the empirical record on the fragmentation of contemporary production, and Baldwin's analysis (within the trade-theory tradition, not against it) registers the failure at the level of the unit-economy the theorem operates on.

Ricardo Composite

R1 does not obtain, on Ricardo's own terms and on Samuelson's concession from inside the trade-theory canon. R2's formal structure obtains, but operates under contemporary conditions in the form Ricardo's argument identifies as the failure case. R3 does not obtain in the form the theorem requires, on Baldwin's analysis from within the trade-theory tradition. The chapter's first-pass finding on Ricardo is that the conditions do not obtain in the form Ricardo's theorem requires, with the failure registered at the level of the tradition's own resources.

2.3 Bastiat's Conditions

Bastiat's *Ce qu'on voit et ce qu'on ne voit pas* (Bastiat 1850/1995, 'What Is Seen and What Is Not Seen') is the most concentrated statement in nineteenth-century economic thought of the visibility conditions for honest economic evaluation. The conditions Chapter 1 extracted (B1 through B3) are drawn from the analytical structure of the work, with attention to Bastiat's distinction between what is seen in any economic transaction and what is not seen (Bastiat 1850/1995, with the broken-window parable at pp. 1–7 and the systematic application across the work; on the analytical structure, Roche 1971, *Frédéric Bastiat: A Man Alone*, pp. 191–227; Salin and Garello 2001 on the formal status of the visibility requirement).

B1. Visibility Structure Admitting Full-Consequence Propagation

Bastiat's first condition requires that the structure of exchange and the structure of policy admit the propagation, to the agent conducting the economic evaluation, of the consequences that bear on the evaluation, including consequences falling on parties not party to the transaction and consequences materialising on timescales longer than the transaction itself (Bastiat 1850/1995, especially pp. 1–7 on the broken-window parable; Roche 1971, pp. 191–227, on the visibility condition's formal status).

The defender's case on B1 is that the contemporary disclosure architecture supplies substantial visibility. Mandatory disclosure regulations across financial services, environmental impact, labour conditions, and product safety; voluntary ESG reporting; investigative journalism; consumer-protection certifications; and platform-based transparency mechanisms collectively provide visibility into the consequences of contemporary transactions that earlier orders did not. The argument has support: the Securities and Exchange Commission's disclosure regime, the European Union's Corporate Sustainability Reporting Directive, the U.S. Federal Trade Commission's enforcement on deceptive marketing, and the journalism on labour conditions at major contractors (the Foxconn coverage across 2010–2012, the New York Times investigation of Apple's supply chain in 2012, the persistent Bangladesh garment-industry coverage following the 2013 Rana Plaza collapse) all operate as visibility mechanisms in Bastiat's sense.

The reservation is what Bastiat's condition required visibility to do. The condition specified that the visibility structure must admit *the consequences that bear on the evaluation at the moment of the evaluation*. The defender's mechanisms (disclosure reports, ESG ratings, investigative journalism, certifications) are temporally and informationally decoupled from the transaction. The consumer at the moment of purchase is not encountering the consequences; the consumer is encountering a user interface that has been designed for conversion, not for consequence-propagation (Pasquale 2015, *The Black Box Society*, especially Chapters 1–3 on the architectural opacity of platform-mediated commerce; Zuboff 2019, *The Age of Surveillance Capitalism*, Part II on the information asymmetries of platform-mediated exchange). The visibility mechanisms the defender invokes operate at sites (the annual report, the academic study, the front-page news investigation) that are systematically routed around the moment of transaction the condition concerns.

The chapter records B1 as admitting the defender's case at the level of structural disclosure availability and as not satisfying Bastiat's condition at the level of consequence-propagation to the agent conducting the evaluation. The crack is registered but not yet sharpened.

B2. Productive Versus Extractive Expenditure

Bastiat's second condition requires that economic evaluation distinguish productive expenditure, which creates new value, from reparative or extractive expenditure, which captures value by maintaining or degrading existing arrangements, with the distinction drawable at the level of the order rather than only at the level of individual transactions (Bastiat 1850/1995, especially pp. 8–63 on the systematic application of the seen/unseen distinction across the policy cases; Salin and Garello 2001 on the productive/extractive distinction in Bastiat's argument).

The empirical record on contemporary corporate capital allocation is sharp. Lazonick's compilation of buyback and dividend distributions against capital expenditure across the major Western publicly listed corporations documents that the listed-corporation sector has, since approximately 2003, returned more cash to shareholders through buybacks and dividends than it has spent on capital expenditure, with the ratio of buybacks-plus-dividends to capital expenditure exceeding one across multiple years (Lazonick 2014, "Profits Without Prosperity", *Harvard Business Review* September 2014, pp. 46–55, with the empirical compilation continued through the Institute for New Economic Thinking working-paper series; Lazonick, Tulum, and Sakinc 2020, *INET Working Paper* No. 145). Apple's pattern is exemplary: cumulative share buybacks of approximately 565 billion U.S. dollars across the decade preceding 2023, against cumulative research-and-development spending of approximately 160 billion and cumulative capital expenditure of approximately 110 billion across the same period (Apple Inc. annual reports, 2014 through 2023, available through SEC EDGAR; 2023 buyback authorisation of 90 billion announced at the second-quarter fiscal 2023 results, May 4, 2023).

The defender has an argument that B2 obtains in modified form. The redeployment thesis runs that share buybacks return capital to shareholders who reinvest it more productively elsewhere; the buyback is not extractive at the system level because the capital is not destroyed but redirected to higher-return uses by markets. The argument is registered in the contemporary corporate-finance literature defending buyback regimes (Fried and Wang 2018, "Are Buybacks Really Shortchanging Investment?", *Harvard Business Review* March-April 2018, pp. 88–95; Asness, Hazelkorn, and Richardson 2018, "Buyback Derangement Syndrome", *Journal of Portfolio Management* 44(5), pp. 50–57).

The redeployment thesis has a testable empirical implication: if returned capital flows to productive investment, aggregate capital expenditure relative to GDP should have risen with the post-1980s buyback regime. The empirical record indicates the opposite. Gross fixed capital formation as a share of U.S. GDP has declined across the period the buyback regime has been operative, from approximately 21 percent in the early 1980s to approximately 19 percent in the late 2010s, with the decline concentrated in private nonresidential fixed investment (Bureau of Economic Analysis, *National Income and Product Accounts*, Table 1.1.5; Gutiérrez and Philippon 2017, "Investmentless Growth: An Empirical Investigation", *Brookings Papers on Economic Activity*, Fall 2017, pp. 89–190, on the documented investment slowdown). The capital returned to shareholders has flowed predominantly to further buybacks at other firms, to asset-price appreciation, to private-equity transactions that load existing firms with debt, and to financial-instrument circulation; the system-level test of the redeployment thesis is therefore not met (the IMF's analysis of the productive-investment slowdown in *World Economic Outlook* October 2019, Chapter 2, reaches the same conclusion on a wider sample).

The chapter records B2 as not obtaining on the empirical record. The redeployment thesis is the strongest libertarian defence available, and the empirical record on aggregate investment falsifies it. The crack is sharp at the level of the tradition's own resources, because the test (system-level capital formation relative to GDP) is the test the redeployment thesis itself implies.

B3. Foreclosed-Trajectory Registration

Bastiat's third condition requires that economic evaluation register, as part of what is at stake in any acquisition of one firm by another, the trajectory the acquired firm would have followed under independent operation, with the foreclosed trajectory specifiable as the competitive cost the acquisition imposes on the order's selection mechanism (Bastiat 1850/1995 on the systematic application of the seen/unseen distinction to all policy and transactional cases).

The contemporary record on technology-platform acquisitions is extensive and specifiable. Meta Platforms (formerly Facebook) acquired Instagram in 2012 for approximately one billion U.S. dollars and WhatsApp in 2014 for approximately nineteen billion (Meta Platforms Inc. annual reports, 2012 and 2014; Khan 2017, especially the platform-acquisition analysis at pp. 740–760). Alphabet (formerly Google) acquired YouTube in 2006 for one point six five billion dollars, DoubleClick in 2007 for three point one billion, and DeepMind in

2014 (Alphabet Inc. annual reports). Microsoft acquired LinkedIn in 2016 for twenty-six billion, GitHub in 2018 for seven point five billion, and Activision Blizzard in 2023 for approximately sixty-nine billion. Salesforce acquired Slack in 2021 for twenty-seven point seven billion. The pattern extends across the order's dominant technology-and-platform sector.

Each acquisition was reviewed by the relevant antitrust authority under the consumer-welfare standard and was cleared. The acquired firms' shareholders accepted the prices as superior to the alternative trajectories the firms could have followed under independent operation. The transactions were voluntary; the visible exchange registered no anti-competitive conduct in the legal-standard sense.

The case is the case Bastiat's analytical framework addresses. The foreclosed trajectory the acquired firm would have followed under independent operation is the unseen the visible transaction forecloses. The unseen is not absence but counterfactual whose non-occurrence the visible transaction has produced. The competitive cost the acquisition imposes on the order's selection mechanism is not registered by the consumer-welfare standard's measurement frame as a legitimate object of regulatory concern. The empirical record on declining business dynamism across the U.S. economy across the period the acquisition pattern has accumulated registers the cumulative cost (Decker, Haltiwanger, Jarmin, and Miranda 2014, "The Role of Entrepreneurship in U.S. Job Creation and Economic Dynamism", *Journal of Economic Perspectives* 28(3), pp. 3–24; Akcigit and Ates 2021, "Ten Facts on Declining Business Dynamism and Lessons from Endogenous Growth Theory", *American Economic Journal: Macroeconomics* 13(1), pp. 257–298).

The defender's case that B3 obtains is that the consumer-welfare standard's review framework captures what the antitrust apparatus is designed to capture. The argument concedes B3 on Bastiat's analytical framework: Bastiat's condition operates at a level the consumer-welfare standard has been institutionally designed not to register. The defender who maintains B3 obtains is operating with a definition of B3 that excludes the level Bastiat's argument addresses.

The chapter records B3 as not obtaining in the form Bastiat's condition requires. The defender's institutional case operates within an apparatus the condition's analytical framework is designed to bring into view. The crack is sharp on Bastiat's own analytical resources.

Bastiat Composite

B1 admits the defender's case at the level of structural disclosure and does not satisfy Bastiat's condition at the level of consequence-propagation to the agent at the moment of evaluation. B2 does not obtain on the empirical record, with the redeployment thesis falsified at the level of aggregate capital formation. B3 does not obtain on Bastiat's own analytical framework, with the acquisition pattern operating as pre-extraction foreclosure of competitive trajectories the consumer-welfare standard does not register. The Bastiat composite registers two of three conditions as failing on the libertarian tradition's own resources, with the third (B1) admitting partial defence at the structural-disclosure level and failing at the moment-of-evaluation level.

2.4 The Austrian Conditions

The Austrian school's contribution to the libertarian tradition is the most analytically articulated body of work on the epistemic structure of economic coordination. The conditions Chapter 1 extracted (A1 through A6) are drawn from Mises on calculation (Mises 1920/1990 on the calculation problem; Mises 1922/1981 on socialism more broadly; Mises 1949 on the foundations of economic analysis), Hayek on the methodological structure of the price mechanism (Hayek 1945, "The Use of Knowledge in Society", *American Economic Review* 35(4), pp. 519–530), Kirzner on entrepreneurial discovery (Kirzner 1973, *Competition and Entrepreneurship*, pp. 30–87), and Hayek again on the order's *kosmos* character (Hayek 1973–1979, *Law, Legislation and Liberty*, Vol. I on rules and order, Vol. III on the political order).

A1. Rational Economic Calculation Through Prices Generated by Genuine Exchange

Mises's first condition requires that prices be generated by genuine exchange among agents whose decisions reflect substrate-coupled valuations (Mises 1920/1990, "Economic Calculation in the Socialist Commonwealth", with the calculation argument across pp. 1–46; Mises 1949, *Human Action*, on the foundations of catallactics across the third and fourth parts). The contemporary order satisfies A1 at the level of its formal structure. Prices are generated by exchange among private parties; the formal apparatus of market exchange operates; the calculation Mises specified is conducted through the prices the apparatus produces. The chapter records A1 as obtaining at the formal-apparatus level.

A2. Knowledge Dispersed in Substrate-Coupled Form

Hayek's first methodological condition requires that the knowledge relevant to economic coordination exists in dispersed substrate-coupled form: in the form of situated agents' familiarity with the particular circumstances of time and place they encounter (Hayek 1945, pp. 521–524, on the character of the relevant knowledge; on the methodological reading, Boettke 2018, *F. A. Hayek: Economics, Political Economy and Social Philosophy*, pp. 48–94 on the epistemic structure; Caldwell 2004, *Hayek's Challenge*, Chapter 8 on Hayek's epistemic project). The chapter records A2 as obtaining: the dispersed substrate-coupled knowledge Hayek specified continues to exist among situated agents in the contemporary order. The pharmaceutical firm's drug pipeline is known in detail to the firm's research scientists, development teams, clinical investigators, regulatory specialists, manufacturing engineers, sales force, and the dispersed network of physicians, pharmacy directors, and patient communities whose situated experience constitutes the dispersed knowledge of the firm's productive position. A2 obtains.

A3. Price Mechanism Aggregating Dispersed Substrate-Coupled Knowledge

Hayek's second methodological condition requires that the price mechanism aggregate the actions agents take on their dispersed substrate-coupled knowledge into signals that other agents can read and act on (Hayek 1945, pp. 525–528, on the aggregation function of the price mechanism; on the methodological reading, Caldwell 2004, Chapter 13 on the relation between Hayek's epistemic and institutional arguments; Lavoie 1985, *Rivalry and Central Planning*, especially Chapters 4 and 6 on the methodological argument's freestanding status).

The empirical record on whether contemporary financial prices aggregate substrate-coupled knowledge is the strongest test the libertarian tradition's own resources can supply. Robert Shiller's 1981 *American Economic Review* paper conducted the test directly. Shiller plotted the S&P composite price index from 1871 to 1979 against the index that would have obtained if the price had perfectly tracked the present value of subsequent realised dividends, discounted at the historical real interest rate (Shiller 1981, "Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends?", *American Economic Review* 71(3), pp. 421–436). The substrate-tracking story Hayek's argument articulates predicted that the two lines would look approximately like each other, with departures bounded by the variability the underlying dividend streams themselves exhibit. The plot showed two lines that did not look like each other. The substrate-tracking line was smooth; the actual price line was wild, with multi-year departures, boom-and-bust cycles whose magnitudes had no counterpart in the underlying dividend trajectory, and variance exceeding the substrate-tracking line's variance by approximately five to thirteen times depending on the specification (Shiller 1981, pp. 432–435 for the variance ratios across specifications).

The result is known in the academic finance literature as the Shiller excess-volatility puzzle. It has resisted resolution within the efficient-markets framework across the four decades since the original paper's publication (Shiller 1987, "Investor Behavior in the October 1987 Stock Market Crash"; Shiller 2000/2015, *Irrational Exuberance*, especially Chapters 1–4 on the empirical pattern; Shiller 2003, "From Efficient Markets Theory to Behavioral Finance", *Journal of Economic Perspectives* 17(1), pp. 83–104). The behavioural-finance literature has addressed the puzzle through residual categories including investor sentiment, narrative dynamics, herding,

momentum effects, and noise-trading patterns (Black 1986, "Noise", *Journal of Finance* 41(3), pp. 529–543; the literature is summarised in Shiller 2003). Each of these mechanisms has documented empirical support. What the residual categories do not provide is an account of the *magnitude* of the residual. On the substrate-tracking story Hayek's argument articulates, residual-category effects should be small relative to substrate variance, with arbitrage forces driving prices back to substrate-grounded values on substrate-cycle timescales. The empirical record indicates the opposite: the residual content dominates; prices remain decoupled from the substrate-tracking line for years to decades.

Shiller's variance-decomposition result is the strongest evidence the libertarian tradition's own analytical resources can supply on A3. If prices aggregate the dispersed substrate-coupled knowledge Hayek specified, the variance of prices should track the variance of the underlying substrate values. The empirical record indicates that contemporary financial prices do not track substrate values; the dominant variance is internal to the price-formation system itself. A3, in the methodological form Hayek specified, is not obtaining at the order's dominant financial markets. The chapter records the failure on the empirical record from inside the finance canon.

A4. Order Admitting Entrepreneurial Alertness

Kirzner's condition requires that the order admit entrepreneurial alertness to opportunities the existing price structure has not yet incorporated (Kirzner 1973, pp. 30–87 on the entrepreneurial-discovery process; Kirzner 1997, "Entrepreneurial Discovery and the Competitive Market Process", *Journal of Economic Literature* 35(1), pp. 60–85).

The defender has an empirical argument that A4 obtains: startups continue to form; new entrants in fintech, AI, software-as-a-service, biotechnology, and other sectors continue to enter; the contemporary economy has produced major new firms (Stripe, OpenAI, Anthropic, Tesla, SpaceX) whose existence indicates that entrepreneurial alertness to unaddressed opportunities continues to operate.

The empirical record admits a more specific reading. Khan's analysis of platform-acquisition patterns documents that entry has been substantially absorbed into incumbent positions before the entrants reach competitive scale: the dominant platforms acquire substrate-coupled competitive trajectories through acquisition (the B3 acquisition pattern), and the entry that survives operates in adjacent technological domains that do not threaten the dominant platforms' core positions (Khan 2017 on the platform-acquisition pattern; Khan 2019 on the structural position of dominant platforms). The empirical record on aggregate business dynamism documents the cumulative pattern: declining startup formation rates across the U.S. economy, declining job-creation by young firms, declining entry into established sectors (Decker, Haltiwanger, Jarmin, and Miranda 2014, "The Role of Entrepreneurship in U.S. Job Creation and Economic Dynamism", *Journal of Economic Perspectives* 28(3), pp. 3–24; Decker, Haltiwanger, Jarmin, and Miranda 2016, "Where Has All the Skewness Gone? The Decline in High-Growth (Young) Firms in the U.S.", *European Economic Review* 86, pp. 4–23; Akcigit and Ates 2021, "Ten Facts on Declining Business Dynamism", *American Economic Journal: Macroeconomics* 13(1), pp. 257–298).

The chapter records A4 as admitting the defender's case at the level of new-entrant existence and as not obtaining at the level of the order's dominant industries, where entry is foreclosed by network effects, capital requirements, data advantages compounding through incumbent operation, and acquisition strategies that absorb entrants before they reach competitive scale. The Kirzner condition operates at the order level; the order's dominant industries do not admit entrepreneurial alertness in the form the condition specifies. The crack is registered but the defender's adjacent-entry case admits partial defence.

A5. Dynamic Market Process Through Dispersed Agents

The Austrian methodological signature requires that the order operate as a dynamic process in which dispersed agents act on their substrate-coupled knowledge through exchange (Hayek 1945, on the process character of the price mechanism; Kirzner 1973, on entrepreneurial discovery as process; Lavoie 1985, especially Chapters 4 and 6, on the methodological argument's dynamic-process character; Boettke 2018, pp. 48–94, on the methodological reading). The condition operates through A3 (the price-aggregation mechanism) and A4 (entrepreneurial entry). The empirical patterns the chapter has registered for A3 and A4 indicate that the dynamic process A5 specifies operates in attenuated form in the order's dominant markets. The chapter records A5 as inheriting from A3 and A4: it operates where A3 and A4 operate, and is attenuated where they are attenuated.

A6. Order Produced as *Kosmos* Rather Than *Taxis*

Hayek's institutional condition concerns the social order's character, distinct from the price-mechanism's methodological function. *Kosmos* is the order emerging from the actions of dispersed agents following abstract rules of conduct; *taxis* is the made order resulting from the deliberate organisation of an authority pursuing specific purposes (Hayek 1973–1979, *Law, Legislation and Liberty*, Vol. I on rules and order, especially pp. 35–54 on the *kosmos*/*taxis* distinction).

The condition admits two readings on the libertarian tradition's own resources. The first reading is that the contemporary order's surface architecture exhibits *kosmos* characteristics: millions of consumers and producers transact through markets they do not individually control; the order's overall pattern emerges from the dispersed decisions of these participants; the formal apparatus of voluntary exchange under abstract legal rules continues to operate. By this reading, A6 obtains.

The second reading concerns the architectural layer at which contemporary coordination is conducted. The platforms that mediate the dominant share of contemporary consumer commerce operate through algorithmic architectures that determine which transactions occur and on what terms; the architectures are themselves the constructions of identifiable authorities (the platforms' engineering and product organisations) pursuing specific purposes (the platform's revenue, growth, and competitive positioning). The order's financial-market apparatus operates through high-frequency-trading systems whose architectural decisions are made by identifiable engineering and trading organisations pursuing specific positioning objectives. The architectures the dominant share of contemporary economic coordination flows through are *taxis*; the surface appearance of distributed coordination is the *kosmos*-form the *taxis*-architectures present to users.

The reading the chapter can register on its own resources is that A6 admits both readings, with the *kosmos* reading dominant at the surface and the *taxis* reading dominant at the architectural layer. The chapter cannot settle the question at the level of the libertarian tradition's own analytical resources, because the resources do not contain the framework needed to settle whether the architectural layer or the surface appearance is the more relevant level of analysis for A6's purposes. The chapter records the reservation as a question the remainder of the book will need to address.

Austrian Composite

A1 obtains at the formal-apparatus level. A2 obtains: the dispersed substrate-coupled knowledge continues to exist. A3 does not obtain on Shiller's variance-decomposition evidence from inside the finance canon; the dominant variance of contemporary financial prices is internal to the price-formation system rather than tracking substrate values. A4 obtains at the adjacent-entry level and does not obtain at the level of the order's dominant industries. A5 inherits from A3 and A4. A6 admits both readings, with the *kosmos* reading dominant at the surface and the *taxis* reading at the architectural layer; the empirical record supports both. The Austrian composite registers A3 as the sharp failure, with the others admitting partial defence on the libertarian tradition's resources.

2.5 Friedman's Conditions

Friedman's contribution to the libertarian tradition is the operational and institutional articulation of competitive markets (Friedman 1962/2002, *Capitalism and Freedom*; Friedman and Friedman 1980, *Free to Choose*; Friedman and Schwartz 1963, *A Monetary History of the United States, 1867–1960*). The conditions Chapter 1 extracted (F1 through F5) operate at the operational and institutional levels at which the more abstract claims of the prior figures are realised in actual orders.

F1. Monetary Stability

Friedman's monetary-stability condition operates at two levels: the consumer-price level (the historical focus of Friedman's monetary work, against the inflations and contractions of the twentieth century) and the broader asset-price level (the extension of Friedman's argument to whatever price signals are corrupted by variability in the unit of account). The condition is articulated principally in Friedman and Schwartz 1963 (with the historical-empirical analysis across the major U.S. monetary disorders) and in Friedman 1968 ("The Role of Monetary Policy", *American Economic Review* 58(1), pp. 1–17, on the natural-rate framework and the monetary-stability requirement).

The consumer-price record obtains across most of the period since the early 1980s. Consumer-price inflation in the major Western economies has averaged within ranges most central banks treat as consistent with monetary stability, with the exceptions of the late-1970s episode (preceding the period the chapter examines), the late-2010s and early-2020s episodes, and the briefer episodes the central banks have addressed through conventional policy (Federal Reserve historical data; Bank of England historical data on the U.K. consumer-price index).

The asset-price record across the same period exhibits sustained appreciation in equity, real-estate, and government-bond markets at rates exceeding the underlying productive growth of the economies the assets formally claim (Shiller 1981, 2003, 2014 on equity markets specifically; on the broader pattern across asset classes, Krippner 2011, *Capitalizing on Crisis*, especially Chapter 1, 'What Is Financialization?'; on the analytical reading of asset-price stability as a monetary condition, Borio and Lowe 2002, "Asset Prices, Financial and Monetary Stability: Exploring the Nexus", *Bank for International Settlements Working Paper* No. 114).

The defender has a serious case that F1 obtains: Friedman's monetary-stability condition was articulated principally at the consumer-price level, and the consumer-price record obtains. The extension to asset prices the chapter has noted operates on the analytical logic of Friedman's argument (price signals corrupted by variability in the unit of account fail the condition regardless of which prices), but the extension is not Friedman's own formulation. The defender who accepts only the consumer-price level can argue F1 obtains.

The chapter records F1 as obtaining at the consumer-price level on Friedman's own formulation and as not obtaining at the asset-price level on the analytical extension Borio and Lowe and the financialisation literature have developed. The asset-price-level extension is registered for completeness; on Friedman's own formulation, F1 obtains.

F2. Substantive Consumer Sovereignty

Friedman's second condition requires substantive consumer sovereignty through genuine alternatives among which the consumer's choice operates as the disciplining mechanism on producer decisions (Friedman 1962/2002, Chapter 1 on the relation between economic and political freedom; Friedman and Friedman 1980, especially Chapter 1 on the power of the market).

The empirical record on contemporary consumer alternatives indicates concentration patterns that have accumulated continuously across the period. Khan's analysis of platform-mediated commerce documents the concentration's mechanisms: network effects compounding through dominant-platform operation, data advantages accumulating across the platform's continued operation, integration with the financial-services and capital-markets infrastructure that gives dominant platforms access to capital at terms entrants cannot match, and

lock-in produced by default settings, switching costs, and the absence of substantive equivalents to the dominant platform's services in adjacent domains (Khan 2017, especially pp. 710–805 on the institutional structure of platform-mediated commerce). The pattern extends across financial services, telecommunications, pharmaceuticals, and the broader U.S. corporate sector (Philippon 2019, *The Great Reversal*, Chapters 2 and 6 on the empirical record across U.S. industries).

The Google search example specified in the chapter's introduction registers the pattern. Approximately ninety percent of U.S. search queries are processed by Google, and approximately ninety percent of Google's search traffic arrives through default settings the user did not actively select (the empirical record was established in *United States v. Google LLC*, Case No. 1:20-cv-03010-APM, with the trial proceedings of September–November 2023 covering the default-distribution evidence; on the broader record, Wu 2018, *The Curse of Bigness*, Chapter 7 and Conclusion).

The defender has the revealed-preference argument: the user's continued use of the default is itself a choice; alternatives exist (Bing, DuckDuckGo) and are one click away; the architecture is not foreclosing substantive choice if substantive choice is one click away.

The empirical record on default-setting payments registers what the *United States v. Google LLC* trial established: Google pays Apple approximately twenty billion U.S. dollars per year to maintain Google as the default search engine on Apple devices (the figure was disclosed in the trial proceedings; the order of magnitude is independently confirmed in Apple Inc. and Alphabet Inc. financial filings). The payment is the empirical measure of the value of the default position the dominant firm is securing against the substantive-alternative argument the defender invokes. If the architecture were not foreclosing substantive choice, the payment would not be valuable to Google. The payment indicates the structural foreclosure operates at a level the revealed-preference argument does not address.

The chapter records F2 as not obtaining in the form Friedman's condition requires across the order's dominant industries. The revealed-preference defence operates against an empirical record (the Google-Apple default-payment record, the cumulative concentration pattern across the major U.S. industries) that registers the structural foreclosure the defence assumes does not exist.

F3. Structural Openness of Competition Permitting Entry

Friedman's third condition requires structural openness permitting entry, operating at the structural level rather than at the formal level of the absence of explicit legal barriers (Friedman 1962/2002, Chapter 8 on monopoly and the social responsibility of business, especially pp. 119–136 on the structural-openness argument). The condition is connected to F2 and to A4: it concerns the structural conditions for new competitors to enter, distinct from the alternatives currently available to consumers.

The empirical record on entry inherits from A4: entry has been substantially foreclosed in the order's dominant industries, with the foreclosure operating through network effects, capital requirements, regulatory complexity that incumbents have shaped, and acquisition strategies through which entrants are absorbed before they reach competitive scale (the citations parallel those at A4). The chapter records F3 as not obtaining at the level of the order's dominant industries, on the same evidentiary basis as A4.

F4. Institutional Vigilance Against Monopoly Accumulation

Friedman's fourth condition requires institutional vigilance against monopoly accumulation (Friedman 1962/2002, Chapter 8 on the policy stance toward monopoly). The empirical record on the institutional vigilance the contemporary American antitrust apparatus has supplied across the period since the late 1970s is the record S3's broad reading addresses: the consumer-welfare standard's interpretive framework has substantially excluded structural concentration as a legitimate object of antitrust intervention (Khan 2017; Wu 2018, especially Chapters 5–7 on the historical reorientation; Philippon 2019 on the empirical consequences). The chapter records F4 as failing on the same evidentiary basis as the broad reading of S3, with the failure registered at the level of the institutional architecture's substantial accommodation of the concentration F4's vigilance was meant to prevent.

F5. Institutional Design Against Regulatory Capture

Friedman's fifth condition requires institutional design against regulatory capture (Friedman 1962/2002, Chapter 9 on occupational licensure as a paradigm case; Friedman and Friedman 1980, Chapter 8 on the cycle of regulation). The condition is articulated in Friedman's own work as a structural threat the institutional design must address; the analytical reading is developed in Nelson 2001, *Economics as Religion: From Samuelson to Chicago and Beyond*, especially Chapters 6–7 on Friedman's institutional thought and on the relation between his analytical position and the contemporary deployment of his name.

The defender has a structural argument that F5 obtains in the form of an absence rather than a presence: regulatory capture is the failure mode of regulation, and the libertarian response is less regulation. The argument has surface plausibility, but it operates against Friedman's own position. Friedman did not argue for the elimination of regulation as such; he argued that institutions designed against capture were necessary for the operations regulation properly addresses (the monetary system in Friedman and Schwartz 1963, the legal-institutional architecture in *Capitalism and Freedom*, the specific institutional designs Friedman defended across his work). The "less regulation" reply is not a Friedmanian response: Friedman would have said the design has failed and needs reconstruction.

The empirical record on regulatory capture across the contemporary order's principal regulatory architectures is extensive. Carpenter and Moss collect the documented cases across the *Preventing Regulatory Capture* volume (Carpenter and Moss 2014, especially the financial-services chapters); Krippner traces the mechanisms across the financialisation of the U.S. economy (Krippner 2011, Chapter 4 and the Conclusion); the revolving-door pattern between regulator and industry across financial services is documented in the *Government Accountability Office* reports collected in the post-2008 reform literature. Five mechanisms recur across the documented cases: the revolving door between regulatory positions and industry positions; the industry's structural advantage in technical expertise; the regulator's dependence on the industry for the data the regulator's decisions require; the industry's superior access to legislative and rulemaking processes through lobbying and sustained relationship-building; and the difficulty regulators face in maintaining positions inconsistent with the industry's preferences (the canonical analytical statement is Stigler 1971, "The Theory of Economic Regulation", *Bell Journal of Economics and Management Science* 2(1), pp. 3–21).

The chapter records F5 as not obtaining in the form Friedman's argument requires across the order's principal regulatory architectures. The defender's "less regulation" response operates against Friedman's own institutional position, and the empirical record on capture is the record Friedman's argument identified as the failure case the institutional design F5 specifies was meant to prevent.

Friedman Composite

F1 obtains at the consumer-price level on Friedman's own formulation and does not obtain at the asset-price level on the analytical extension. F2 does not obtain in the order's dominant industries, with the revealed-preference defence operating against the empirical record on structural foreclosure. F3 does not obtain at the level of the order's dominant industries, on the same evidentiary basis as A4. F4 does not obtain in the form Friedman's argument requires, on the institutional record S3's broad reading also addresses. F5 does not obtain across the order's principal regulatory architectures, on the documented capture record. The Friedman composite registers four of five conditions as failing on the libertarian tradition's own resources, with the consumer-price level of F1 admitting Friedman's own formulation.

2.6 Sowell, Rothbard, and Rand

The eleven conditions extracted from Sowell (So1–So4), Rothbard (Ro1–Ro3), and Rand (Ra1–Ra3) operate at analytical levels and through articulations that overlap with the conditions extracted from the prior figures. The overlaps were registered at §1.10 as the convergence the tradition's distinct voices produce on substantially the same requirements. The empirical examinations conducted across §§2.1 through 2.5 have therefore already supplied much of the documentary record relevant to these conditions in their canonical form. This section registers the conditions' distinct articulations against the documentary record without retreading the ground the prior sections have traversed, while noting one finding the present section's structure makes visible that the prior sections did not.

Sowell

Sowell's four conditions (Sowell 1980, *Knowledge and Decisions*, especially Chapters 1–3; Sowell 2014, *Basic Economics*, especially Chapter 4) concern the informational character of prices, the operation of profit-and-loss discipline, the substantive voluntariness of exchange, and the dispersed-and-local character of the relevant knowledge.

So1 (prices as messengers carrying information from substrate-coupled actions) is the operational form of Hayek's methodological condition A3 examined at §2.4. The empirical record there indicates A3 does not obtain at the order's dominant financial markets, and So1 inherits the finding.

So2 (profit-and-loss discipline operative through bearing of consequences) is the operational form of the Austrian dynamic-process condition A5. The empirical record on the insulation of major financial institutions from the consequences of their decisions registers the sharpest case. In the week of September 14, 2008, Lehman Brothers filed for Chapter 11 bankruptcy. In the week that followed, the Federal Reserve, the Treasury Department, and the Federal Deposit Insurance Corporation extended emergency support measures to the remaining major U.S. financial institutions. The American International Group received an 85 billion dollar credit facility on September 16. Goldman Sachs and Morgan Stanley received Federal Reserve approval to convert from investment-bank holding-company status to bank-holding-company status on September 21, gaining access to the Federal Reserve's discount window. The Troubled Asset Relief Program was authorised on October 3, with 700 billion dollars committed to the purchase of distressed assets and to direct capital injections. The Federal Reserve's emergency lending programmes across the period from September 2008 through approximately mid-2010 extended cumulative gross transactions at amounts the *Government Accountability Office*'s subsequent audit reported as approximately 16 trillion dollars, with the peak outstanding balance approximately 1.2 trillion (Government Accountability Office 2011, *Federal Reserve System: Opportunities Exist to Strengthen Policies and Processes for Managing Emergency Assistance*, GAO-11-696; on the institutional pattern, Financial Crisis Inquiry Commission 2011, *The Financial Crisis Inquiry Report*, especially Chapters 1–3 and 22; for the analytical account, Stiglitz 2010, *Freefall*, Chapters 1 and 5).

The institutions whose decisions had produced the losses continued operating after the support had been provided. The losses that would have been borne under the discipline of profit and loss were absorbed onto the central-bank balance sheet and onto the public fisc. The pattern has continued: the central-bank balance sheets in the United States, the United Kingdom, the eurozone, and Japan absorbed exposures during the 2020 pandemic episode and during the 2022–2023 regional-banking episode that the discipline Sowell specified would have placed on the institutions whose decisions produced them (Bank for International Settlements 2024 on the post-2008 expansion of central-bank balance sheets across the major Western economies).

The defender's case that So2 obtains across the order outside the major financial institutions admits the central case as exceptional. The chapter records So2 as not obtaining at the order's dominant financial institutions, where the insulation from loss is institutionalised through the central-bank backstop architecture the post-2008 framework formalised. The crack is sharp at the order's dominant financial sector.

So3 (substantive voluntariness of exchange with substantive alternatives) is examined at §2.5 under F2 and inherits the finding.

So4 (knowledge dispersed and local) parallels A2 and obtains.

Rothbard

Rothbard's three conditions (Rothbard 1962/2009, *Man, Economy, and State*, especially Chapter 12 on the market and the state; Rothbard 1973/2006, *For a New Liberty*, especially Chapter 12 on the political economy of state capitalism) concern substantive voluntariness, the methodological requirement to examine the order to determine market capitalism versus state capitalism, and the requirement that the order be free of state-granted privileges.

Ro1 (substantive voluntariness, coercion absent in fact) is examined at §2.5 under F2 and inherits the finding.

Ro2 (the methodological condition to examine the order to determine market capitalism versus state capitalism) is the condition the present chapter is itself satisfying through its empirical examination: the chapter is conducting the determination Rothbard's condition requires the libertarian tradition's defenders to conduct (Rothbard 1962/2009, Chapter 12; Rothbard 1973/2006, Chapter 12; on the methodological position, Gordon 2007, *The Essential Rothbard*).

Ro3 (absence of state-granted privileges producing state capitalism) is the sharp condition Rothbard's own analytical framework produces. Rothbard distinguished market capitalism from state capitalism by the presence of state-granted privileges that advantage incumbents and produce the order Rothbard classified as state capitalism. The categories Rothbard specified include subsidies and infrastructure provision at below-cost rates to favoured industries; regulatory frameworks designed to advantage incumbents; statutory monopolies and exclusive trading privileges; intellectual-property monopolies whose contemporary scope exceeds anything Rothbard's argument anticipated; and the legal-institutional apparatus through which these privileges are constructed and maintained (Rothbard 1962/2009, Chapter 12; Rothbard 1973/2006, Chapter 12).

The contemporary empirical record on each of the categories Rothbard specified is documented. Regulatory frameworks advantaging incumbents are the F5 record at §2.5. Intellectual-property monopolies are documented in Boldrin and Levine 2008, *Against Intellectual Monopoly*, especially Chapters 1–3 on the contemporary scope; the pharmaceutical patent extension record, the copyright extension record, the patent-thicket pattern in technology industries are each registered in the secondary literature on contemporary IP. Infrastructure provided at below-cost rates to favoured industries is documented across the federal-state agricultural support apparatus, the U.S. defense industrial base, and the contemporary energy-subsidy architecture. The legal-institutional apparatus through which these privileges are constructed and maintained is the apparatus the F5 record documents at §2.5.

The chapter records Ro3 as failing on Rothbard's own analytical framework. The contemporary Western order is, on Rothbard's own classification, state capitalism rather than market capitalism. The defender who

maintains that the order is the realisation of the libertarian tradition's claims about market capitalism is, on Rothbard's own framework, operating against Rothbard's own taxonomy. The crack is sharp at the level of the tradition's own analytical resources, and it is sharp in a particular way: it does not require any apparatus the chapter has not supplied; it requires only that Rothbard's own framework be applied to the empirical record.

Rand

Rand's three conditions (Rand 1957, *Atlas Shrugged*; Rand 1966, *Capitalism: The Unknown Ideal*, especially "America's Persecuted Minority: Big Business" at pp. 38–66 on the productive-versus-extractive distinction; Rand 1966, "What Is Capitalism?" at pp. 11–37 on the moral foundation) concern productive achievement rewarded over extraction, substantive separation of economic and political power, and the structural advantage of productive achievement over extraction.

Ra1 (productive achievement rewarded over extraction) parallels B2 examined at §2.3 and inherits the finding.

Ra2 (substantive separation of economic and political power) is the institutional condition Rand specified across *Capitalism: The Unknown Ideal*. The empirical record on the political-economic separation across the contemporary American order is extensive. Corporate lobbying intensity has accumulated continuously across the period (Drutman 2015, *The Business of America Is Lobbying*, on the empirical record of the growth of corporate lobbying in the United States; Hacker and Pierson 2010, *Winner-Take-All Politics*, on the pattern across multiple policy domains). The corporate sector's representation in legislative drafting, regulatory rulemaking, and executive-branch appointments has reached scales that, by Rand's standard, would constitute the collapse of the separation she identified as constitutive of capitalism. The chapter records Ra2 as not obtaining on the documentary record.

Ra3 (productive achievement structurally advantaged over extraction) parallels Ra1 and B2 and inherits the finding.

Sowell, Rothbard, Rand Composite

The eleven conditions, examined against the documentary record across the prior sections and the present section, register the convergence the libertarian tradition's voices produce on substantially the same requirements. The sharp condition the present section's structure makes visible is Ro3, which applies Rothbard's own classification to the empirical record on state-granted privileges. On Rothbard's framework, the contemporary order is state capitalism rather than market capitalism, and the defender who maintains otherwise is operating against Rothbard's own analytical apparatus. So2 is the other sharp condition the section registers, with the post-2008 financial-institution insulation operating as the case Sowell's profit-and-loss-discipline requirement identifies as the failure case.

2.7 The First-Pass Composite Finding

The chapter has examined thirty-one conditions extracted from the canonical sources of nine principal figures of the libertarian tradition. The examination has been conducted using the tradition's own analytical resources, applied to the documentary record on the contemporary Western order's operation across the four decades since approximately 1980. The findings can be presented in composite form.

Identifier	*Condition*	*First-Pass Finding*
S1	Moral embeddedness	Obtains in defensible substituted form; reservation on substantive moral psychology

Identifier	*Condition*	*First-Pass Finding*
S2	Local proximity	Obtains in defensible substituted form; reservation on functional substitution
S3	Legal disfavour of producer coordination	Admits narrow reading on which it obtains; broad reading from WN IV.viii–IV.ix does not obtain
S4	Reputational propagation	Obtains at producer-consumer register; does not obtain at platform register
R1	Capital immobility between nations	Does not obtain; Samuelson 2004 concession from inside trade-theory canon
R2	Asymmetric labour mobility	Formally obtains; operates under R1 failure as the form Ricardo identified as the failure case
R3	Bounded national economies	Does not obtain; Baldwin's analysis of global value chains from within trade theory
B1	Visibility structure	Obtains at structural-disclosure register; does not obtain at moment-of-evaluation register
B2	Productive vs extractive expenditure	Does not obtain; redeployment thesis falsified at aggregate-capital-formation level
B3	Foreclosed-trajectory registration	Does not obtain on Bastiat's own analytical framework
A1	Calculation through prices generated by exchange	Obtains at formal-apparatus level
A2	Knowledge dispersed in substrate-coupled form	Obtains
A3	Price mechanism aggregating dispersed knowledge	Does not obtain; Shiller variance-decomposition from inside finance canon
A4	Order admitting entrepreneurial alertness	Obtains at adjacent-entry level; does not obtain in dominant industries
A5	Dynamic market process	Inherits from A3 and A4
A6	Order produced as *kosmos* rather than *taxis*	Admits both readings; relevant architectural layer left open
F1	Monetary stability	Obtains at consumer-price level on Friedman's own formulation; does not obtain at asset-price level
F2	Substantive consumer sovereignty	Does not obtain in dominant industries
F3	Structural openness of competition	Does not obtain in dominant industries
F4	Anti-monopoly vigilance	Does not obtain; inherits from S3 broad reading
F5	Design against regulatory capture	Does not obtain across principal regulatory architectures
So1	Prices as messengers	Inherits from A3

Identifier	*Condition*	*First-Pass Finding*
So2	Profit-and-loss discipline	Does not obtain at order's dominant financial institutions
So3	Voluntary exchange with substantive alternatives	Inherits from F2
So4	Knowledge dispersed and local	Obtains; parallel to A2
Ro1	Substantive voluntariness	Inherits from F2
Ro2	Methodological examination of the order	The chapter is itself satisfying this condition
Ro3	Absence of state-granted privileges	Does not obtain on Rothbard's own analytical framework
Ra1	Productive achievement rewarded	Inherits from B2
Ra2	Separation of economic and political power	Does not obtain on documentary record
Ra3	Productive achievement structurally advantaged	Inherits from B2 and Ra1

The first-pass composite registers a structurally specific pattern. Several conditions obtain on the libertarian tradition's own resources, in defensible forms the defender can maintain at the level of the tradition's vocabulary: S1, S2, A1, A2, A6 (in the surface reading), F1 (at the consumer-price level), So4, Ro2. Several conditions admit partial defence, with the cracks located at specific levels the chapter has identified: S3 (narrow versus broad reading), S4 (producer-consumer versus platform level), B1 (structural disclosure versus moment of evaluation), A4 (adjacent entry versus dominant-industry entry), F1 (consumer-price versus asset-price).

The sharp failures the chapter has registered, on the libertarian tradition's own analytical resources, are the following. R1 fails on Samuelson 2004's concession from inside the trade-theory canon. R3 fails on Baldwin's analysis of global value chains from within trade theory. B2 fails on the empirical record of aggregate capital formation, which falsifies the redeployment thesis the defender of corporate buybacks invokes. B3 fails on Bastiat's own analytical framework for the unseen. A3 fails on Shiller's variance-decomposition result from inside the finance canon. F2 fails on the empirical record of dominant-industry concentration and the *United States v. Google LLC* trial evidence on default-payment economics. F3 fails on the same dominant-industry record, with the structural-openness condition foreclosed at the level the market-structure literature documents. F4 fails on the institutional record of antitrust accommodation of concentration. F5 fails on the documented capture record across the principal regulatory architectures. So2 fails on the post-2008 financial-institution insulation pattern. Ro3 fails on Rothbard's own analytical framework for distinguishing market capitalism from state capitalism. Ra2 fails on the documentary record of corporate political-economic integration.

Twelve conditions fail sharply on the libertarian tradition's own analytical resources. The pattern of the failures has a structure. The sharp failures cluster in specific domains: trade theory (R1, R3); financial economics (B2, A3, So2); institutional architecture (F4, F5, Ro3, Ra2); the analytical framework itself (B3); and competitive structure (F2, F3). The defender of the contemporary order has, on the tradition's own resources, ground to defend several of the conditions and no ground to defend the twelve that fail sharply.

The chapter does not adjudicate beyond the composite. The findings are stated in the form the chapter's examination has produced them. The question of why these particular conditions fail in these particular places, and the question of what mechanism produces the pattern, are questions the chapter has not addressed and will not address. The remainder of the book takes them up.

2.8 What the Chapter Has Produced and What It Has Not

The chapter has applied the libertarian tradition's own conditions to the empirical record of the contemporary Western order's operation across the four decades since the institutional reorganisations of the late 1970s and early 1980s. The examination has used the tradition's own analytical resources, without introducing analytical frameworks the tradition itself does not contain. The findings are registered against the documentary record from the canonical sources, the established secondary scholarship within each canonical figure's tradition, and the contemporary empirical literature on the institutional, financial, and political-economic architectures the conditions concern.

The chapter has produced a composite of thirty-one findings, with twelve conditions failing sharply on the tradition's own resources, several admitting partial defence at specifiable levels, and several obtaining in defensible forms the defender can maintain. The pattern the composite registers is that the contemporary Western order, examined against the libertarian tradition's own conditions, fails sharply on conditions central to the tradition's economic theorems (R1, R3, B2, B3, A3, F2, F3, F4, F5, So2, Ro3, Ra2) while admitting defence on conditions concerning moral psychology and architectural appearance (S1, S2, A6 surface reading, A1, A2). The defender of the order has resources at the level of the tradition's vocabulary, and the defender's strongest defences operate where the tradition's resources can settle most cleanly.

The chapter has not produced an account of why the conditions fail where they fail, of the mechanism through which the institutional pattern the documentary record exhibits has been reproduced across the period the order has operated, of whether the failures admit correction by institutional intervention, or of the relation between the conditions that obtain and the conditions that fail. The chapter has not produced an account of why the cracks operate at the specific places the composite has identified.

These are the questions the chapter has placed in view. They are the questions the remainder of the book takes up.

Chapter 3 conducts the parallel examination on the contemporary Chinese state-administered order, using the same thirty-one conditions and the same documentary discipline. The Chinese examination will register a finding that the present chapter could not produce, because the Western examination alone cannot produce it: a finding that requires the comparison between two orders to make visible. The finding will not resolve the questions the present chapter has placed in view, but it will sharpen them in a form the remainder of the book can address.

CHAPTER 3

The Conditions Examined Against the Chinese Order

3.0 What This Chapter Does

This chapter conducts the symmetric application of the procedure Chapter 2 conducted on the contemporary Western order. The same thirty-one conditions extracted in Chapter 1 are applied to the documentary record of how the People's Republic of China has structured its economic order across the period since the late 1970s. The examination is conducted on the order's actual structure, not on its self-description, using the documentary record across the relevant literatures on Chinese political economy.

The chapter is constrained by four discipline conditions the chapter's evidentiary standard requires to be stated before the examination begins.

The first constraint is that the examination is strictly diagnostic. The chapter does not claim that the Chinese order is preferable to the Western order on any dimension the chapter does not assess. The chapter does not claim that the Chinese order is more just, more humane, or more deserving of political endorsement. The protections of individual liberty, the rule of law and constraints on arbitrary state action, the institutional accessibility of public discourse to non-aligned voices, the institutional redress available to those harmed by state action, and the long-cycle questions of stability across leadership transitions are dimensions on which the comparative-politics literature reaches assessments that vary substantially across analysts. On the rule of law and constraints on arbitrary state action, see Pei 2006 (*China's Trapped Transition: The Limits of Developmental Autocracy*, Harvard University Press) and Minzner 2018 (*End of an Era: How China's Authoritarian Revival Is Undermining Its Rise*, Oxford University Press); on the accessibility of public discourse, King, Pan, and Roberts 2013 ("How Censorship in China Allows Government Criticism but Silences Collective Expression", *American Political Science Review* 107(2), pp. 326–343) and Repnikova 2017 (*Media Politics in China: Improvising Power under Authoritarianism*, Cambridge University Press); on the long-cycle stability question, Shirk 2007 (*China: Fragile Superpower*, Oxford University Press) and McGregor 2010 (*The Party: The Secret World of China's Communist Rulers*, Harper). The examination this chapter conducts is not designed to address these dimensions, and the chapter's findings do not licence conclusions about the Chinese order on dimensions the examination does not assess.

The second constraint is that the examination is conducted on the order's actual structure rather than on its self-description. The Chinese state's official discourse describes the order in vocabulary that includes "socialism with Chinese characteristics," "socialist market economy," and the Plan-system terminology of "state-owned," "state-supported," "state-controlled," and the categories specific to the cadre-evaluation, capital-allocation, and industrial-policy apparatus. The official discourse is part of the documentary record the chapter examines, but the discourse's claims about the order are tested against the order's operation, not accepted as descriptions of it. The same discipline Chapter 2 applied to the contemporary Western order applies here.

The third constraint is that the examination operates on the order as it has actually existed across the period the chapter examines. The chapter examines the order that operated through the period of accelerated growth from approximately 1980 through approximately 2020, with the recognition that the order's contemporary phase, beginning approximately 2020, has features the prior phase did not exhibit. Where the order's features have changed across the period, the changes are registered.

The fourth constraint is that the examination operates at the empirical level. The chapter does not pursue the question of why the conditions, where they fail or are satisfied, fail or are satisfied in the specific ways the examination identifies. The account of the order's mechanisms is the work later chapters will undertake. The present chapter's work is to register what the documentary record indicates about whether the conditions extracted in Chapter 1 are satisfied by the Chinese order as it has actually operated.

The chapter proceeds across seven sections. §3.1 examines the order's banking and capital-allocation architecture against Ricardo's first condition. §3.2 examines the order's labour-mobility architecture against Ricardo's second condition. §3.3 examines the order's industrial-cluster organisation against Ricardo's third condition. §3.4 examines the order against the conditions extracted from Smith, Bastiat, and the Austrians. §3.5 examines the order against the conditions extracted from Friedman, Sowell, Rothbard, and Rand. §3.6 presents the composite finding. §3.7 records what the chapter has produced and the question it has placed in view.

3.1 The Banking Architecture and Ricardo's First Condition

Ricardo's first condition (R1) requires that capital remain substantially within national boundaries. The condition is stated at *Principles* I.VII, pp. 134–137, and the failure case Ricardo himself articulated is the case where capital moves freely across borders and the comparative-advantage mechanism dissolves into absolute advantage (Ricardo 1817/1951, Vol. I, p. 136). Chapter 2 §2.2 established that R1 does not obtain in the contemporary Western order, on Samuelson's 2004 concession from inside the trade-theory canon (Samuelson 2004, *Journal of Economic Perspectives* 18(3), pp. 135–146). The present section examines R1's satisfaction in the contemporary Chinese order.

The Chinese banking architecture is the institutional apparatus through which the Chinese state directs capital allocation. The architecture's principal features are documented across the standard institutional-historical literature on the Chinese economy: Naughton 2007/2018 (*The Chinese Economy: Adaptation and Growth*, MIT Press, second edition 2018, especially Chapters 12–13 on the banking system and capital allocation), Lardy 2014 (*Markets over Mao: The Rise of Private Business in China*, Peterson Institute for International Economics, on the post-reform evolution), Lardy 2019 (*The State Strikes Back: The End of Economic Reform in China?*, Peterson Institute, on the post-2012 state reassertion, especially Chapters 1–4), and the Carnegie Endowment China Financial Markets analyses Michael Pettis has conducted across 2013–2024 (with the analytical framework consolidated in Pettis 2013, *The Great Rebalancing*, Princeton University Press, and extended across the Carnegie working-paper series).

The architecture operates through four institutional features that distinguish it from the Western banking architecture Chapter 2 §2.2 examined.

The first feature is the state ownership of the major commercial banks. The four largest Chinese banks (Industrial and Commercial Bank of China, China Construction Bank, Agricultural Bank of China, Bank of China) are state-owned commercial entities whose lending decisions are conducted within a framework of state direction the Western commercial-banking architecture does not exhibit (Naughton 2018, Chapter 19; Lardy 2019, Chapter 2). The four banks together hold approximately forty percent of total banking-sector assets, and the broader state-owned banking sector holds the dominant share of total banking-system assets. The lending priorities of the state-owned banks are coordinated with the Plan-system industrial-policy framework and the macroeconomic policy stance the People's Bank of China directs.

The second feature is the capital-account controls that constrain cross-border capital flows. Chinese residents face administrative restrictions on the volume of capital they may move out of China per year; corporations face approval requirements for overseas direct investment; portfolio investment by foreigners into Chinese markets operates through the Qualified Foreign Institutional Investor and Stock Connect frameworks that the state administers (Naughton 2018, Chapter 17; Pettis 2013, Chapter 4 on the institutional architecture of the controls). The controls are not absolute; capital does move across the Chinese border, both into and out of the country. But the volume of cross-border flow is constrained in administrative form that the post-1980s Western elimination of capital controls eliminated.

The third feature is the People's Bank of China's coordination of credit allocation across the banking system and the broader financial architecture. The PBOC operates as the architect of the financial system's lending direction, not as the reactive monetary regulator the Western central-banking model describes (Naughton 2018, Chapter 18; Lardy 2019, Chapter 1; on the institutional comparison with the Western central-banking model, Pettis's analytical framework across the Carnegie series). The PBOC coordinates with the State Council and the Plan-system apparatus to direct the banking system's lending toward sectors the industrial-policy framework prioritises.

The fourth feature is the institutional architecture of local-government financing vehicles (LGFVs) and the local-banking apparatus that operates as the implementation layer for state-directed capital allocation at the regional level. The LGFV apparatus emerged in the post-1994 fiscal reform period and expanded substantially across the post-2008 stimulus program (Naughton 2018, Chapter 20 on the local-government fiscal architecture; the LGFV apparatus is documented in detail across the Pettis Carnegie series, particularly the analyses from 2018 onward; Pearson, Rithmire, and Tsai 2021, "Party-State Capitalism in China", *Current History* 120(827), pp. 207–213, on the integration of local-state financial apparatus with the broader industrial-policy framework).

The four features together constitute an architecture under which capital does not flow to its highest-return location across national boundaries in the form Western capital markets exhibit. The Chinese banking architecture directs capital to remain within the bounded national economy the planning architecture has built and maintains. The documentary record on cross-border financial flows registers this directly: the cross-border financial transaction volume relative to underlying trade volume, which Chapter 2 §2.2 documented as approximately sixty to one for the global aggregate, is substantially lower for Chinese cross-border flows than for the OECD aggregate, reflecting the institutional architecture's constraint on the flow rate (Bank for International Settlements 2024 on the comparative cross-border financial transaction data; on the comparative analytical framework, Pettis 2013, Chapters 3 and 4, and Pettis's subsequent Carnegie analyses across 2018–2024).

The Chinese order's R1 satisfaction is therefore not a contingent feature of the order. It is an architectural feature the Chinese banking system has been constructed to produce and maintain. The institutional architecture differs in form from the Bretton Woods capital controls Chapter 2 §2.2 noted as the postwar Western architecture that produced R1's satisfaction in the postwar period. The Bretton Woods architecture operated through inter-state legal-institutional arrangements that were progressively dismantled across the post-1971 period (Eichengreen 1996/2008, *Globalizing Capital*, Princeton University Press, Chapter 6 on the dismantlement). The Chinese architecture operates through the state's direct administrative coordination of the financial system's lending and the cross-border flow apparatus. The architectural form differs; the consequence for R1 is the same.

The chapter records R1 as obtaining in the Chinese order. The defender who maintains that R1's satisfaction in the Chinese case is achieved through institutional mechanisms the libertarian tradition would have classified as the failure case for the broader conditions the tradition specifies is accepting the finding as the present section presents it: R1 obtains, and it obtains through the planning the libertarian tradition has historically opposed.

3.2 The Hukou System and Ricardo's Second Condition

Ricardo's second condition (R2) requires asymmetric labour mobility: internal mobility permitting reallocation across industries within the bounded national economy, external mobility constrained between national economies, maintaining the factor-endowment differentials the theorem operates on (Ricardo 1817/1951, Vol. I, pp. 135–137). Chapter 2 §2.2 found R2 formally obtaining in the contemporary Western order but operating under R1's failure in the form Ricardo's argument identified as the failure case (Samuelson 2004, pp. 135–146).

The Chinese order's labour-mobility architecture operates through the *hukou* (household-registration) system, which the chapter examines for its bearing on R2.

The *hukou* system was instituted in the late 1950s and has been the central instrument of Chinese internal-mobility administration across the period the chapter examines. The system classifies the population into rural and urban categories, with the classification determining access to public services, education, healthcare, housing, and social-insurance benefits in the locality of registration (Naughton 2018, Chapter 6 on the *hukou* system and Chapter 9 on labour-market institutions; Solinger 1999, *Contesting Citizenship in Urban China*, University of California Press, on the system's operation during the early reform period; Chan 2010, "The Household Registration System and Migrant Labor in China: Notes on a Debate", *Population and Development Review* 36(2), pp. 357–364, on the system's institutional architecture).

The system creates an asymmetric mobility structure that differs in form from both the Western internal-mobility architecture and the standard Ricardian condition's specification. Internal mobility within China is administratively constrained by the *hukou* system: the rural-to-urban migrant who works in coastal manufacturing centres but retains a rural *hukou* registration does not have full access to the urban locality's public services, with the migrant's children often required to attend schools in the rural-registration locality or to pay supplementary fees for urban-school access. The constraint operates as a friction on internal mobility that differs in form from the Western pattern, where internal mobility is constrained principally by housing costs, labour-market matching frictions, and the costs of relocation that Ganong and Shoag 2017 documented (*Journal of Urban Economics* 102, pp. 76–90).

External mobility across the Chinese-international border is constrained by the same institutional features that constrain external mobility in most contemporary economies: immigration restrictions, language barriers, credentialing arrangements, and the cost of international relocation. The constraints operate with greater administrative force in the Chinese case because the Chinese passport apparatus and the international-mobility regulatory framework operate as state-administered systems with greater direct administrative control than the Western counterparts (Naughton 2018, Chapter 6 on the urban-rural divide; on the comparative framework, Chan and Selden 2014, 'China's Rural Migrant Workers, the State, and Labour Politics', *Critical Asian Studies* 46(4), pp. 599-620).

The chapter records R2 as obtaining in the Chinese order through the *hukou* system's institutional architecture. The form of R2's satisfaction differs from Ricardo's specification of asymmetric mobility as the contingent outcome of geographic and institutional friction. The *hukou* system is an engineered administrative apparatus that produces the asymmetric mobility R2 specifies, with the asymmetry maintained as a state policy rather than as a contingent feature of the order. The conditions Ricardo specified as necessary for the comparative-advantage theorem to operate are reproduced at scale by the state's administrative coordination of the labour-mobility architecture.

The defender's analytical move on R2 in the Chinese case is to note that the *hukou* system's continued administration is the source of R2's satisfaction. The defender who maintains that R2 obtains in the Chinese order is conceding that the satisfaction is achieved through the administrative apparatus the libertarian tradition's analysis identifies as the failure case for the broader conditions. The chapter records R2 as obtaining, with the institutional architecture of the satisfaction noted alongside.

3.3 The Industrial Cluster System and Ricardo's Third Condition

Ricardo's third condition (R3) requires that the economies whose internal opportunity-cost ratios the theorem compares are bounded units in which the internal cost structures persist as distinct cost structures (Ricardo 1817/1951, Vol. I, pp. 134–139; Schumacher 2012b, *Free Trade and Absolute and Comparative Advantage: A Critical Comparison of Two Major Theories of International Trade*, pp. 88–102). Chapter 2 §2.2 found R3 not obtaining in the contemporary Western order, on Baldwin's analysis of the second unbundling and the fragmentation of contemporary production across jurisdictions (Baldwin 2016, *The Great Convergence*, Harvard University Press, especially Chapter 3).

The Chinese order's industrial-cluster system is the principal architectural feature the chapter examines for its bearing on R3. The system organises production at the regional level into bounded clusters specialised for specific categories of production, with each cluster operating as an integrated productive unit whose internal cost structure persists as a distinct cost structure across the period the cluster is operative.

The cluster pattern is documented across the standard institutional-historical literature on Chinese industrial organisation: Naughton 2007/2018, Chapter 14 on industrial organisation and the cluster pattern; Wang Jinmin 2014 (*Institutional Change and the Development of Industrial Clusters in China: Case Studies from the Textile and Clothing Industry*, World Scientific) on the cluster-economic analysis; Naughton 2021 (*The Rise of China's Industrial Policy 1978 to 2020*, Centro de Estudios China-México, Universidad Nacional Autónoma de México) on the post-1978 industrial-policy framework; Ang 2016 (*How China Escaped the Poverty Trap*, Cornell University Press) on the development-state institutional analysis.

The principal documented clusters operate at scales the comparative-advantage theorem's bounded-economy condition addresses. Datang in Zhejiang Province produces approximately one-third of the world's socks at the cluster's manufacturing capacity (Naughton 2018, Chapter 13; on the empirical record of the Datang cluster, the cluster's productive capacity has been the subject of sustained reporting in the international trade press across the past two decades). Shenzhen in Guangdong Province produces the dominant share of consumer electronics components for the global market, with the cluster's productive architecture including the integration of upstream component suppliers, downstream assembly capacity, and the prototyping-and-iteration infrastructure that makes the cluster the dominant location for consumer-electronics product development globally (Naughton 2018, Chapter 13; for the institutional-historical analysis of Shenzhen's development, see O'Donnell, Wong, and Bach 2017, *Learning from Shenzhen: China's Post-Mao Experiment from Special Zone to Model City*, University of Chicago Press). Yiwu in Zhejiang operates as a wholesale-trading and small-commodities production cluster of comparable scale. Qiaotou in Zhejiang produces the dominant share of the world's buttons. Datang in Zhejiang Province (the same name as the socks cluster, in a different province administrative unit) produces a significant share of small electrical components. Huiyang in Guangdong is the dominant producer of acoustic guitars. The pattern extends across hundreds of clusters specialising in specific product categories: textiles, machinery, electronics, light manufactures, components, and the broader range of small-and-medium-enterprise sectors.

The cluster architecture is the construction of the Chinese state's industrial-policy apparatus operating in coordination with local-government administration. The clusters did not emerge through dispersed market discovery of comparative advantage in the form the Austrian tradition specifies (Kirzner 1973 on entrepreneurial discovery; the Austrian analytical framework on the dispersed-discovery pattern). The clusters emerged through the post-1978 industrial-policy framework that directed state investment, infrastructure provision, capital allocation, labour-mobility administration through the *hukou* system, and the broader institutional apparatus to construct bounded productive units specialised for specific categories of production (Naughton 2021 on the institutional architecture of the cluster construction; Ang 2016 on the development-state analytical framework).

The Chinese order's R3 satisfaction is therefore registered as the construction of bounded productive units through state planning, with the units exhibiting the distinct internal cost structures the comparative-advantage theorem operates on. Each cluster is what Ricardo's theorem requires the comparison to operate on: a bounded productive unit with a distinct internal cost structure that persists across the period the unit is operative. None of the clusters was discovered by dispersed market agents through price signals operating across an unbounded space;

each was constructed by sovereign planning operating through the institutional apparatus the Chinese state has built and maintained.

The chapter records R3 as obtaining in the Chinese order through the industrial-cluster system. The form of R3's satisfaction differs from Ricardo's specification of bounded national economies whose distinct internal cost structures emerge through the geographic and institutional conditions Ricardo's argument presupposes. The Chinese cluster system is an engineered productive architecture that produces the bounded units R3 specifies, with the boundedness maintained as a state-coordinated industrial policy rather than as a contingent feature of geographic and institutional history.

3.4 Smith, Bastiat, and the Austrian Conditions Against the Chinese Order

The conditions extracted from Smith (S1–S4), Bastiat (B1–B3), and the Austrians (A1–A6) operate at levels that the Chinese order's institutional features address in forms distinct from the forms the contemporary Western order's features address.

Smith's Conditions

Smith's S1 (moral embeddedness) and S2 (local proximity) are not satisfied at the level of the order's dominant exchange forms. The contemporary Chinese consumer-goods economy operates through platform-mediated commerce comparable to the Western pattern Chapter 2 §2.1 documented, with the major Chinese platforms (Alibaba's Taobao and Tmall, JD.com, Pinduoduo, Meituan) operating as architectural intermediaries between consumers and producers in forms that exhibit the same producer-consumer separation Chapter 2 examined (on the platform-mediated Chinese consumer economy, see Lardy 2019). S1 and S2 do not obtain at the level of the order's dominant consumer-goods exchange forms.

Smith's S3 (legal disfavour of producer coordination) operates in a form distinct from the Western pattern. The Chinese order's central operating principle is the integration of state and producer interests through the Plan-system industrial-policy apparatus. The integration is not the explicit producer-cartel conspiracy Smith's S3 was articulated against; it is the institutional architecture under which the state and the dominant producers operate as coordinated agents with shared planning objectives. Smith's S3, read narrowly against the producer-cartel pattern, is satisfied in the Chinese order. Read broadly against the legal-institutional architecture facilitating concentration and the integration of producer-state interests, S3 fails sharply: the architecture's central operating principle is the integration Smith's broad reading would have classified as the law's facilitation of producer interest against the consumer's. The chapter records S3 as satisfied in narrow reading and failed in broad reading, with the broad reading drawn from Smith's *Wealth of Nations* IV.viii–IV.ix as Chapter 2 §2.1 reconstructed.

Smith's S4 (reputational propagation) operates in a form distinct from both Smith's specification and the contemporary Western pattern. The Chinese order's reputational architecture is partly state-administered (through the social-credit apparatus and the state-coordinated rating systems for sellers, producers, and consumers) and partly platform-administered (through the rating systems the major Chinese platforms operate). The administered character of the reputational architecture differs from the form Smith's condition specifies, with the state's role as the architectural authority operating at a level Smith's argument did not address. The chapter records S4 as operating in a form distinct from Smith's specification.

Bastiat's Conditions

Bastiat's B1 (visibility of consequences) is attenuated by the Chinese state's information-control apparatus, which constrains the propagation of certain categories of consequence-information through the state-administered media and the controlled-internet architecture (King, Pan, and Roberts 2013 on the information-control architecture; Repnikova 2017 on the media-political dynamics). The defender's analytical move on B1 in the Chinese case parallels the analytical move on B1 in the Western case: structural disclosure operates in some forms (corporate filings, regulatory reporting, the state-administered statistical apparatus), and the moment-of-evaluation visibility Bastiat's condition specifies is constrained by the information architecture's features. The chapter records B1 as constrained in form distinct from but parallel to the Western pattern.

Bastiat's B2 (productive versus extractive expenditure) obtains across the principal growth phase of the Chinese order (approximately 1980 through approximately 2014). The Chinese investment pattern across this period directed capital substantially toward productive expenditure on physical infrastructure, manufacturing capacity, education, and the institutional apparatus of the development state (Naughton 2018, Chapter 7 on the investment pattern; Ang 2016 on the development-state analysis). The contemporary phase of the order (approximately 2014 onward) exhibits patterns that raise the question Bastiat's condition addresses: the post-2014 expansion of property-sector investment, with the documented oversupply, the local-government financing-vehicle expansion, and the post-2020 property-sector crisis (Pettis's Carnegie analyses across 2018–2024 document the property-sector pattern; on the broader contemporary-phase analytical framework, Pei 2016, *China's Crony Capitalism: The Dynamics of Regime Decay*, Harvard University Press). The chapter records B2 as obtaining across the principal growth phase and as raising questions in the contemporary phase that the chapter cannot settle on the documentary record alone.

Bastiat's B3 (foreclosed-trajectory registration in acquisition pattern) operates in a form distinct from the Western pattern. The Chinese order's acquisition pattern is administered through the state's review apparatus rather than through the private-acquisition pattern Chapter 2 §2.3 documented for the contemporary Western platform-acquisition record. The defender's analytical move on B3 in the Chinese case is that the state's administrative review of mergers and acquisitions operates as the institutional mechanism the consumer-welfare-standard Western architecture lacks. The chapter records B3 as operating in form distinct from the Western pattern, with the foreclosed-trajectory question addressed through the state's administrative apparatus rather than through the consumer-welfare antitrust framework.

The Austrian Conditions

The Austrian conditions A1 through A6 operate against the Chinese order in forms that distinguish the consumer-goods sector from the strategic sectors.

A1 (rational economic calculation through prices generated by exchange) obtains at the consumer-goods sector level, where prices are generated by exchange among private parties through the platform-mediated and physical-retail apparatus. A1 is attenuated in the strategic sectors (banking, energy, telecommunications, defense, and the broader Plan-priority sectors), where prices are administratively set or administratively coordinated through the state apparatus (Naughton 2018, Chapter 5 on the dual-track pricing architecture; on the contemporary administrative-pricing pattern in strategic sectors, Lardy 2019, Chapter 2). The chapter records A1 as satisfied at the consumer-goods sector level and attenuated in strategic sectors.

A2 (knowledge dispersed in substrate-coupled form) obtains: the dispersed substrate-coupled knowledge of the order's productive position continues to exist among situated agents in the Chinese order, in the same form Chapter 2 §2.4 found A2 obtaining in the Western order. The chapter records A2 as obtaining.

A3 (price mechanism aggregating dispersed substrate-coupled knowledge) is partly satisfied in the consumer-goods sector, where the price-formation apparatus aggregates dispersed knowledge through the platform-mediated exchange architecture. A3 fails in the strategic sectors, where prices are administratively set rather than aggregated from dispersed exchange. The Chinese order's price-formation apparatus therefore satisfies

A3 in attenuated form in some sectors and fails to satisfy A3 in others. The chapter records the asymmetric pattern.

A4 (entrepreneurial alertness) operates in the consumer-goods sector through the entrepreneurial entry the Chinese platform economy and the consumer-electronics sector have documented across the period (on the empirical record of Chinese entrepreneurship in the consumer-goods sector, Lardy 2014 on the rise of private business). A4 is foreclosed in the strategic sectors, where state ownership and the industrial-policy framework constrain entry. The chapter records the asymmetric pattern.

A5 (dynamic market process) inherits from A3 and A4: it operates in the consumer-goods sector where A3 and A4 obtain in attenuated form and is foreclosed in the strategic sectors.

A6 (the order produced as *kosmos* rather than *taxis*) is the condition the Chinese order's institutional architecture acknowledges as not obtaining. The Chinese order does not present itself as the *kosmos* the Western order presents itself as. The order's self-description is the deliberate organisation of an authority pursuing specific purposes, which is the *taxis* characterisation Hayek 1973–1979 articulated as the contrast to *kosmos*. The chapter records A6 as not obtaining in the Chinese order, with the non-satisfaction acknowledged in the order's own institutional discourse.

3.5 Friedman, Sowell, Rothbard, and Rand Against the Chinese Order

Friedman's Conditions

F1 (monetary stability) obtains in the Chinese order at the consumer-price level across most of the period, with the People's Bank of China operating as the macroeconomic stabilisation authority and the consumer-price index maintaining stability within ranges the central-banking literature treats as consistent with monetary stability (Naughton 2018, Chapter 18; Pettis's Carnegie analyses on the monetary-policy framework). F1 raises questions at the asset-price level in the contemporary phase of the order, where the documented property-sector appreciation and the broader asset-price patterns the Pettis Carnegie series has tracked across 2018–2024 register patterns the asset-price-stability reading of F1 (Chapter 2 §2.5) would identify. The chapter records F1 as obtaining at the consumer-price level and raising questions at the asset-price level in the contemporary phase.

F2 (substantive consumer sovereignty) is satisfied in attenuated form in the consumer-goods sector, where the Chinese consumer economy offers substantive alternatives across categories the Plan-system architecture admits (Lardy 2014 on the consumer-goods sector's evolution; on the contemporary consumer economy). F2 is foreclosed in sectors the state administratively controls. The chapter records the asymmetric pattern.

F3 (structural openness of competition) is satisfied at the consumer-goods level and is foreclosed in strategic sectors, on the same documentary record as A4 and F2.

F4 (anti-monopoly vigilance) operates in form distinct from Friedman's argument. The Chinese order's anti-monopoly apparatus, principally the State Administration for Market Regulation and its predecessor agencies, operates against producer concentration that conflicts with the state's industrial-policy priorities, not against producer concentration as a category. The 2020–2021 anti-monopoly actions against the Chinese platform companies (Alibaba, Tencent, Meituan, and the broader platform sector) are documented in the contemporary literature on Chinese antitrust enforcement (Pearson, Rithmire, and Tsai 2021 on the broader pattern; on the platform-sector enforcement specifically, contemporary reporting and analysis across the China-economy press). The enforcement pattern indicates that anti-monopoly action is directed at producer behaviour that conflicts with state-priority alignment, not at concentration as a category. The chapter records F4 as operating in form distinct from Friedman's specification, with the enforcement criterion being Plan-priority alignment rather than the structural-competition criterion Friedman's argument specifies.

F5 (design against regulatory capture) does not obtain in the Chinese order. The architecture's central operating principle is the integration of the regulatory apparatus with the industrial-policy framework and the state-ownership architecture. The integration is not the failure case Friedman's F5 was articulated against; it is the order's central operating principle. The chapter records F5 as not obtaining in the Chinese order, with the architectural feature operating as the order's central feature rather than as a failure of the order's design.

Sowell, Rothbard, and Rand

So1 (prices as messengers carrying substrate information) parallels A3 and inherits the asymmetric finding.

So2 (profit-and-loss discipline operative through bearing of consequences) operates in attenuated form across the Chinese order. The state-owned enterprises and the broader state-coordinated sector exhibit insulation from the profit-and-loss discipline through state-financial backstop and policy-coordinated lending (Naughton 2018, Chapter 14 on the SOE architecture; Lardy 2019, Chapter 3 on the post-2012 SOE realignment). The chapter records So2 as operating in attenuated form across the order, with the state-coordinated sectors exhibiting the insulation Sowell's argument identifies as the failure case.

So3 (voluntary exchange with substantive alternatives) parallels F2 and inherits the asymmetric finding.

So4 (knowledge dispersed and local) parallels A2 and obtains.

Ro1 (substantive voluntariness, coercion absent in fact) is not satisfied in the form Rothbard's argument requires. The Chinese order's institutional architecture includes state coordination at scales the substantive-voluntariness condition is articulated against (Rothbard 1973/2006, Chapter 12 on substantive voluntariness; on the institutional architecture of state coordination in the Chinese order, Naughton 2018 and Lardy 2019 throughout).

Ro2 (the methodological examination of the order to determine market versus state capitalism) is the condition the present chapter is itself satisfying through its empirical examination, alongside Chapter 2 §2.6. The Chinese order's character is acknowledged in its own discourse: the order describes itself as a state-coordinated political economy with market features at the consumer-goods sector level, not as the market-capitalist order the libertarian tradition celebrates.

Ro3 (absence of state-granted privileges producing state capitalism) does not obtain in the Chinese order. The architecture's central operating principle is the integration of state and producer interests that Rothbard's analytical framework identifies as the defining feature of state capitalism. The Chinese order is, on Rothbard's own classification, state capitalism, and the order's own discourse acknowledges the integration the libertarian tradition's framework identifies as the failure case.

Ra1 (productive achievement rewarded over extraction) obtains across the principal growth phase of the Chinese order, on the documented investment pattern toward productive capacity. The contemporary phase raises questions parallel to those B2 raised at §3.4.

Ra2 (substantive separation of economic and political power) does not obtain in the Chinese order. The architecture's central operating principle is the integration of economic and political power through the Plan-system framework and the Party-state apparatus.

Ra3 (productive achievement structurally advantaged) inherits from Ra1 and B2.

3.6 The Composite Finding

The empirical examination conducted across §§3.1 through 3.5 has applied the thirty-one conditions extracted in Chapter 1 to the documentary record of the Chinese order's operation across the period since the late 1970s. The findings can be presented in composite form.

Identifier	*Condition*	*Empirical Finding for the Chinese Order*
S1	Moral embeddedness	Not satisfied at level of dominant consumer-goods exchange
S2	Local proximity	Not satisfied at level of dominant consumer-goods exchange
S3	Legal disfavour of producer coordination	Satisfied in narrow reading; failed in broad reading (integration of state and producer)
S4	Reputational propagation	Operates in form distinct from Smith's specification
R1	Capital immobility between nations	Obtains, through state-directed banking architecture
R2	Asymmetric labour mobility	Obtains, through the *hukou* system
R3	Bounded national economies as operative unit	Obtains, through the industrial-cluster system
B1	Visibility of consequences	Constrained by information-control architecture
B2	Productive versus extractive expenditure	Obtains across principal growth phase; contemporary phase raises questions
B3	Foreclosed-trajectory registration	Operates through state administrative review
A1	Calculation through prices generated by exchange	Satisfied at consumer-goods sector; attenuated in strategic sectors
A2	Knowledge dispersed in substrate-coupled form	Obtains
A3	Price mechanism aggregating dispersed knowledge	Attenuated in consumer-goods sector; fails in strategic sectors
A4	Order admitting entrepreneurial alertness	Obtains in consumer-goods sector; foreclosed in strategic sectors
A5	Dynamic market process	Inherits from A3 and A4
A6	Order produced as *kosmos* rather than *taxis*	Not satisfied; acknowledged as *taxis* in the order's own discourse
F1	Monetary stability	Obtains at consumer-price level; raises questions at asset-price level in contemporary phase
F2	Substantive consumer sovereignty	Attenuated in consumer-goods sector; foreclosed in administered sectors
F3	Structural openness of competition	Obtains at consumer-goods level; foreclosed in strategic sectors
F4	Anti-monopoly vigilance	Operates with Plan-priority alignment as the enforcement criterion
F5	Design against regulatory capture	Not satisfied; integration is the order's central principle

Identifier	*Condition*	*Empirical Finding for the Chinese Order*
So1	Prices as messengers from substrate	Inherits from A3
So2	Profit-and-loss discipline	Attenuated across state-coordinated sectors
So3	Voluntary exchange with substantive alternatives	Inherits from F2
So4	Knowledge dispersed and local	Obtains; parallel to A2
Ro1	Substantive voluntariness	Not satisfied in form Rothbard's argument required
Ro2	Examination conducted to determine market versus state capitalism	The order's character is acknowledged in its own discourse
Ro3	Absence of state-granted privileges	Not satisfied; integration is the order's central principle
Ra1	Productive achievement rewarded	Obtains across principal growth phase
Ra2	Separation of economic and political power	Not satisfied; integration is the order's central principle
Ra3	Productive achievement structurally advantaged	Inherits from Ra1 and B2

Three patterns warrant attention against the first composite from Chapter 2.

The First Pattern: The Ricardian Inversion

The Ricardian conditions R1, R2, and R3 are satisfied in the Chinese order, through institutional architectures the libertarian tradition has historically opposed. R1 is satisfied through the state-directed banking architecture that operates capital controls and coordinates lending across the financial system. R2 is satisfied through the *hukou* system's engineered administration of internal labour mobility. R3 is satisfied through the industrial-cluster system the state has constructed and maintains. The conditions Ricardo identified in *Principles* I.VII as constitutive of the comparative-advantage theorem are reproduced at scale in the contemporary global economy by the order that operates farthest from the architecture the libertarian tradition's contemporary articulation defends.

The contemporary Western order, examined in Chapter 2, does not satisfy R1, R2, or R3 in the form Ricardo's theorem requires. The contemporary Chinese order satisfies all three. The institutional architectures producing the satisfaction in the Chinese case are the architectures the libertarian tradition's analytical framework identifies as the failure cases for the broader conditions of the tradition's argument: state-directed capital allocation, administrative coordination of labour mobility, sovereign planning of bounded productive units. The conditions the tradition's central trade-theoretic figure specified as necessary for the mutual-benefit conclusion of comparative-advantage trade are satisfied through institutional mechanisms the same tradition's broader analytical framework classifies as the failure cases.

This finding is the chapter's central comparative result, which I call the Ricardian inversion. The order the libertarian tradition's vocabulary classifies as the antithesis of its preferred architecture is the order that operates closest to what the tradition's central trade-theoretic figure specified as necessary for the mutual-benefit conclusion of trade.

The Second Pattern: The Distinctness of the Two Orders' Failures

The Western order fails the libertarian tradition's conditions through the institutional sequence of dismantlement that operated across the post-1980 period: the conditions were progressively eliminated across the four-decade history through legislative-regulatory and institutional reorganisations whose effect was to remove the frictions the conditions required (Chapter 2 §2.7's composite registered the empirical pattern). The Chinese order fails the libertarian tradition's broader conditions through a different institutional pattern: the conditions are partly satisfied in the consumer-goods sector and operate through institutional engineering in the strategic sectors, with the order's central operating principle being the integration of state and producer interests the tradition's analytical framework classifies as state capitalism. The two failure patterns are distinct in form, even where the cumulative non-satisfaction of the broader conditions across the thirty-one items registers in both composites.

The Third Pattern: The Asymmetric Satisfaction of the Ricardian Conditions

The two composites register an asymmetric satisfaction across the most architecturally specifiable conditions of the libertarian tradition's central trade-theoretic figure. The Western order satisfies neither the Ricardian conditions nor the broader libertarian conditions, with the Ricardian failures operating through dismantlement and the broader failures operating through the patterns Chapter 2 documented. The Chinese order satisfies the Ricardian conditions through engineering and fails the broader libertarian conditions through the patterns this chapter has documented.

The asymmetry is the chapter's central comparative finding. The conditions Ricardo identified as necessary for the comparative-advantage theorem are reconstructed at scale only where sovereign power maintains them, and the order that does so is not the order the libertarian tradition's contemporary articulation defends.

The Composite Stated in Compact Form

Neither the contemporary Western order nor the Chinese order is the order the libertarian tradition's economic theorems describe. The Western order is the tradition's institutional vocabulary applied to an architecture that fails the conditions the tradition's central figures identified as constitutive. The Chinese order is the reconstruction of the Ricardian conditions through institutional means the tradition's broader analysis identifies as the failure case. The order the tradition's vocabulary describes, which is decentralised coordination through dispersed agents whose substrate-coupled situated knowledge the price mechanism aggregates, with capital and labour and the bounded productive unit operating through the conditions Ricardo and Smith and Hayek and Friedman identified, does not exist at scale in either contemporary order.

3.7 What the Chapter Has Produced and What It Has Not

The chapter has applied the libertarian tradition's own conditions to the empirical record of the contemporary Chinese order's operation across the period since the late 1970s. The examination has used the same analytical resources Chapter 2 applied to the contemporary Western order, with the discipline that the comparison is conducted at the empirical level and not on the basis of analytical frameworks the chapter has not supplied. The findings are registered against the documentary record from the standard institutional-historical literature on the Chinese economy.

The chapter has produced two findings the prior chapter could not produce, because the prior chapter examined only one order. The first is the Ricardian inversion: the Chinese order satisfies the Ricardian conditions through institutional architectures the libertarian tradition has historically opposed, and does so at scales the contemporary Western order has not approached in forty years. The second is the asymmetric pattern of failure across the broader libertarian conditions: the two orders fail the libertarian tradition's broader conditions through

distinct institutional patterns, with the Western order failing through dismantlement and the Chinese order failing through institutional engineering and the integration the tradition's framework classifies as state capitalism.

The chapter has not produced an account of why either order fails the broader libertarian conditions or of why the Ricardian conditions are satisfied in one order and not the other, has not produced an account of what institutional mechanism could produce the simultaneous satisfaction of all of the libertarian tradition's conditions or whether such an institutional mechanism could exist, and has not produced an account of the relation between the two orders' operations and the analytical vocabulary the libertarian tradition supplies for examining them.

The chapter has placed in view a question the chapter cannot answer on the libertarian tradition's own resources. The question is: why does the contemporary global economy, examined against the libertarian tradition's own conditions, exhibit the pattern the two composites have registered? Why do both dominant contemporary orders fail the broader libertarian conditions, and why does the order that operates farthest from the architecture the tradition's contemporary articulation defends satisfy the Ricardian conditions the contemporary Western order has eliminated? The pattern the two composites register is not a pattern of one order failing in a way the other succeeds. It is the pattern of both orders failing the broader conditions, with the conditions Ricardo identified as constitutive of comparative-advantage trade reconstructed only where sovereign power maintains them.

The libertarian tradition's vocabulary admits no analytical resources for the pattern the two composites have registered. The pattern is what the empirical record indicates. The question is what the question forces.

This is the question Chapter 4 takes up.

Part II: Why More Tools Are Needed

CHAPTER 4

Where the Tradition's Resources Run Out

4.0 What This Chapter Asks

Chapters 2 and 3 have placed in view a pattern the libertarian tradition's own analytical resources have produced and the same resources cannot account for. The Western order, examined against the conditions canonical figures of the tradition themselves specified, fails sharply on conditions central to the tradition's economic theorems and admits defence on conditions concerning moral psychology and architectural appearance (Smith 1776/1976, especially WN I.x.c.27 on producer coordination and WN IV.viii–IV.ix on legal facilitation of producer interest; Samuelson 2004 on the failure of capital immobility from inside trade-theory canon; Shiller 1981 on the variance-decomposition foreclosure from inside the finance canon; Khan 2017 on the consumer-welfare standard; Philippon 2019, Chapters 2 and 6, on concentration). The Chinese order, examined against the same conditions, satisfies the Ricardian conditions through institutional architectures the libertarian tradition has historically opposed, and does so at scales the contemporary Western order has not approached in four decades (Lardy 2014; Naughton 2018, Chapters 4 and 13; Pearson, Rithmire, and Tsai 2022, 'China's Party-State Capitalism and International Backlash: From Interdependence to Insecurity', *International Security* 47(2), pp. 135-176). The composite the two chapters have produced stands at the empirical level the tradition's own conditions specify. What is generating the pattern is not part of what the composite reports.

The question is whether the libertarian tradition's resources are sufficient to produce that account. The chapter takes the question up step by step. It examines what the composites of Chapters 2 and 3 contain at the points where the tradition's resources meet the empirical record, names the configuration of findings the examination identifies, and asks what kind of work the configuration licenses.

4.1 What the Composites Contain

The composites Chapters 2 and 3 produced have to be examined at the points where the libertarian tradition's framework meets the empirical record it has itself produced. Five locations in the composites are where the chapter conducts the examination. The first three are drawn from the Western composite, where the framework's commitments meet the contemporary order whose institutional realisation the framework's defenders take the order to constitute. The fourth is drawn from the platform register, where the framework's apparatus encounters an institutional form the framework was not constructed to address. The fifth is drawn from the Chinese composite Chapter 3 produced, where the framework's predictions meet an order satisfying the libertarian tradition's central economic conditions through institutional architectures the framework has historically rejected. The five locations are worked through one by one. The terminology the chapter will need to talk about what the locations contain is introduced where the cases force the chapter to need it, and not before.

Smith's anti-conspiracy commitment

The first location is Smith's prohibition on legal facilitation of producer combination, examined against the empirical record of the contemporary order's antitrust architecture. Smith's *Wealth of Nations* Book I, Chapter X, Part II, specifies, in language the libertarian tradition has historically treated as authoritative, that the law ought to do nothing to facilitate the assembly of producers' interest into structural concentrations against the consumer (Smith 1776/1976, WN I.x.c.27, p. 145 in the Glasgow Edition; the reading is at Fleischacker 2004, *On Adam Smith's Wealth of Nations*, pp. 130–151, on Smith's analysis of producer combination). The commitment is canonical for the libertarian tradition, and the contemporary defender holds it with the authority of Smith's own text.

The contemporary antitrust architecture, developed across the period since Bork 1978 forward under the consumer-welfare doctrine the *Chicago* school's influence on enforcement made operative, conducts its work through a test the libertarian tradition's defenders treat as the legitimate institutional realisation of Smith's vigilance: a transaction or institutional configuration is admissible unless it can be demonstrated to produce a measurable price effect on the consumer in the short run (Khan 2017, "Amazon's Antitrust Paradox," on the test's operative shape; Wu 2018, *The Curse of Bigness*, on the institutional history; Philippon 2019, *The Great Reversal*, especially Chapters 2 and 6, on the empirical record of concentration the architecture has admitted). The empirical record across the four decades the architecture has operated shows structural concentration of the kind Smith's text identified as the principal danger the law should not facilitate, at scales the contemporary economic literature documents extensively. The architecture has not registered the concentration as a candidate for legal action under its operative doctrine, because the doctrine the architecture conducts its work under takes the absence of measurable short-run consumer harm as sufficient ground for non-action.

The contemporary defender therefore holds two commitments at the same moment. The first is Smith's prohibition on legal facilitation of producer combination. The second is the legitimacy of the legal architecture the empirical record demonstrates has rendered combination legally invisible. The two commitments are incompatible on the libertarian tradition's own resources. The defender cannot endorse both Smith's text and the architecture the text would have placed under the prohibition, and the incompatibility is not a matter of interpretation: it follows from applying Smith's own language to the architecture's record on the framework's own terms. The defender's choices are to abandon Smith's prohibition or to abandon the legitimacy of the contemporary architecture. The libertarian tradition's contemporary articulation has been declining the choice.

Ricardo's capital-immobility condition

The second location is Ricardo's specification of the comparative-advantage theorem against the empirical record of the contemporary order's capital-account-liberalised architecture. The theorem, as Ricardo set it out in Chapter 7 of the *Principles*, treats comparative advantage as the operative principle under which the gains from trade between nations are produced; the theorem requires, as an operative condition of the gains' realisation, that capital be substantially immobile between the trading nations (Ricardo 1817/1951, *Principles of Political Economy and Taxation*, Chapter 7, pp. 132–149, in the Sraffa edition; on the reading of the immobility condition, Samuelson 2004, 'Where Ricardo and Mill Rebut and Confirm Arguments of Mainstream Economists Supporting Globalization', *Journal of Economic Perspectives* 18(3), pp. 135-146). The condition is not incidental to the theorem. The theorem's derivation depends on capital being committed to its national economy with sufficient stability that comparative-cost differences within each nation determine the production pattern; if capital can move at low friction between nations, the theorem's logic fails to produce the gains the theorem predicts, as Samuelson 2004 demonstrated from inside the trade-theory canon (Samuelson 2004 in the *Journal of Economic Perspectives* on the failure of the Ricardian gains when capital is mobile and technology transferable).

The contemporary order's architecture has produced capital mobility at scales the immobility condition forecloses. The capital-account-liberalised regime, instituted progressively across the period since 1971 and operative across the OECD economies and the integrated emerging-market economies since the late 1990s, treats

capital mobility as a feature of the architecture rather than as a variable to be regulated against the Ricardian condition. The empirical record documents the consequences: investment patterns shaped by capital's willingness to relocate across borders; productive capacity migrating to lower-cost jurisdictions in ways the theorem's national-production logic does not predict; the gains the theorem promised distributed across populations the architecture's design did not contemplate as the relevant unit of analysis.

The contemporary defender of the architecture holds two commitments at once. The first is the comparative-advantage theorem in the form the libertarian tradition canonises as the central theoretical defence of free trade. The second is the legitimacy of the architecture the empirical record shows has produced capital mobility at scales the theorem's operative condition forecloses. The two commitments are incompatible on the libertarian tradition's own resources. The chapter has now encountered, for a second time, the same form of incompatibility. The location takes the same form as the first: a foundational text of the libertarian tradition meets a contemporary institutional architecture, and the defender cannot hold both the text's specification and the architecture's record on the framework's own terms.

Hayek's dispersed-knowledge argument

The third location is Hayek's argument that the price mechanism aggregates dispersed knowledge, examined against the empirical record of the contemporary order's asset-price-formation architecture. Hayek's 1945 paper "The Use of Knowledge in Society" is the canonical statement (Hayek 1945, *American Economic Review* 35(4), pp. 519–530; the paper has been elevated by the tradition's contemporary articulation to a central defence of the price mechanism as a discovery procedure that aggregates information the central planner cannot possess). The argument's operative claim is that prices, formed under conditions the argument specifies, contain information about the substrate-state of supply and demand that no other apparatus can match.

The contemporary order's asset-price-formation architecture is the institutional locus at which the claim meets the empirical record. Shiller's 1981 paper in the *American Economic Review*, working strictly inside the finance canon, demonstrated that contemporary asset prices exhibit variance substantially exceeding what the rational-expectations framework's aggregation argument can account for; the variance is incompatible with prices being the efficient summary of the substrate's underlying state (Shiller 1981 in the *American Economic Review* 71(3), pp. 421–436; with the analytical follow-up at Shiller 2003, "From Efficient Markets Theory to Behavioural Finance," *Journal of Economic Perspectives* 17(1), pp. 83–104). The finding was conducted from inside the framework's own apparatus. The variance-decomposition result is not an external critique; it is what the framework's resources, applied to the empirical record on the framework's terms, return when the substrate's underlying volatility is measured against the prices' observed volatility.

The contemporary defender holds the dispersed-knowledge argument's truth-conducive aggregation claim alongside the legitimacy of the contemporary order's asset-price-formation architecture and the variance-decomposition record the architecture has produced, and the two commitments cannot be held together on the framework's own resources. The defender cannot hold both the Hayekian claim that prices aggregate information accurately and the empirical record that prices in the most consequential price-formation register the architecture conducts (asset prices, where the dispersed-knowledge claim's authority is most strongly invoked in the contemporary defensive register) exhibit variance the claim cannot explain. The chapter has now encountered the same form of incompatibility three times.

The recurrence requires the chapter to name what it has been encountering. The form is constant across the three cases. A foundational commitment of the libertarian tradition's framework meets the contemporary order's institutional architecture; the commitment, applied to the architecture's empirical record, returns a finding incompatible with another commitment the framework holds; the defender cannot hold both. The existing vocabularies of economic methodology, philosophy of science, and the libertarian tradition's own self-description do not contain a single word for the feature this case shares with the first. I call it a *seam*. The seam is the location at which a paradigm's own commitments, applied to the empirical record the paradigm itself authorises, return

findings the paradigm cannot integrate without invoking what it has formally excluded as inadmissible. The seam is not a fact of interpretation: it follows from applying the framework's own commitments, on the framework's own terms, to the empirical record the framework itself has produced. Better application of the framework's apparatus does not close it, because the seam holds in the commitments themselves, not in how the commitments are applied. The seam is the diagnostic signature of a constitutive limit: the place where the framework cannot complete the account it has set out to give without invoking what it has formally placed outside its admissible apparatus.

Smith's reputational mechanism at the platform register

The fourth location is Smith's account of reputational propagation as the mechanism through which producer conduct is disciplined by consumer assessment, examined against the empirical record of the contemporary platform-mediated review architecture. Smith's framework treats reputational propagation as the operative mechanism that aligns producer interest with consumer interest under conditions where exchange occurs across distance and direct moral assessment is unavailable to the consumer (Smith 1776/1976, WN I.x.b.5 and WN I.ii.2, on the conditions under which reputational propagation operates; the reading is at Otteson 2002, *Adam Smith's Marketplace of Life*, pp. 100–169, on the conditions Smith's account presupposes).

The contemporary platform-mediated review architecture conducts reputational propagation at velocity and fidelity exceeding what unmediated exchange across distance once permitted. The architecture produces the producer-consumer reputational discipline Smith's framework predicts as the success case: producers whose conduct fails consumer assessment lose market position; producers whose conduct succeeds gain it. The empirical record of platform-mediated commerce documents the operation across product categories the literature has examined at length (Khan 2017, "Amazon's Antitrust Paradox," on the structural position of dominant platforms; Khan 2019, "The Separation of Platforms and Commerce," *Columbia Law Review* 119(4), pp. 973–1098, on the analytical distinction between the platform's role as marketplace and its role as participant in the marketplace; Pasquale 2015, *The Black Box Society*, Chapters 3 and 4, on the architectural opacity of platform-mediated reputation).

The framework registers the success, and producer-consumer reputational discipline operates as Smith predicted. The platform is doing something else the framework does not register. The platform is the architecture within which the propagation is conducted. The platform sets the conditions under which review information is gathered, ranked, displayed, and made available to subsequent consumers. The platform is also a participant in the market the platform is conducting: the platform competes with producers whose products it lists; the platform sets terms for inclusion and visibility under criteria the platform itself specifies. The framework's apparatus treats reputational propagation as occurring between producers and consumers, with the architecture within which the propagation occurs treated as a neutral medium that does not enter into what propagates. Platforms operate as something other than such a medium: a platform conducts an operation the framework's apparatus has no analytical category for, because the operation is not the act of an identifiable agent with a specifiable preference making a choice in a market; the operation is the architecture's setting of the conditions under which what the framework would recognise as choice can be conducted at all.

The location differs in structure from the first three. There is no incompatibility between the framework's foundational commitment and the empirical record. The framework holds Smith's account of reputational propagation. The empirical record confirms reputational propagation operates between producers and consumers on the platform. The framework's resources are not in contradiction with what the record shows. The framework's resources are insufficient to reach what the record contains: the platform-level operation the framework's apparatus has no category to register. The chapter has encountered a seam of a different kind. The two forms now in view do not share a name in the existing literatures, and the distinction between them is not drawn in any vocabulary the philosophical or economic literatures contain. I name the two kinds the *paradox-seam* and the *unaccountability-seam*. A paradox-seam is the location at which two commitments the framework holds are jointly untenable on the empirical record. An unaccountability-seam is the location at which

the framework registers a finding but lacks the resources to account for the mechanism producing it. The first three cases were paradox-seams. The platform case is an unaccountability-seam: the framework's apparatus runs out before the empirical record's mechanism is reached.

The Chinese order's Ricardian satisfaction

The fifth location is the Chinese order's satisfaction of the Ricardian conditions documented in Chapter 3, examined against the libertarian tradition's framework. The contemporary Chinese order satisfies the Ricardian conditions through institutional architectures (state-directed banking, the *hukou* labour-mobility system, the industrial-cluster system) the libertarian tradition's framework treats as inadmissible forms of institutional engineering (Lardy 2014, *Markets over Mao*, Chapters 2 and 3, on the banking architecture; Pearson, Rithmire, and Tsai 2022, 'China's Party-State Capitalism and International Backlash: From Interdependence to Insecurity', *International Security* 47(2), pp. 135-176, on the integration of state and producer; Naughton 2018, *The Chinese Economy: Adaptation and Growth*, Chapter 13, on the industrial-cluster system). The framework predicts that an order satisfying the Ricardian conditions through such architectures should fail at conditions concerning entrepreneurial alertness, dynamic competition, and consumer sovereignty. The Chinese order does fail at several such conditions. It also satisfies R1 through R3 at scales the contemporary Western order, dismantling its own Ricardian preconditions across the period since 1971, has not approached in forty years.

The framework registers the failures and registers the satisfactions. What the framework does not register is what the Chinese order's institutional engineering is doing that produces the satisfactions. The engineering operates through forms the framework treats as outside the class of admissible economic mechanism: state direction of banking flows toward strategic sectors; administrative restriction of labour mobility across regions; coordinated cluster development that pools complementary producers in geographic proximity. Each form, considered as an economic mechanism, is what the libertarian tradition's framework places in the category of inadmissible institutional design, on grounds the tradition has elaborated across its canonical texts. The mechanisms produce the satisfactions the framework documents, and the framework has no apparatus to explain how. The Chinese case is an unaccountability-seam of the same form as the platform case: the framework registers what is happening; the framework's resources are insufficient to reach the mechanism producing it.

What the five cases together produce

The five locations together exhibit two distinct forms. Three are paradox-seams: the framework holds two commitments the empirical record renders jointly untenable. Two are unaccountability-seams: the framework registers an empirical finding the framework's apparatus has no resources to explain. Across the five, the framework has been examined on its own commitments, applied to the record the framework itself produces as legitimate, and the framework has failed to carry its account through in each case. The five together produce a finding the chapter will draw out: the seams are not isolated points of difficulty the framework's defenders can address one at a time by adjusting the framework's apparatus locally, and the seams cluster at a single kind of location in the framework's operations.

The chapter's working vocabulary has emerged from the cases. *Seam* is the technical term for the location at which the framework's commitments cannot be held together with its record on its own resources. *Paradox-seam* is the strict case of incompatibility between commitments. *Unaccountability-seam* is the case of framework-resources insufficient to reach a finding the framework has registered. The resources the framework excludes as inadmissible, and which any account that would complete what the framework cannot would have to invoke, are what I call the framework's *constitutive outside*. The term is mine; it names a feature the existing methodological vocabularies do not isolate. The seam and the constitutive outside are paired pieces of analytical apparatus the chapter has been forced into by the working-through. The seam is where the framework's resources run out. The constitutive outside is what the framework has excluded that the empirical record would require.

4.2 What the Recurrence Indicates

The five seams the working-through of §4.1 has identified share a feature beyond their being seams. They cluster at a single kind of location in the framework's operations, and the location is the same across the five. The framework conducts its analysis from a position it treats as outside the order whose mechanisms the framework is examining. The price-formation mechanism is described as if from outside the order whose prices are being formed. The exchange architecture is described as if from outside the architecture's operations. The reputational propagation is described as if from outside the platforms within which the propagation occurs. The capital movement is described as if from outside the institutional infrastructure that produces the movement. The institutional engineering is described as if from outside the order whose institutions are being engineered. The framework's contemporary defensive form conducts its analysis from a vantage the framework treats as available, the order treats as occupiable, and the empirical record of the order's actual operations does not allow.

The same vantage-position produces the same form of seam across cases drawn from different institutional registers (antitrust, trade, finance, platform commerce, comparative orders), different canonical figures of the tradition (Smith on producer combination, Ricardo on capital and trade, Hayek on dispersed knowledge), and different contemporary architectures. The seams are not five independent points at which the framework happens to fail. They are five instances of the framework failing at the same kind of location, where the location is given by the framework's standing methodological commitment to conducting its analysis from a position the order's actual operations do not contain.

The framework has, in its contemporary defensive articulation, formally placed outside the class of admissible analysis the very resources an account that would reach the empirical record would have to invoke. The exclusion is not a contingent feature of the framework's recent shape that some sharpening could repair. The exclusion is constitutive of the framework's standing analytical commitments, organising what the framework will admit as legitimate analytical material and what it will not. The framework cannot relinquish the exclusion without ceasing to be the framework its defenders are defending. The seams are signalling, at the locations they have appeared, that the empirical record the framework has produced cannot be carried through to an account of what is producing it without invoking what the framework has placed in its constitutive outside.

What the constitutive outside contains, and what the resources that would carry the account through would look like, is not what the present chapter undertakes to specify. The chapter has shown where the framework's resources run out, and has shown that the running-out is not local: the seams cluster at a location internal to the framework's standing methodological commitments. The work of specifying what the framework has excluded, and how that exclusion can be reached without abandoning analytical rigour, is the work the rest of the book conducts.

4.3 The Long Record of This Form

A conceptual framework, in conducting analysis of an object, conducts the analysis under categories the framework itself supplies. The framework's categories let some questions be asked and answered; the framework's categories also fix the conditions under which questions of that kind can be asked at all. When the analysis is extended beyond the conditions, the framework does not register the extension as a category-mistake. It registers strange recurring problems instead: paradoxes that cannot be dissolved by tightening procedures, contradictions the apparatus was meant to rule out, undecidables the apparatus was meant to decide, phenomena the apparatus has no vocabulary for. The wall the framework has hit is invisible from inside the framework. The framework has no apparatus for distinguishing a problem soluble within its categories from a problem produced by the categories themselves.

The pattern recurs across domains that have little in common other than the recurrence. The most rigorous sciences are not exempt. The pattern's clearest historical demonstrations come from the philosophy of mathematics, where the conditions on proof are the most demanding any discipline has set itself, and where the figures who hit the walls were trying to settle their disciplines on absolutely secure foundations. When the rigour

at which the discipline operated meant that no procedural tightening could be evaded, the structural character of the problem became visible.

The chapter conducts the case study for two reasons. The first is that the libertarian tradition's contemporary defence treats the chapter's diagnosis as outside the admissible space of economic argument, and the case study shows that the form of diagnosis the chapter is conducting has a long record in disciplines whose admissible-argument space is far more restrictive than economics. The second is that the case study shows what the wall looks like and what the move that resolves the situation looks like. The reader who has the form of move in mind, having watched it conducted across two and a half millennia, can read §4.4 and §4.5 with the form in view.

The form the chapter has been forced into by working through the composites has been encountered across the past century in the philosophy of mathematics and in the economic discipline itself. The chapter did not begin from a methodological commitment to the form. The chapter began from the composites of Chapters 2 and 3 and was driven, by the working-through of the five locations, into the form the coinages of §4.1 name; the recognition of the form's recurrence elsewhere in the long record is retrospective.

The ten cases the chapter now sets out (four from the philosophy of mathematics, six from economics) are not instances of the framework §4.1 has developed. None of the figures the ten cases name used the vocabulary §4.1 introduced. Zeno did not encounter a seam; Aristotle did not work out the constitutive outside of the Eleatic framework; Frege did not formalise an unaccountability-seam; Gödel did not develop a paradox-seam in the Hilbert programme; Pigou did not name what he extracted as a paradigm's constitutive outside. Each figure conducted the diagnostic move under the vocabulary that figure's own discipline supplied (paradox, antinomy, contradiction, incompleteness, externality, transaction cost, information asymmetry, bounded rationality, institutional rule, non-rival good), and the figure's contribution stands in those terms. The coinages of §4.1 are what allow the chapter to recognise the ten cases as instances of a single form, where the existing terminology in each discipline named only the form's local appearance in that discipline's frame. Without the coinages, the ten cases are ten unrelated developments in the history of mathematics and economics. With the coinages, they are ten instances of the same diagnostic move (a paradigm's own commitments, applied to the empirical record the paradigm itself authorises, returning findings the paradigm cannot integrate without invoking what it has formally excluded), conducted under ten different local vocabularies across two disciplines over two and a half millennia.

The ten cases carry an additional weight in the economic register: the discipline has, in each instance, awarded its highest institutional honours to the figures who conducted the move, and treats the once-excluded categories as the foundations of its contemporary analytical apparatus. The libertarian tradition's contemporary defenders are treating as inadmissible the same kind of move the discipline has decorated heavily and absorbed without trace.

The mathematical record

The diagnostic function of paradox is a position with a developed history in the philosophy of mathematics. Zeno of Elea's paradoxes of motion, transmitted through Aristotle's *Physics*, are now standardly read as demonstrations that the categories of magnitude, infinity, and continuity available to fifth-century Greek philosophy could not coherently account for motion as a phenomenon to which the categories were being applied (Aristotle, *Physics* VI.9, 239b5–240a18, in the Hardie and Gaye translation in the Barnes 1984 edition; on the historical reconstruction, Kirk, Raven, and Schofield 1983, pp. 263–279). The application of more rigorous fifth-century technique to fifth-century categories was never going to dissolve the paradoxes. Aristotle's response was the development of new categories (the distinction between potentiality and actuality, the continuum as infinitely divisible rather than as composed of indivisible points), under which what had appeared as paradox under the prior categories ceased to be paradox (Aristotle, *Physics* III.6, 206a9–206b33; with the philosophical reconstruction at Lear 1981, pp. 91–101). The structure the present chapter is identifying appears here in its earliest form. A paradox is a sign that the framework has been applied beyond the conditions under which its own categories can carry the application, and the move that resolves the situation is the development of new categories rather than the tightening of procedures inside the old.

Kant's antinomies of pure reason performed the diagnostic operation at a higher level of generality, and the *Critique of Pure Reason*'s reception across two centuries reads the antinomies as symptoms that reason is operating beyond the conditions under which its operations can yield determinate results (Kant 1781/1998, A405–567/B432–595; the reading on which the chapter draws is at Allison 2004, pp. 357–395; Bennett 1974, *Kant's Dialectic*, especially Chapters 7 and 8). Kant's response was a delimitation of the conditions rather than a tightening of the procedures the prior conditions had authorised, and the delimitation was conducted from a position the prior procedures could not occupy. When a framework's own assumptions, applied to their object, generate determinations the framework cannot integrate, the move that resolves the situation is not within the framework but at the boundary the framework had treated as the limit of admissible work.

The philosophy of mathematics in the late nineteenth and early twentieth centuries furnishes the case the chapter examines in fullest detail. The figures involved understood themselves to be settling the question of what mathematics is, on which the philosophical and the mathematical tradition had been working for over two millennia, and they were treating the question as on the point of being settled.

Through the eighteenth century and into the early nineteenth, the dominant philosophical account of mathematical knowledge had been Kant's, who in the *Critique of Pure Reason* (Kant 1781/1998, A19–49/B33–73) had treated mathematical truths as *synthetic a priori*, grounded in the pure forms of intuition: space as the form that grounds geometry, time as the form that grounds arithmetic. Mathematics on this account was the structure we impose on the world by being the kind of beings we are, rather than something we find in the world. Geometry had been the foundational branch of mathematics for over two millennia, since the Greek discovery that some magnitudes (the diagonal of a unit square, for instance) cannot be expressed as a ratio of whole numbers. Arithmetic could handle only what was countable and rational; geometry could always draw a continuous line, and Eudoxus's theory of magnitudes let geometric reasoning proceed with incommensurable quantities that arithmetic could not represent. Continuous quantity belonged to geometry, and the rest of mathematics involving continuous magnitudes (areas, volumes, ratios, the calculus when it eventually arrived) was conducted in geometric terms. Descartes's *La Géométrie* (1637), the appendix to the *Discourse on Method*, made the first systematic connection between algebra and geometry by assigning coordinates to points so that a curve like the parabola became a relation between numbers ($y = x^2$) rather than a figure that could only be drawn. The connection was a partial inversion of the ancient hierarchy: a geometric object could now be analysed through arithmetic. The nineteenth century completed the inversion. The non-Euclidean geometries of Lobachevsky (publishing from 1829), Bolyai (publishing from 1832), and Riemann (whose habilitation lecture was delivered in 1854), demonstrated that consistent geometries existed in which Euclid's parallel postulate failed, and that consistent geometries in which space was curved were as defensible mathematically as Euclid's flat geometry was; the question of which geometry actually described physical space could no longer be read directly off intuition.

Gauss, in his 1830 letter to Bessel, wrote that geometry should now be ranked with mechanics rather than with arithmetic, which alone he held to be "purely aprioristic" (Gauss to Bessel, 9 April 1830, in *Werke* VIII, p. 201). The arithmetisation of analysis, conducted from Cauchy's *Cours d'analyse* (1821) through the work of Bolzano, Weierstrass, Dedekind, Heine, Méray, and Cantor across the next half-century, eliminated geometric intuition from the proofs of the calculus by reducing the real numbers and the operations on them to constructions out of the rationals, the rationals to constructions out of the integers, and the integers to constructions out of the natural numbers. One concrete instance of the reduction makes the move legible: Dedekind in 1872 defined an irrational real such as √2 by partitioning the rational numbers into two sets, those whose square is less than 2 and those whose square is greater than 2, and taking the partition itself (the *Dedekind cut*) to *be* the real number √2 (Dedekind 1872/1963, *Continuity and Irrational Numbers*). The irrational number is no longer a geometric magnitude that arithmetic cannot quite catch; the irrational number is a construction out of the rationals, and the rationals are themselves constructions out of the integers, and the integers are constructions out of the naturals. By 1872 the reduction was substantially complete (the year is the "red-letter year" in the standard reconstruction at the SEP entry on Dedekind). The two-thousand-year hierarchy that had placed geometry at the centre of mathematical knowledge had been inverted. The unreduced bedrock on which the rest of mathematics now sat was the natural numbers (Boyer and Merzbach 1991, *A History of Mathematics*, chs. 23–25; Jahnke 2003, *A History of Analysis*, chs. 6–10).

Set theory begins, as a mathematical discipline, with Georg Cantor's papers across the 1870s and 1880s, the founding paper being "Über eine Eigenschaft des Inbegriffes aller reellen algebraischen Zahlen" (Cantor 1874, *Journal für die reine und angewandte Mathematik* 77, pp. 258–262). A set in Cantor's sense is a well-defined collection of objects, taken as a single mathematical entity. The objects can be numbers, points, functions, or other sets, and the collection is well-defined when there is a determinate fact of the matter about whether any given object belongs to it. The shoes on one's feet form a set; the natural numbers form a set; the real numbers between zero and one form a set. The empty set, containing no objects, is also a set. Set theory's contribution to the arithmetisation programme was a vocabulary in which the natural numbers, the integers, the rationals, and the reals could all be constructed from the single primitive of the set, conducted at a level of generality that earlier arithmetical work had not reached.

Cantor's most consequential result, and the one that established his method as a tool the rest of the foundational work would deploy, was the demonstration that the real numbers cannot be enumerated. The argument, published in 1891 (Cantor 1891, "Über eine elementare Frage der Mannigfaltigkeitslehre," *Jahresbericht der Deutschen Mathematiker-Vereinigung* 1, pp. 75–78), runs as follows. Suppose someone claims to have produced a list pairing every natural number with a distinct real number between zero and one, so that every real in the interval appears somewhere on the list. Cantor's move is to construct, from any such list, a real that cannot be on it. The construction is the diagonal: take the first digit of the first listed real and change it; take the second digit of the second listed real and change it; take the *n*-th digit of the *n*-th listed real and change it; continue. The result is a real number whose digits, by construction, differ from the *n*-th listed real in the *n*-th decimal place, for every *n*. The constructed real cannot be the first on the list (it differs in the first digit), cannot be the second (differs in the second digit), cannot be the *n*-th (differs in the *n*-th digit), for any *n* whatsoever. The list, however assembled, is missing at least one real. The reals therefore cannot be put into one-to-one correspondence with the naturals: the reals are *uncountable*, the naturals are *countable*, and the two infinities are of different sizes. The diagonal move, applied to a list, produces an object the list cannot contain. The move would recur, with the same logical structure though different content, in Russell's paradox (the set defined by a predicate the licensing principle cannot itself accommodate) and in Gödel's construction (the formula whose self-reference the system can express but cannot resolve).

The construction can be set out formally. Take any function $f : \mathbb{N} \to (0, 1)$ proposed as a bijection, with each value written in decimal form as $f_n = 0.d_{n1}d_{n2}d_{n3}d_{n4}\ldots$. Construct a new real $d \in (0, 1)$ by setting, for each natural number n, the n-th decimal digit of d as follows:

$$d_n = 5 \text{ if } d_{nn} \neq 5, \quad d_n = 6 \text{ if } d_{nn} = 5.$$

Then d differs from f_n at the n-th decimal place for every n, so d does not appear among the values of f, contradicting the assumption that f is surjective. The cardinality of the unit interval exceeds the cardinality of the naturals:

$$|(0, 1)| > |\mathbb{N}|.$$

The question that became live in the wake of the reduction was the question Frege and Russell took themselves to be settling: what are the natural numbers? Two answers had been on offer through the mid-nineteenth century, and Frege took both to be wrong. The first was *empiricism* in John Stuart Mill's form, set out in the *System of Logic* (Mill 1843, Book II Chapters V and VI): numbers are generalisations from observed instances of collecting and separating physical objects, and the truths of arithmetic are inductive laws confirmed by the success of the operations they describe. The second was *psychologism*, the position that the laws of logic and arithmetic are descriptions of how the human mind operates when it operates correctly; the position had been developed at length by Erdmann, Sigwart, Beneke, and later Lipps in the German philosophical tradition, and dominated the late-nineteenth-century academic field on both sides of the Channel. Frege's complaint against both positions, conducted at length in the *Grundlagen* introduction (Frege 1884, §§ vi–xvii) and developed into a sustained polemic in the Foreword to *Grundgesetze* Volume I (Frege 1893, in the Ebert and Rossberg translation 2013, pp. xiv–xxvi), is that they get the modality of arithmetical truth wrong. If arithmetic is psychology, then arithmetical truth is contingent on the structure of human minds, and a differently constituted being would have different arithmetical truths to acknowledge. If arithmetic is empirical generalisation, then arithmetical truth is contingent on the world having behaved in a certain way until now. The truth that 7+5=12 should hold for any rational being whatsoever, in any world whatsoever; Frege held that this view confuses *that which is grasped* with *the grasping of it*, and that the content of an arithmetical truth is independent of the act through which any mind reaches it. Kant's transcendental idealism stands apart from the psychologism-empiricism pairing the *Grundlagen* and *Grundgesetze* take down together, and a substantive engagement with Kant's account of arithmetic falls outside the present chapter. Frege engaged Kant directly in the *Grundlagen* and accepted the synthetic-a-priori framing while rejecting the appeal to pure intuition as ungrounded; the quarrel turned on what makes arithmetical truth necessary, with both Frege and Kant treating the truth as objective.

The alternative Frege proposed, and to which Russell at Cambridge independently came in the 1890s, was *logicism*: arithmetic is a branch of logic. The natural numbers and the operations on them are definable in logical terms alone, and the truths of arithmetic are derivable from logical axioms by logical inference. The position has the advantage Frege required: if arithmetic reduces to logic, then arithmetical truth is grounded neither in the structure of human cognition nor in the operations of human minds, but in logical objects whose objectivity is independent of any mind. Frege's *Begriffsschrift* (Frege 1879, Halle: Nebert, in the van Heijenoort 1967 translation as *Concept-Script*) had developed a formal logic more powerful than any the period had produced. *Die Grundlagen der Arithmetik* (Frege 1884, Breslau: Koebner, in the Austin 1950 translation as *The Foundations of Arithmetic*) gave the philosophical case for the logicist programme. The *Grundgesetze der Arithmetik* (Frege 1893 and 1903, Jena: Pohle, two volumes, in the Ebert and Rossberg 2013 translation as *Basic Laws of Arithmetic*) was the work in which the formal-mathematical execution of the programme was conducted. The construction proceeded by treating the *extension of a concept* as a basic logical notion. Frege's vocabulary distinguishes *concepts* from their *extensions*. A predicate expresses a concept: the predicate "x is a horse" expresses the concept *is a horse*. The extension of the concept collects every entity the concept is true of, so the extension of *is a horse* contains every horse there is. The principle on which the construction rested, formulated as *Basic Law V* in the *Grundgesetze* and known elsewhere as the *unrestricted comprehension principle*, says that any well-formed predicate determines a set, namely the set whose members are the entities the predicate applies to. The principle was treated by Frege as logically self-evident.

Russell's own logicist project had been developing alongside Frege's across the 1890s. Russell finished a first draft of *The Principles of Mathematics* on 31 December 1900; in the late spring of 1901, in May or June, while continuing to work through the apparatus, he noticed that the unrestricted comprehension principle Frege had codified as Basic Law V produced the contradiction the next paragraphs set out. Russell revised the *Principles*

manuscript across the year and a half that followed, and added an *Appendix B: The Doctrine of Types* sketching a first response to the paradox; the revised manuscript reached the publisher in early June 1902, two weeks before Russell wrote to Frege with news of the contradiction (Russell 1903, *The Principles of Mathematics*, Cambridge: Cambridge University Press, with Appendix B at pp. 523–528; the chronology is reconstructed at Grattan-Guinness 2000, pp. 310–319, and at Moore's editorial introduction to *Towards the 'Principles of Mathematics' 1900–1902*, Russell 1993). The first edition of *The Principles of Mathematics* was advertised as "Volume I" of a projected series whose subsequent volume was to conduct the formal-mathematical execution of the programme in symbolic notation. The execution was abandoned in the form *Principles* had advertised and resumed across the decade that followed as a new project Russell took up with Alfred North Whitehead. The new project produced the *theory of types* and the formal system set out across three volumes as *Principia Mathematica* (Whitehead and Russell 1910–1913), with Cardinal Arithmetic developed in Volume II, Part III.

Two men set themselves the task of demonstrating, from logic alone, that one and one make two. They worked on the demonstration for the better part of a decade. The three volumes that resulted run to some two thousand pages of symbolic notation, and the proof that 1+1=2 arrives, when it arrives, on a page deep inside the second volume.

The construction can be followed in plain language and in the order in which Whitehead and Russell conducted it. The starting object is the *class*: a collection of things determined by a predicate. The Beatles form a class: anyone the predicate "is a member of the Beatles" applies to is in the class (John, Paul, George, Ringo), anyone it does not apply to is out (the milkman, the Pope, the reader). Two classes count as *similar* when their members can be paired off one-to-one. The Beatles can be paired off one-to-one with the four wheels on a car, with the four suits in a pack of playing cards, with the four members of any other quartet, and the pairing is conducted without anyone counting. The cardinal numbers can then be defined from classes and similarity alone. The *cardinal number four* is the class of all classes similar to the Beatles, so that every four-membered class whatever (the four suits, the four wheels, the four members of ABBA, the four directions, the four seasons) is a member of the cardinal four, and the cardinal four *is* that class of classes. The same construction gives the cardinal *two* as the class of all two-membered classes (any pair: a married couple, two shoes, two parents), the cardinal *one* as the class of all singletons (the Moon, the Queen, any one thing), and the cardinal *zero* as the class containing only the empty class (the class of unicorns currently in Hyde Park, the class of integers between 3 and 4, every such empty class). Addition follows from disjoint union: a class of two apples and a class of three oranges, sharing no members, combine into a union with five members, and the cardinal of the union is the cardinal two plus the cardinal three.

Behind this thought sits a patient construction and a heavy apparatus. Volume I sets out the propositional and predicate logic the system requires. The theory of types is built into the apparatus to keep the system from collapsing under the contradiction Russell had already identified in Frege's work. Volume II's Part III opens with the construction of cardinal numbers from classes. The reader who follows the construction from the first page through the apparatus of classes and relations and the theory of types and the cardinal-number definitions arrives, some eight hundred pages in, at Volume II, Proposition 110.643, where Whitehead and Russell derive that 1+1=2.

The accompanying remark, written in the dry register *Principia* maintains throughout, observes that "the above proposition is occasionally useful."

For all the apparatus the construction requires, the whole edifice rests on a principle that can be stated in one line: any well-formed predicate determines a class.

The principle is the *unrestricted comprehension principle* Frege had codified as Basic Law V, and it licenses every class the construction has used, from the empty class through the singletons through the two-membered classes through the cardinals themselves. The construction is the most ambitious philosophical-mathematical execution of the period, and it is the construction whose founding principle Russell himself had already demonstrated could not be sustained. The contradiction Russell had identified, in May or June 1901, follows by applying the principle to a single particular predicate (Russell's own reconstruction of the discovery is at Russell

1959, *My Philosophical Development*, Chapter 7; the historical reconstruction is at Grattan-Guinness 2000, *The Search for Mathematical Roots, 1870–1940*, pp. 310–319). The contradiction can be set out step by step.

Consider the predicate *is not a member of itself*. The predicate is well-formed, composed of the membership relation (which the theory admits), the negation operator (which logic admits), and the reflexive reference to the set itself (which the predicate's grammar admits). Most sets are not members of themselves: the set of all horses is not itself a horse, the set of all the chapters of this book is not itself a chapter of this book, the set of all real numbers is not itself a real number. By the comprehension principle, the predicate *is not a member of itself* determines a set, call it R, the set of all sets that are not members of themselves. Ask now whether R is a member of itself. There are two cases. If R is a member of itself, then R is a set that is a member of itself, and R does not satisfy the predicate *is not a member of itself*, and R is not a member of R, and R is not a member of itself, which contradicts the assumption. If R is not a member of itself, then R is a set that is not a member of itself, and R satisfies the predicate *is not a member of itself*, and R is a member of R (which is the set of all such sets), and R is a member of itself, which contradicts the assumption. R both is and is not a member of itself on the principle's own terms. The principle, applied without restriction to a well-formed predicate, produces a contradiction the apparatus the principle was meant to ground cannot accommodate.

Russell, having noticed that the contradiction could not be sequestered within his own work but had to follow equally inside Frege's published apparatus, communicated the result to Frege by letter dated 16 June 1902 (the letter is reproduced in English translation at van Heijenoort 1967, *From Frege to Gödel*, pp. 124–125; Frege's reply of 22 June 1902 follows immediately, at pp. 126–128). Frege had completed Volume II of the *Grundgesetze* and was preparing it for the press; the contradiction reached him while the volume was already in production. The wider philosophical reception of the episode is collected at Moore 1982, *Zermelo's Axiom of Choice*; Hallett 1984, *Cantorian Set Theory and Limitation of Size*; and the *Stanford Encyclopedia* entry on Russell's paradox at Irvine and Deutsch 2021. Frege's response, recorded in the appendix to Volume II of the *Grundgesetze* in 1903, registered the situation with the directness for which the philosophy of mathematics has continued to read the passage: a scientific writer can hardly meet with anything more undesirable than to have one of the foundations of his edifice shaken after the work is finished (Frege 1903, Volume II, Afterword, in the Beaney 1997 selection, pp. 279–80).

Frege's Basic Law V, the licensing principle the existing apparatus had operated under, can be written

$$\forall \varphi \, \exists R \, \forall x \, (x \in R \leftrightarrow \varphi(x)).$$

Taking the predicate $\varphi(x) \equiv x \notin x$, the principle delivers a set R with

$$\forall x \, (x \in R \leftrightarrow x \notin x).$$

Instantiating at x = R yields

$$R \in R \leftrightarrow R \notin R,$$

a contradiction. The system that licenses Basic Law V derives this biconditional, and from any contradiction every formula in the language follows (*ex falso quodlibet*), so the system the tradition had taken to ground arithmetic in logic is, on its own resources, inconsistent.

Russell himself, presenting the contradiction in lectures and writings across the years that followed, gave it a popular form that has held its place in the philosophical-mathematical literature for over a century. In a certain village every man must be cleanly shaven, and there is only one barber. Each man in the village either shaves himself, or is shaved by the barber. Now ask the question: who shaves the barber? If the barber shaves himself, he is one of the men who shave themselves, and so the barber does not shave him. If the barber does not shave himself, he is one of the men shaved by the barber, and so the barber does shave him. The barber both does and does not shave himself, on the rule's own terms. The paraphrase carries the formal contradiction at the level of plain narration, with the predicate *is not a member of itself* replaced by *is shaved by the barber*, and the universal applicability of the comprehension principle replaced by the universal applicability of the village rule. The contradiction is a feature of the logical structure that lets a relation reference itself without restriction; it is neither a feature of arithmetic nor a feature of set theory.

The mathematical-philosophical community's response to the contradiction was a delimitation of the apparatus rather than a vindication of it. Ernst Zermelo, working at Göttingen, published in 1908 an axiomatisation of set theory in which the unrestricted comprehension principle was replaced by a restricted *axiom of separation*: a predicate determines a subset of an already-given set, not a set in absolute terms. The set of all sets is therefore not constructible (since the principle no longer licenses its construction from the predicate alone, and the apparatus does not supply an already-given set of which it would be a subset), and the construction of R that produced Russell's contradiction is no longer admissible. Abraham Fraenkel and Thoralf Skolem subsequently extended Zermelo's axiomatisation across the 1920s, producing the system now standard as Zermelo-Fraenkel set theory with the axiom of choice (ZFC), in which the unrestricted comprehension principle has been replaced by a layered apparatus of axioms (extensionality, regularity, separation, replacement, union, pairing, power set, infinity, and the axiom of choice) that permits the constructions mathematics requires while ruling out the construction Russell's predicate licensed (the standard textbook reconstruction is at Jech 2003, *Set Theory*; the philosophical reconstruction is at Hallett 1984). Russell himself, with Whitehead, took a different route in *Principia Mathematica*, developing a *theory of types* in which sets are organised into a hierarchy of levels and a set's members are restricted to objects at lower levels than the set itself, so that the construction of a set whose membership relation references itself is grammatically ruled out (the theory of types is set out across the introduction to *Principia Mathematica* Volume I; the philosophical reconstruction is at Linsky 2011, *The Evolution of Principia Mathematica*). In both cases the move was the same in kind. The construction that produced the contradiction was placed outside what the apparatus admits as a legitimate operation, and the apparatus was permitted to continue work within the smaller territory the restriction authorised. The original logicist claim that arithmetic is grounded in unrestricted logic could no longer be held in the form Frege and Russell had originally claimed; what could be held was the more limited claim that arithmetic is grounded in logic subject to the restrictions the foundational crisis had forced.

The seam in Frege's apparatus followed from the foundational assumption itself, not from any flaw in his procedure. The assumption the procedure operated under (that the extension of a predicate is a logical object available without restriction) could not, applied to a well-formed predicate, complete itself without producing the contradiction. The work the unrestricted apparatus could not complete had to be conducted within delimited territory: under axioms that restricted which predicates determine sets, or under an apparatus of types that organised sets into a hierarchy of levels and restricted membership to objects at lower levels than the set itself, or under some other restriction that ruled out the construction Russell's predicate licensed. Each of these moves delimited the apparatus rather than resolving the contradiction. The contradiction the unrestricted principle produced was not made to vanish; the construction that produces the contradiction was placed outside the apparatus's admissible operations. The work the apparatus could do was conducted within the smaller territory the delimitation authorised, and the logicist programme's original claim (that arithmetic is reducible to logic, that the natural numbers and operations on them are definable in logical terms alone) was held only in the form the delimited apparatus permitted, which was less than the form Frege and Russell had originally claimed. Frege himself, in the appendix to Volume II of the *Grundgesetze*, attempted a restriction of Basic Law V that would block the contradiction, and the attempted restriction was shown not long after, in work conducted in Leśniewski's seminars in Warsaw and published by Leśniewski's student Bolesław Sobociński in 1949, to render the system inconsistent in a different way: any model of the restricted system has to contain at most one object, which makes the system unusable for the arithmetic it was meant to ground (Sobociński 1949–1950, "L'analyse de l'antinomie russellienne par Leśniewski," *Methodos* 1 and 2; the standard English reconstruction is at Quine 1955, "On Frege's Way Out," *Mind* 64, pp. 145–159, with the philosophical reconstruction at Geach 1956 in *Philosophical Review* 65, pp. 408–409). Frege himself acknowledged in his later years that the project of grounding arithmetic in the logical apparatus of the *Grundgesetze*, as he had constructed it, had not succeeded.

The delimitation of set theory addressed the construction Russell's predicate had licensed. The wider crisis the contradiction had opened was not addressed by the delimitation. The contradiction had shown that mathematics, taken as the apparatus of axioms and inference-rules its practitioners actually used, could harbour contradictions whose presence the apparatus did not register from inside. If a contradiction was present, every

proposition could be derived from it (since classical logic permits anything to follow from a contradiction), and the apparatus would no longer distinguish theorems from non-theorems. The set-theoretic restrictions ensured that the Russell-style construction was no longer admissible, but they did not establish that further contradictions were not harboured elsewhere in the apparatus the restrictions still authorised. Whether the apparatus could be shown, from inside, to be free of contradiction was the question David Hilbert at Göttingen set himself to answer across the next two decades. Hilbert's programme proposed to close the crisis from within the resources mathematics already possessed.

Hilbert's response was the development, across a series of papers and lectures from 1900 through the 1920s, of what came to be called the *formalist* programme (Hilbert 1925, "Über das Unendliche," translated as "On the Infinite" in van Heijenoort 1967, pp. 367–392; the full reconstruction is at Zach 2003 in the *Stanford Encyclopedia of Philosophy* on Hilbert's programme, and at Sieg 2013, *Hilbert's Programs and Beyond*). The programme had two parts. The first was the *formalisation* of mathematics: a branch of mathematics, treated formally, becomes a system in which the propositions of the branch are expressed as sequences of symbols drawn from a finite alphabet, the axioms are designated sequences in this alphabet, and the inference rules specify mechanically which sequences may be derived from which. A proof in the formalised system is a finite sequence of symbol-sequences in which each line is either an axiom or follows from earlier lines by an inference rule. The formalisation strips the system of any reliance on the mathematician's intuition about what the symbols mean; the proof can be checked by inspection of the symbol-sequences alone. The second part of the programme was the project of a *consistency proof*: a demonstration, conducted in a meta-mathematical position outside the formalised system, that the system harbours no contradiction (in technical terms, that no symbol-sequence and its negation are both derivable as theorems). The consistency proof itself was to be conducted by *finitary* means, by which Hilbert understood reasoning that operated only on concretely surveyable, finite combinatorial objects, without invoking the infinitary methods whose admissibility was now in question. The programme's vision was that the consistency of all of classical mathematics could be established by a finitary meta-mathematical proof, and that the foundations crisis the Russell paradox had opened could thereby be closed from inside the resources mathematics already possessed.

The programme was the most ambitious foundational project the period produced. Across the 1920s, Hilbert and his collaborators (principally Paul Bernays and Wilhelm Ackermann) developed the formalisation apparatus to the point at which substantial parts of classical mathematics had been brought into a formalised system whose syntax was specifiable in detail. The meta-mathematical apparatus the consistency proof would require was being prepared alongside. As of 1929, the consistency proof for arithmetic was widely held to be within reach, the consistency proof for analysis was held to follow on its heels, and the foundations of mathematics were held to be on the verge of being secured by methods whose admissibility could not be challenged.

In 1931, a twenty-five-year-old Austrian mathematician named Kurt Gödel published a paper in the *Monatshefte für Mathematik und Physik* titled "Über formal unentscheidbare Sätze der Principia Mathematica und verwandter Systeme I" ("On Formally Undecidable Propositions of *Principia Mathematica* and Related Systems I"; the original is at Gödel 1931, translated in Gödel 1986, *Collected Works* Volume I; the accessible secondary reconstruction is at Smith 2007, *An Introduction to Gödel's Theorems*; the technical reconstruction is at Smullyan 1992, *Gödel's Incompleteness Theorems*). The paper demonstrated two results that closed the Hilbert programme as Hilbert had specified it.

The formal system of arithmetic Hilbert's programme had specified contains a finite set of basic symbols (the logical connectives, the quantifiers, the variables, the arithmetic operations) and a definite syntax for combining them into formulae. Every formula the system can express, every proof the system can construct, is at bottom a sequence of these symbols. Gödel's move is to give every such sequence a unique numerical address, calculated from the symbols themselves, so that the entire body of statements the system can express becomes a list (an infinite deck of cards, in one common image) where each card carries one formula or one proof and the card's number identifies it uniquely. The encoding works reversibly in the sense that, from the number alone, the

formula can be reconstructed. Once the encoding is in place, statements *about* formulae and proofs ("this formula is well-formed," "this sequence is a proof of that formula," "this formula is provable") become statements about the cards' numbers. And statements about numbers are exactly what the arithmetic system was built to make. The system can therefore talk about its own formulae and proofs, in its own arithmetic vocabulary, through the addresses the encoding has assigned them.

The card-image just sketched is what Gödel achieved formally through the *arithmetisation of syntax*, the construction the literature now calls *Gödel numbering*. The basic symbols of the formalised system (the logical connectives, the quantifiers, the variables, the predicates, the parentheses, the arithmetic symbols) are each assigned a distinct natural number. A symbol-sequence (a formula) is then encoded as a single natural number by an explicit construction: the *n*-th prime number is raised to the power of the *n*-th symbol's number, and the products are multiplied across all symbols in the sequence (so the formula "0 = 0" with symbol-numbers ⟨6, 5, 6⟩ encodes as 2^6 × 3^5 × 5^6, a definite large but finite natural number). A proof (a sequence of formulae) is encoded by the same operation applied at a higher level: the *n*-th prime raised to the power of the *n*-th formula's Gödel number, multiplied across all formulae in the proof. The encoding works reversibly through prime factorisation, by which the encoding number's prime factorisation recovers the original sequence. The consequence is that statements *about* the formal system (claims that this formula is well-formed, that this sequence is a proof, that this formula is a theorem) can be translated into statements *of arithmetic* about the natural numbers, because the syntactic properties of formulae and proofs become arithmetic properties of their Gödel numbers. Whether a formula is well-formed becomes a question about the structure of its Gödel number; whether a sequence of formulae is a valid proof becomes a question about the relationship between the Gödel numbers of its component formulae; whether a formula is provable in the system becomes a question of the existence of a number that codes a valid proof of the formula. Each of these meta-mathematical predicates ("is a well-formed formula," "is a proof of," "is provable in this system") can be specified as an arithmetic predicate the formalised system itself can express.

The encoding can be stated formally. An effective assignment

$$s : \mathrm{Sym} \to \mathbb{N}$$

gives each primitive symbol a distinct natural number. For a finite symbol-sequence with k entries, the encoding is

$$\ulcorner \sigma \urcorner = \prod_{i=1}^{k} p_i^{\,s(\sigma_i)},$$

where p_i is the i-th prime. With $s(0) = 6$ and $s(=) = 5$, the formula 0 = 0 has code

$$\ulcorner 0 = 0 \urcorner = 2^6 \cdot 3^5 \cdot 5^6 = 243{,}000{,}000.$$

For a sequence of formulae forming a candidate proof, the same construction encodes the whole sequence as a single natural number, with the i-th prime raised to the power of the i-th formula's Gödel number. The encoding remains reversible when applied to proof-sequences, since the encoded number's unique prime factorisation recovers the original sequence. The arithmetic system can therefore express a primitive-recursive predicate

$$\mathrm{Prf}(x, y),$$

which holds in the natural numbers if and only if x codes a proof of the formula coded by y.

Gödel constructed a card that says, of the formula whose Gödel number is *g*, that no proof of it exists in the system. The card itself has a Gödel number, and Gödel arranged the construction so that the card's own Gödel number is *g*. The card therefore says, in its arithmetic vocabulary: *the formula whose number is g cannot be proven in this system*; and the formula whose number is *g* is the card itself. The card, read in plain terms, says *this card cannot be proven*. The self-reference is constructed without violating the system's grammar, conducted entirely through the encoding the previous paragraph specified: the card's statement about the formula numbered *g* is an arithmetic claim about a particular natural number, and the natural number in question, by Gödel's construction,

is the number the card has been assigned. What Russell's paradox had achieved at the level of set membership (a set whose definition makes it both contained and not contained in itself), Gödel achieved at the level of provability (a formula whose construction makes it both provable and not provable, unless one of the two horns is given up).

Gödel then constructed a particular formula, call it G, which says of itself that it is not provable in the system. The construction is a self-referential operation conducted at the level of Gödel numbers: G has a Gödel number g, the predicate "is provable in this system" can be expressed inside the system as an arithmetic predicate P, and G is constructed to say *P(g) is false*: that the formula whose Gödel number is g is not provable. The formula whose Gödel number is g is G itself, and so G says, in its arithmetic vocabulary, *G is not provable in this system*. The self-reference does not violate the system's grammar; it is conducted entirely within the arithmetic apparatus the system contains, made possible by Gödel numbering's translation of meta-mathematical statements into arithmetic ones. The self-reference is the diagonalisation Cantor had used in 1891 to demonstrate that the real numbers are not enumerable, and Gödel's construction is sometimes called *Gödel's diagonal lemma* because the same diagonal move (the construction of a thing that refers to itself by encoding the reference numerically) is operating.

The construction goes through the *diagonal lemma*. For any formula with one free variable in the language of arithmetic, there exists a sentence that is provably equivalent to that formula applied to the sentence's own Gödel number:

$$PA \vdash \varphi \leftrightarrow \psi(\ulcorner \varphi \urcorner).$$

Define the provability predicate

$$\mathrm{Prov}_T(y) \equiv \exists x\, \mathrm{Prf}(x, y).$$

Applying the diagonal lemma to the formula $\psi(x) \equiv \neg \mathrm{Prov}_T(x)$ delivers a sentence G satisfying

$$PA \vdash G \leftrightarrow \neg \mathrm{Prov}_T(\ulcorner G \urcorner).$$

G says, of the formula whose code is $\ulcorner G \urcorner$, that the formula is not provable in T; and the formula whose code is $\ulcorner G \urcorner$ is G itself.

The first incompleteness theorem follows by examining what happens when G is asserted to be provable or not provable in the system. There are two cases. If G is provable in the system, then what G says is true, since the system has proven it; but what G says is that G is not provable; so G is not provable. The case yields a contradiction: G both is and is not provable. If the system is consistent (does not derive contradictions), this case is excluded. If G is not provable in the system, then what G says is true (G says G is not provable, and G is not provable), but G is not provable. So G is a true arithmetic statement that the formalised system cannot prove. The system is therefore *incomplete*: an arithmetic truth (G itself) exists that the system's resources cannot reach. The first incompleteness theorem states the result generally: any consistent formal system that is rich enough to express elementary arithmetic contains true arithmetic statements that the system cannot prove. Completeness (the proof of every truth the system can express) and consistency (the absence of contradictions) cannot both hold of a formal system rich enough to do arithmetic.

The result can be stated. Let T be a consistent, recursively axiomatised formal system containing Robinson arithmetic Q. Then there exists a sentence G in the language of T such that

$$T \nvdash G \quad \text{and} \quad T \nvdash \neg G.$$

The proof proceeds by two cases. Suppose first that $T \vdash G$. By the diagonal-lemma equivalence,

$$T \vdash G \rightarrow \neg \mathrm{Prov}_T(\ulcorner G \urcorner),$$

so by modus ponens $T \vdash \neg \mathrm{Prov}_T(\ulcorner G \urcorner)$. But $T \vdash G$ means there is a proof of G in T, whose code n satisfies $\mathrm{Prf}(n, \ulcorner G \urcorner)$, whence $T \vdash \mathrm{Prov}_T(\ulcorner G \urcorner)$ by Σ_1-completeness. The system derives both the provability predicate and its negation, contradicting the consistency assumption. Therefore $T \nvdash G$. Suppose, in the other direction, that $T \vdash \neg G$. By the diagonal-lemma equivalence,

$$T \vdash \neg G \rightarrow \mathrm{Prov}_T(\ulcorner G \urcorner),$$

so by modus ponens $T \vdash \mathrm{Prov}_T(\ulcorner G \urcorner)$. By Σ_1-completeness this entails $T \vdash G$, contradicting $T \vdash \neg G$ under the consistency assumption. Therefore $T \nvdash \neg G$.

The second incompleteness theorem extends the result to the consistency proof Hilbert's programme required. The construction begins with the observation that the consistency of the system can itself be expressed as a sentence in the system's arithmetic vocabulary. The system is consistent if it does not derive a contradiction; the absence of a contradiction can be expressed as the claim that the formula "0 = 1" (a designated contradiction) is not provable in the system. Call this consistency sentence Con. Gödel showed that within the system, the implication "if Con, then G" can be derived: from the assumption that the system is consistent, the unprovability of G follows. But "if Con, then G" plus a proof of Con would yield a proof of G, and the first incompleteness theorem has established that G is not provable in the system. Therefore Con is not provable in the system. The system's own consistency cannot be established from inside it. Hilbert's programme as Hilbert had specified it closes here: the consistency of the formalised mathematics of arithmetic (and of any richer system that contains arithmetic) cannot be proven by methods the formalised system itself contains. If a consistency proof exists at all, it must be conducted in resources the system does not possess.

The result can be stated. Let T be a consistent, recursively axiomatised formal system containing Robinson arithmetic Q, and define

$$\mathrm{Con}(T) \equiv \neg \mathrm{Prov}_T(\ulcorner 0 = 1 \urcorner).$$

Then

$$T \nvdash \mathrm{Con}(T).$$

The proof of the first incompleteness theorem (Case 1 above) can be formalised inside T itself. Formalising the implication "if T is consistent then T does not prove G" gives

$$T \vdash \mathrm{Con}(T) \rightarrow \neg \mathrm{Prov}_T(\ulcorner G \urcorner),$$

and by the diagonal-lemma equivalence $G \leftrightarrow \neg \mathrm{Prov}_T(\ulcorner G \urcorner)$ this is equivalent to

$$T \vdash \mathrm{Con}(T) \rightarrow G.$$

If T were to prove Con(T), modus ponens would deliver $T \vdash G$, contradicting the first incompleteness theorem. Therefore $T \nvdash \mathrm{Con}(T)$. Gentzen's 1936 consistency proof for PA uses transfinite induction up to the ordinal ε_0 in a meta-theory whose resources PA itself cannot contain (Gentzen 1936, translated in Szabo 1969).

Taken together, the two incompleteness theorems leave the formalist with a definite outcome. The first theorem says that any formal system rich enough to express elementary arithmetic faces a binary choice: it can be consistent, in which case it is incomplete (true arithmetic statements exist that it cannot prove); or it can be complete, in which case it is inconsistent (it proves both a statement and its negation, and so proves everything). It cannot be both consistent and complete. The second theorem says that a consistent system rich enough to express arithmetic cannot prove its own consistency from inside its own resources. If a consistency proof exists, it must be conducted in some larger system whose own consistency would then itself stand in need of proof, with the regress continuing without termination from inside any of the systems concerned. Hilbert's programme had specified that the consistency of mathematics would be established from inside mathematics, by finitary means the system itself authorised. The programme as specified could not be carried out.

A foundational assumption of the paradigm (that the consistency of the apparatus could be established from inside the apparatus, by finitary means the apparatus already contained) was incompatible with another foundational commitment of the paradigm (that the apparatus encompasses what arithmetic requires). The incompatibility followed from the foundational assumptions themselves. Hilbert's apparatus was the most rigorous formal system the period possessed; the formalisation programme was conducted at the level the foundations crisis had demanded. What Gödel demonstrated was that the assumptions the programme was conducted under could not, within the resources the assumptions specified, complete the programme's central task. The programme as Hilbert had specified it could not be carried through. Subsequent consistency proofs for arithmetic operate in meta-mathematical systems that contain resources arithmetic does not, and the work

conducted in those systems is held only at the price of using methods Hilbert's programme had been constructed to avoid (the most famous of these is Gentzen's 1936 consistency proof, which uses transfinite induction up to the ordinal ε_0, a method whose admissibility Hilbert had meant his programme to avoid; the proof is at Gentzen 1936, "Die Widerspruchsfreiheit der reinen Zahlentheorie," translated in Szabo 1969, *The Collected Papers of Gerhard Gentzen*). The formalisation apparatus the programme developed survives; the programme's central foundational claim does not. The deeper crisis Russell's paradox had opened, the question of whether mathematics can be shown to be free of contradiction by methods the apparatus itself authorises, was not closed. The crisis was, and remains, part of the conditions under which mathematics conducts its work. The historical sequence the section has set out (Zeno, Kant, Cantor, Frege, Russell, Hilbert, Gödel) is the canonical record in the philosophy of mathematics of a paradigm whose foundational assumptions, applied to their object, returned findings the paradigm could not integrate without invoking resources the paradigm had placed outside its admissible operations. Each figure conducted the diagnostic move in the vocabulary the figure's own moment supplied. The form the chapter has been driven into by working through the composites of Chapters 2 and 3 is the form the philosophy of mathematics has been working under for the same period, and the form the economic discipline (in the cases the next subsection sets out) has been working under for somewhat over a century.

The economic record

The diagnostic move has been made repeatedly inside economics itself, and the move's track record inside the discipline matters more for the present chapter's argument than the mathematical precedent does. Where the mathematical cases establish the form of the diagnostic move, the economic cases establish that the form is one the contemporary economic discipline has executed on itself across the past century, in each instance taking what its dominant framework had ruled out as inadmissible economic material and reconstituting it as the foundational apparatus on which the contemporary discipline now rests. The chapter walks through six of these cases, each with the form the mathematical cases have established: a dominant framework operating with a load-bearing assumption that ruled a category out; an empirical record the framework's own resources could not account for; an extraction of the operative structure of the excluded category; a formalisation of the extracted structure; an absorption that transformed the framework's working apparatus; and the institutional recognition (in five of the six cases, the highest honour the discipline confers) of the figures who conducted the operation.

Pigou and the externality (1920)

The classical and early-marginalist framework treated market exchange as the operative locus of economic value. Marshall's *Principles of Economics* (Marshall 1890), the dominant textbook of the late-nineteenth-century English tradition, organised economic analysis around the encounter of supply and demand at the market price, with the price treated as the operative summary of the considerations relevant to economic analysis. Costs and benefits that did not enter market exchange were not, on the framework's working commitments, economic facts. The category of value lay inside the market; outside it lay the territory of social, moral, or political consideration, addressed by other disciplines.

The phenomena that produced the seam were industrial: factory smoke that damaged neighbouring property and respiratory health without compensating the affected parties; railway sparks that ignited fields without entering into the railway's accounting; congestion on roads that imposed time costs on other users without showing up in any market transaction. The phenomena were widely visible and widely recognised, but the framework's resources placed them outside economic analysis as such, locating them in the domain of jurisprudence, public administration, or moral philosophy. The framework could register that factories produced smoke; it could not register the smoke's damage as a quantity its apparatus would weigh against the factory's production.

Arthur Cecil Pigou, working at Cambridge as Marshall's successor, extracted the operative structure of the excluded category in *The Economics of Welfare* (Pigou 1920, with the analytical apparatus developed across Part II, especially Chapters I and IX on the divergence between marginal social and private net product). The

extraction was not the invention of a new category. The extraction was the move of treating the damage and the benefit that fell outside market exchange as economic quantities of the same kind as those that fell inside it, distinguished only by the institutional fact that the framework's price-mechanism did not record them. The category Pigou named was *the divergence between marginal social cost and marginal private cost* (and the parallel divergence between marginal social benefit and marginal private benefit), with the divergence treated as a quantity an economic analyst could measure, sum, and compare against the production it accompanied. The formalisation Pigou conducted gave the divergence a name (in the subsequent literature, the *externality*), an institutional remedy (a tax on the producing party equal to the marginal external cost, or a subsidy equal to the marginal external benefit, calibrated to bring the producer's private cost-benefit calculation into alignment with the social one), and an analytical place inside the framework of welfare economics the rest of *The Economics of Welfare* developed (Backhouse 2010, *The Puzzle of Modern Economics*, Chapter 6 on the development of welfare economics; Aslanbeigui and Oakes 2015, *Arthur Cecil Pigou*, on the biographical and intellectual context).

The externality is now a foundational category of mainstream economics. Public economics, environmental economics, transport economics, health economics, education economics, the economics of innovation, the economics of agglomeration, the economics of communicable disease: each is organised around the externality as the central analytical object. Environmental policy across all major jurisdictions operates within a vocabulary the externality concept supplies, with carbon-pricing schemes, emissions trading systems, congestion charges, tobacco taxes, vaccination subsidies, and patent regimes all conducted as instances of the Pigovian operation Pigou specified at *The Economics of Welfare* a century earlier. No mainstream economist today would describe smoke damage as outside economic analysis. The category Marshall's framework had located outside the field has become one of the field's central operating objects.

The contemporary student of economics encounters the externality in the first weeks of intermediate microeconomics and treats the category as obvious. The pre-Pigovian framework's exclusion of the category is recovered, if at all, in the history-of-thought courses the discipline now confines to a minor specialty. The move Pigou conducted is invisible as a move at all; the externality appears to the contemporary reader as something economics has always known how to think about.

Coase and transaction costs (1937 and 1960)

The neoclassical framework that consolidated through the first half of the twentieth century treated the firm as a black box. The firm was a production function: an apparatus that took inputs and produced outputs according to a technological relation the framework specified abstractly, with the apparatus's internal organisation treated as either administrative detail outside economic analysis or as derivable from the production function the framework had already specified. The framework's central operation was the price-mediated coordination of production across separate firms; the existence of firms as such, and the question of why some transactions occurred inside hierarchically organised firms rather than across market prices, was not a question the framework had analytical resources to address.

The phenomenon producing the seam was the persistent existence of firms of substantial size, conducting internal transactions through administrative direction rather than market price, in economies whose dominant theoretical apparatus held that price-mediated exchange was the efficient form of economic coordination. If price-mediated coordination was efficient, why did large hierarchical organisations exist at all? Why did some transactions go through markets and others through firms? The framework's resources had nothing to say about the question. The fact of the firm was the phenomenon; the framework's apparatus did not register it as a phenomenon.

Ronald Coase's 1937 paper "The Nature of the Firm" (Coase 1937, *Economica* 4(16), pp. 386–405) extracted the operative structure. The paper's claim was that price-mediated exchange is not costless. The act of finding a counterparty, negotiating terms, drafting and enforcing contracts, monitoring performance, and bearing the risk of opportunism are all costly activities. The framework had treated these activities as outside economic analysis. Coase named them *transaction costs*, treated them as economic quantities, and observed that the firm exists

because internal hierarchical organisation can conduct some transactions at lower transaction cost than market exchange could. The boundary between the firm and the market is set at the margin where internal and external transaction costs are equal. Coase extended the analysis in his 1960 paper "The Problem of Social Cost" (Coase 1960, *Journal of Law and Economics* 3, pp. 1–44), where he showed that the allocation of property rights determines the distribution of transaction-cost burdens and therefore the institutional architecture under which production is conducted.

The formalisation took decades to be carried through into a working economic apparatus, conducted principally by Oliver Williamson. Williamson developed transaction-cost economics into a working apparatus across *Markets and Hierarchies* (Williamson 1975) and *The Economic Institutions of Capitalism* (Williamson 1985), specifying the asset-specificity dimensions, the contracting hazards, and the governance structures under which different transactions are conducted. The new institutional economics literature that developed around Coase and Williamson treats the firm, the contract, the property right, and the institutional architecture as economic variables proper, with the framework's once-black-boxed apparatus now an object of analysis at its own level.

Coase received the Sveriges Riksbank Prize in Economic Sciences in 1991 "for his discovery and clarification of the significance of transaction costs and property rights for the institutional structure and functioning of the economy" (Nobel Committee 1991). Williamson received the prize jointly with Elinor Ostrom in 2009 for his work on the governance of transactions and the boundaries of the firm. The transaction-cost concept is now foundational to industrial organisation, organisational economics, the economics of contracting, corporate governance, and the analysis of vertical integration. The firm has ceased to be a production function and has become a governance structure.

The contemporary economist treats the question "why do firms exist?" as a question economics knows how to answer. The framework's prior inability to address the question is recovered only in the history of thought. The category once outside the field is one of the field's central organising objects.

Akerlof, Spence, and Stiglitz on asymmetric information (1970–1976)

The neoclassical framework as it had developed through the post-war decades operated under an assumption that economic agents transacting with each other share the same information about the goods and conditions of the transaction. The assumption was load-bearing in a particular way: the price-formation apparatus the framework relied on depends on agents acting on information the framework treats as common to both sides of the exchange, and where information differed across the sides of a transaction, the framework's resources had no apparatus for tracking what the difference produced.

The phenomena the framework's complete-information apparatus could not accommodate had been visible across markets for years before the formalisation arrived. Used-car markets exhibited patterns the framework's price-discovery mechanism did not predict, with sellers' superior information about the quality of their vehicles producing systematic effects on the market's equilibrium configuration. Insurance markets exhibited adverse selection, where the agents most eager to purchase insurance were the agents the insurer would least want to cover, and the framework's risk-pooling apparatus did not track the dynamic. Labour markets exhibited persistent wage dispersion the framework's marginal-productivity theory did not account for. Credit markets exhibited rationing the framework's clearing-price theory did not permit. Each of these phenomena was visible to the empirical economist; each was outside what the framework's complete-information apparatus could integrate.

George Akerlof's 1970 paper "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism" (Akerlof 1970, *Quarterly Journal of Economics* 84(3), pp. 488–500) extracted the operative structure. The paper specified what happens when one side of a transaction has better information than the other: the better-informed side has both the incentive and the capacity to act on the difference, and the resulting equilibrium can fail to support transactions the framework's complete-information apparatus would predict. The lemons example specified the case where information asymmetry produces market collapse: buyers, unable to distinguish high-quality from low-quality used cars, offer a price reflecting the average quality; sellers of high-quality cars,

unwilling to accept the average price, withdraw; the market unravels. The paper was rejected by three journals on grounds the framework's complete-information assumption had made plausible; the framework's resources had no apparatus for the kind of analysis the paper conducted.

Michael Spence's 1973 paper "Job Market Signaling" (Spence 1973, *Quarterly Journal of Economics* 87(3), pp. 355–374) and his subsequent doctoral work formalised the case of *signalling*, where the better-informed side conducts costly actions to credibly convey its private information to the less-informed side. Joseph Stiglitz's work across the 1970s, including the Rothschild-Stiglitz model of insurance market equilibrium (Rothschild and Stiglitz 1976, *Quarterly Journal of Economics* 90(4), pp. 629–649) and his collaboration with Andrew Weiss on credit rationing (Stiglitz and Weiss 1981, *American Economic Review* 71(3), pp. 393–410), formalised the case of *screening*, where the less-informed side designs the terms of the transaction to induce the better-informed side to reveal its private information. The trio of contributions established the information-economics apparatus the discipline has worked with ever since.

The Sveriges Riksbank Prize in Economic Sciences was awarded jointly to Akerlof, Spence, and Stiglitz in 2001 "for their analyses of markets with asymmetric information" (Nobel Committee 2001). Mechanism design, contract theory, principal-agent analysis, screening models, signalling models, auction theory, regulatory design under information asymmetry: each is constructed on the operative structure the three Laureates extracted from a category the framework's complete-information apparatus had ruled out. The contemporary economic discipline now treats asymmetric information as the natural case and complete information as the limiting special case the apparatus invokes only when the analytical context permits the simplification. The order is the reverse of what the framework had treated as natural before 1970.

Kahneman, Tversky, and the bounded-rationality programme (1974–1979)

The neoclassical framework operated under a *rational agent* axiom whose explicit form was the expected-utility maximisation hypothesis the discipline had inherited from von Neumann and Morgenstern (1944) and Savage (1954). The axiom held that economic agents choose among alternatives by computing the expected utility of each and selecting the alternative with the highest expected utility, with the computation conducted as if the agent had unlimited cognitive resources and unrestricted access to the probability distribution over outcomes. The axiom's operational status was central: the framework's analytical apparatus, in its consumer-theoretic, game-theoretic, and decision-theoretic registers, presupposed rational choice in this technical sense as the foundation of the apparatus's derivations.

The phenomena had been observed across economic and psychological literatures for decades before the formal absorption into the discipline began. Herbert Simon's 1955 paper "A Behavioural Model of Rational Choice" (Simon 1955, *Quarterly Journal of Economics* 69(1), pp. 99–118) had specified that economic agents are subject to cognitive limitations the framework's rational-agent axiom did not register, and proposed *satisficing* (the selection of a satisfactory rather than optimal alternative) as the operating procedure agents actually conducted. Simon's work was respected (he received the Nobel in 1978) but was treated by mainstream economics as a sociological observation about real agents that did not displace the framework's working axiom for analytical purposes. The framework's resources continued to operate as if agents satisfied the rational-agent axiom, with the empirical departures registered as noise around the equilibrium the framework specified.

Daniel Kahneman and Amos Tversky, working as psychologists in Jerusalem and later in Vancouver and Stanford, extracted the operative structure of the excluded category. Their 1974 paper "Judgment under Uncertainty: Heuristics and Biases" (Tversky and Kahneman 1974, *Science* 185(4157), pp. 1124–1131) catalogued cognitive heuristics (representativeness, availability, anchoring and adjustment) that produced systematic departures from the framework's probability calculus, with the departures being neither random noise nor correctable by attentiveness but operative regularities of human judgement under uncertainty. Their 1979 paper "Prospect Theory: An Analysis of Decision under Risk" (Kahneman and Tversky 1979, *Econometrica* 47(2), pp. 263–291) constructed a formal alternative to expected utility theory: a value function defined over gains and losses (with the reference point being the agent's current position rather than the framework's absolute

outcomes), a probability-weighting function that overweighted low probabilities and underweighted moderate-to-high ones, and a fourfold pattern of risk attitudes the framework's expected-utility apparatus could not generate. Their later "Advances in Prospect Theory" (Tversky and Kahneman 1992, *Journal of Risk and Uncertainty* 5(4), pp. 297–323) developed cumulative prospect theory, the version of the apparatus the subsequent literature has worked with.

Richard Thaler at Chicago Booth conducted the integration into economic analysis proper through a series of papers and through the *Anomalies* series in the *Journal of Economic Perspectives* across the late 1980s and the 1990s, extending the Kahneman-Tversky apparatus to consumer behaviour, savings decisions, financial markets, and policy design (Thaler 1980 in the *Journal of Economic Behavior and Organization* 1(1), pp. 39–60, on consumer choice; Thaler and Sunstein 2008, *Nudge*, on policy applications). The formalisation produced behavioural game theory (Camerer 2003, *Behavioral Game Theory*), behavioural finance (Shleifer 2000, *Inefficient Markets*), behavioural macroeconomics (Akerlof and Shiller 2009, *Animal Spirits*), and behavioural development economics (Banerjee and Duflo 2011, *Poor Economics*).

Kahneman received the Sveriges Riksbank Prize in Economic Sciences in 2002 (jointly with Vernon Smith), with the Academy citing his work for having integrated insights from psychological research into economic science. Thaler received the prize in 2017 for his contributions to behavioural economics. The contemporary economic discipline treats bounded rationality, prospect-theoretic preferences, framing effects, default effects, and behavioural anomalies as legitimate explanatory variables, with the rational-agent axiom now treated as a benchmark model whose departures the empirical literature documents and the theoretical literature accommodates. The framework's once-load-bearing axiom has become one of several working assumptions the discipline deploys situationally.

North, Ostrom, and the institutional turn (1990)

The neoclassical growth and development frameworks that dominated economic analysis through the post-war decades treated institutions as background. The Solow-Swan growth apparatus (Solow 1956 in the *Quarterly Journal of Economics* 70(1), pp. 65–94) and the post-war development economics tradition operated with production functions, capital-accumulation dynamics, and technological change as the operative variables, with institutional structure either treated as exogenous or assumed to be sufficiently similar across the cases under analysis that institutional variation was not the relevant explanatory variable. The framework's resources had no apparatus for treating *the rules under which economic activity is conducted* as themselves economic variables that the framework's analysis would track.

The phenomenon producing the seam was cross-national variation in economic performance the production-function apparatus could not account for. Countries with similar capital stocks, similar populations, and similar nominal access to the same technologies produced systematically different growth rates over the long run. The variation was visible; the framework had no apparatus to locate it. Within the development literature, the framework's recommendations had produced inconsistent results across cases the framework treated as comparable, and the inconsistency was widely registered without the framework's resources supplying an account of why.

Douglass North's *Institutions, Institutional Change and Economic Performance* (North 1990, Cambridge University Press) extracted the operative structure. Institutions, in North's specification, are the *rules of the game* under which economic activity is conducted: the formal rules (constitutions, laws, property rights) and informal rules (conventions, codes of conduct, social norms) that structure incentives and constrain behaviour. Institutions are economic variables proper, with measurable consequences for the costs of transacting, the security of property, and the trajectory of economic development. North's earlier work with Robert Thomas, *The Rise of the Western World* (North and Thomas 1973), had developed the historical case; North's 1990 book gave the apparatus its theoretical statement; his 2005 *Understanding the Process of Economic Change* extended the framework to the analysis of cognitive and institutional co-evolution.

Elinor Ostrom's *Governing the Commons* (Ostrom 1990, Cambridge University Press) extracted a parallel structure from a different excluded category. The framework had treated common-pool resources as subject to the *tragedy of the commons* Garrett Hardin had named in his 1968 *Science* paper (Hardin 1968, *Science* 162(3859), pp. 1243–1248), with the prescription being either privatisation or state regulation as the only options for sustainable management. The framework's apparatus did not register the third option: governance by user communities under self-designed rules. Ostrom's fieldwork across decades documented the option empirically (Swiss alpine commons at Törbel, Japanese village commons at Hirano and Nagaike, Spanish *huerta* irrigation at Valencia and Murcia, Philippine *zanjera* irrigation systems, Turkish coastal fisheries at Alanya, California groundwater basins), and her 1990 book formalised the design principles under which self-governance of commons succeeds: clearly defined boundaries, congruence between rules and local conditions, collective-choice arrangements that include affected users, effective monitoring, graduated sanctions, low-cost conflict resolution, recognised rights to organise, and nested governance arrangements for systems embedded in larger systems.

North received the Sveriges Riksbank Prize in Economic Sciences in 1993 jointly with Robert Fogel for renewing research in economic history. Ostrom received the prize in 2009 jointly with Oliver Williamson, becoming the first woman to receive the economics prize, for her analysis of economic governance, especially the commons. The absorption produced the *new institutional economics* as one of the contemporary discipline's major working programmes (Williamson 2000 in the *Journal of Economic Literature* 38(3), pp. 595–613, on the contemporary state of the field; Acemoglu, Johnson, and Robinson 2001 in the *American Economic Review* 91(5), pp. 1369–1401, on institutional explanations of cross-country differences). Institutions are now treated as central economic variables, with cross-country institutional variation supplying the principal explanation the contemporary growth literature offers for long-run differences in performance. Common-pool resources are now treated as legitimately governable by user communities under conditions Ostrom's apparatus specifies. The categories the framework had placed outside economic analysis have become categories the discipline treats as core.

Romer and the endogenisation of technical change (1986 and 1990)

The Solow-Swan growth framework (Solow 1956; Swan 1956 in the *Economic Record*) accounted for long-run growth by treating technological change as an exogenous variable that entered the production function as a time-trend the framework did not itself explain. Growth accounting conducted within the framework attributed the bulk of observed productivity growth to a *residual* (the Solow residual) that the framework named, measured, and treated as outside the analysis. The residual was a placeholder for whatever it was that produced growth beyond the framework's accounted-for factors (capital accumulation, labour-force expansion, education); the framework's resources had no apparatus for treating the residual's contents as economic variables proper.

The phenomenon producing the seam was the residual itself. By the 1980s the residual was treated as accounting for the majority of observed growth in developed economies, and the framework was in the awkward position of having a working theory of growth whose principal explanatory variable was a name for the framework's own ignorance. Cross-country growth differences, persistent over decades, were attributed to differences in the time-trend the framework had not itself analysed. The framework's apparatus continued to work; the apparatus's working depended on a black box the apparatus could not open from inside.

Paul Romer's 1986 paper "Increasing Returns and Long-Run Growth" (Romer 1986, *Journal of Political Economy* 94(5), pp. 1002–1037) and his 1990 paper "Endogenous Technological Change" (Romer 1990, *Journal of Political Economy* 98(5), pp. S71–S102) extracted the operative structure of the excluded category. The extraction worked through a particular property of ideas as economic objects: ideas are *non-rival* (one agent's use of an idea does not preclude another's use of the same idea), and partially excludable (intellectual property rights, patents, trade secrets, and the time costs of imitation produce incomplete excludability). Non-rivalry has implications the framework's standard apparatus, organised around rival goods, did not register. The 1986 paper specified the increasing-returns dynamic that follows when ideas accumulate as non-rival capital; the 1990 paper formalised the endogenous-growth apparatus, with research and development conducted by profit-motivated

firms producing the technological change the Solow framework had treated as exogenous, and with the dynamics of growth determined inside the model rather than imposed from outside it.

Robert Lucas's 1988 paper "On the Mechanics of Economic Development" (Lucas 1988, *Journal of Monetary Economics* 22(1), pp. 3–42) constructed the parallel apparatus for human capital, with the accumulation of skills and knowledge inside individuals producing the growth dynamics the Solow framework had treated as exogenous. The endogenous-growth literature that developed across the 1990s and 2000s (Aghion and Howitt 1992 in *Econometrica* 60(2), pp. 323–351, on creative destruction; Jones 1995 in the *Journal of Political Economy* 103(4), pp. 759–784, on R&D-based growth; Acemoglu 2009, *Introduction to Modern Economic Growth*, as the contemporary textbook treatment) gave the apparatus its working form.

Romer received the Sveriges Riksbank Prize in Economic Sciences in 2018, jointly with William Nordhaus, "for integrating technological innovations into long-run macroeconomic analysis" (Nobel Committee 2018). The contemporary growth literature treats endogenous technical change as the natural case and exogenous technological progress as a working simplification the apparatus invokes only when the analytical context permits the bracketing of the endogenous dynamics. The framework's once-exogenous residual has been brought inside the analysis as one of the analysis's central operating objects.

The general structure has been articulated at the level of a philosophy of paradigm transition in Kuhn's *The Structure of Scientific Revolutions*, where the term *anomaly* is used to mark the empirical signature of the configuration the present chapter is calling a seam, and the term *crisis* is used to mark the methodological situation a paradigm enters when the accumulation of anomalies has ceased to be incidental and has become part of the paradigm's normal-science working life (Kuhn 1962/2012, *The Structure of Scientific Revolutions*, especially Chapters VI on anomaly and VII on the response of normal science to crisis; the standard reading is at Bird 2000, *Thomas Kuhn*, especially Chapters 2 and 3; the *Stanford Encyclopedia* entry on Kuhn at Bird 2018 supplies the contemporary scholarly reception). Kuhn's analysis is more general than the chapter requires; the chapter borrows from it only the recognition that anomalies under a paradigm's normal-science operation can stop being one-off and become a recurring presence inside the paradigm's working life, that anomalies of this kind do not yield to better technique within the paradigm, and that the move that resolves them is a move to a paradigm whose foundational assumptions differ from those of the prior one.

The ten cases just rehearsed (Zeno's paradoxes and the development of the actual-potential distinction; Kant's antinomies and the delimitation of pure reason; the Frege-Russell paradox and the move from naive comprehension to axiomatic set theory; the Hilbert programme and the incompleteness results; Pigou and the externality; Coase and transaction costs; Akerlof, Spence, and Stiglitz on asymmetric information; Kahneman, Tversky, and Thaler on bounded rationality and behavioural anomalies; North and Ostrom on institutions and the commons; Romer and the endogenisation of technical change) are not my case. The case was conducted at §4.1 on the five locations the composites of Chapters 2 and 3 produced. The ten cases set out here demonstrate that the form of the move I have been driven into (a paradigm's own assumptions, applied without departure from the framework's own resources, return findings the paradigm cannot integrate without invoking what it has excluded) is a form the philosophy of science, the philosophy of mathematics, and economics itself have recognised as both real and diagnostic. The economic cases carry the additional weight that the discipline has, in each instance, awarded its highest institutional honours to the figures who conducted the move, and treats the once-excluded categories as the foundations of its contemporary analytical apparatus. The libertarian tradition's contemporary defenders, faced with the seams I have identified, are treating as inadmissible the same kind of move the discipline has decorated heavily and absorbed without trace.

4.4 What the Framework Cannot Reach

The seams are visible because the libertarian tradition's own conditions made them visible. The tradition's framework can register that something has failed. It cannot register what is producing the failure. The empirical examination Chapters 2 and 3 conducted has produced an account of what is failing. It has not produced an account of what is operating to produce the failure: the pattern is visible, but what is generating the pattern is not.

Sharpening the framework's apparatus does not alter the situation. The framework that has rendered the operations invisible cannot, by the application of more technique within the framework, make those operations visible. The apparatus itself is what is producing the invisibility. The diagnosis the seams indicate is a diagnosis of position. The libertarian tradition's framework assumes a position from which the order can be described as if from outside the order's own operations. What the empirical record demonstrates is that the position is not available. The framework has been conducting its analysis from a vantage the framework treats as available, the order treats as occupiable, and the order's actual operations do not allow.

4.5 The View from Nowhere

The position the chapter has identified as the libertarian tradition's central methodological commitment carries a name from outside economic methodology. Thomas Nagel, in *The View from Nowhere* (Nagel 1986, Oxford University Press), names the unsituated vantage from which an order's structure is taken to be describable as it is, in itself, independently of any practice the description is conducted within. Nagel's concern in the book is mind, ethics, and metaphysics; the philosophy of economics is not what Nagel is doing. The name nevertheless picks out exactly the position required, since the position the chapter has identified at the libertarian tradition's centre is the position Nagel's phrase names. The diagnosis the chapter conducts under the name (the demonstration that the position is unavailable to economic analysis, the identification of the position as what produces the seams the composites of Chapters 2 and 3 have generated, and the analysis of what happens to the word *market* once the position is unavailable) is conducted on the chapter's own apparatus. Nagel supplied the name; the chapter has supplied the application.

The view from nowhere, in the sense the chapter deploys it, is not the absence of a position. The position holds that analytical access to an order's underlying structure can be achieved by an observer whose position the order does not include, conducted in a vocabulary the observer's standpoint authorises independently of the order's own conditions of operation.

The position cannot be occupied. Observation is conducted from somewhere, by some observer, with some measuring apparatus, in some vocabulary; the somewhere, the observer, the apparatus, and the vocabulary enter into the observation, and the observation cannot be conducted outside them. Description is conducted from inside a practice, with the practice's resources, on terms the practice supplies; description outside any practice is not description but a posture of description with no operative content. Distinction-drawing is conducted from a position the distinction itself produces, since the line between what is distinguished and what is excluded is the same line on both sides; distinction without a position from which the line is drawn is not distinction but a representation of distinction that has lost the operative move. The libertarian tradition's framework, in its contemporary defensive form, conducts its analysis from a vantage the framework treats as available, the order treats as occupiable, and the order's actual operations do not allow.

The case of the word *market*

The observation concerns the operative status of the tradition's central term, the word *market*, in its contemporary use.

The word *market*, as the libertarian tradition's contemporary articulation deploys it, is not the word's earlier sense in Smith's *Wealth of Nations*. Smith's market is a specific institutional arrangement, located in identifiable towns at identifiable times, with the moral psychology of the butcher and the brewer and the baker setting the

operative conditions under which the arrangement operates as the chapter at WN I.ii.2 describes (Smith 1776/1976, pp. 26–27; the reading is at Otteson 2002, *Adam Smith's Marketplace of Life*, pp. 100–169, on the conditions Smith's account presupposes; Werhane 1991, *Adam Smith and His Legacy for Modern Capitalism*, Chapter 3, on the moral-psychological architecture; Fleischacker 2004, *On Adam Smith's Wealth of Nations*, pp. 80–104, on the social-conditions register of Smith's analysis). The word, in Smith's text, names a configuration of practices the analyst describes from inside a society the analyst inhabits and whose moral psychology the analyst shares. The word does work in Smith's text because the configuration it names has specifiable features the rest of Smith's argument turns on, and the configuration's identification supplies the analytical purchase the rest of the argument requires.

The word *market* in the libertarian tradition's contemporary defensive articulation operates differently. The contemporary use is the use the contemporary defender deploys when offered the empirical record of the order's operations and asked to evaluate it. The defender invokes *the market* as the authoritative entity whose verdict the empirical record is treated as recording. The order's outcomes are *what the market produced*. The order's prices are *what the market discovered*. The order's allocations are *what the market determined*. The order's reformability is constrained by *what the market would tolerate*. The word, in each of these formulations, operates as the name of an entity the defender treats as having a structure, a logic, and an authority the analyst is treating the analysis as recording.

The position from which the word in this contemporary use is being deployed is the position this section has identified as foreclosed. *The market*, in the contemporary defensive register, is the name of an entity the defender treats as describable from outside the order whose operations the entity is supposed to be conducting. The defender's analytical vantage is the position outside the order from which the order's market-operations can be observed and their authority recorded. The position is not one any observer can occupy: there is no observer outside the conditions of observation; there is no description outside the practice that conducts the description; there is no distinction-drawer outside the operation of distinction-drawing. The position the defender's word *market* presupposes is the position the diagnosis forecloses.

What the contemporary use does, once the position it presupposes is unavailable, is rhetorical rather than analytical. The word continues to be spoken, written, and invoked as if it were doing the analytical work the position would supply. The work the position would supply is not being done, because the position is not available to be occupied. The word survives as a token whose evocative authority continues to be honoured in the discourse the libertarian tradition's contemporary articulation conducts, but the analytical operations the token would carry through to a conclusion are not being performed. The word lies in the sentence as if it were doing work, and the sentence proceeds as if the work the word would do were being done; the work is not done, and the sentence is, at the analytical level, empty at the location the word is supposed to fill. The word *market*, in its contemporary defensive use, names a position the order does not include from which the order's operations are treated as available for observation: the view from nowhere, which the order does not allow. The word, deployed in the position's absence, conducts the rhetorical operation of marking a place where analysis is treated as having occurred without the analysis having been conducted. The chapter is not making the claim that the word should be removed from analytical use. The chapter is making the claim that the word, in its contemporary defensive use, has ceased to do analytical work and survives as a token whose continued circulation conceals the absence of the analysis the word's earlier use was conducted from within.

The case of the word *market* is the case of the libertarian tradition's contemporary articulation in microcosm. The articulation's vocabulary presupposes a position from which the order is treated as available for description, and the position is unavailable. The vocabulary continues to operate as if the position were available, and the operation produces the seams the composites of Chapters 2 and 3 have recorded.

4.6 What This Chapter Has Done

The chapter has worked through the composites Chapters 2 and 3 produced and identified what kind of finding they contain. The composites contain seams: locations where the libertarian tradition's framework, applied to the empirical record of the contemporary order, generates findings the framework cannot integrate without invoking resources the framework has placed outside its admissible apparatus. Seams of two kinds were identified: paradox-seams, where two of the framework's commitments are jointly untenable on the empirical record, and unaccountability-seams, where the framework's vocabulary runs out before the record's mechanism is reached. Five specific cases from the composites were taken up; the seams were exhibited; the feature they share was specified.

The chapter then asked what the recurrence indicates. The seams cluster at a single location in the framework's operations: the position from which the framework treats the order's mechanisms as available for description. The position is the position outside the order whose mechanisms the framework is examining, and the empirical record demonstrates that the position is not available.

The chapter then registered, retrospectively, that the form it had been driven into is one the philosophy of mathematics and the economic discipline have themselves been driven into across the past century. Ten cases were set out: Zeno, Kant, Frege-Russell, Hilbert-Gödel from the philosophy of mathematics; Pigou, Coase, Akerlof-Spence-Stiglitz, Kahneman-Tversky-Thaler, North-Ostrom, and Romer from the economic discipline. The cases were not precedent the chapter cited to authorise its move. They were company the chapter discovered itself in. The economic cases also demonstrated that the discipline has decorated heavily the figures who conducted moves of the form the libertarian tradition's contemporary defenders are treating as inadmissible.

The case of the word *market* exhibited the consequence at the level of the framework's central term: the word, in its contemporary defensive use, has ceased to do analytical work and survives as a token whose continued circulation conceals the absence of the analysis the word's earlier use was conducted from within.

The framework cannot complete the account it has set out to give. The empirical record exceeds what the framework's resources can carry. The seams indicate a limit internal to the framework's admissible operations, and the limit is not removable by sharpening the framework's apparatus within the framework's own commitments.

The chapter ends here.

CHAPTER 5

Cybernetics and the Architecture of Regulation

5.0 Why a Thermostat Cannot Cool a House It Cannot Measure

A thermostat sits on a wall. It has a temperature sensor, a setpoint dial, and a switch that turns the air conditioning on when the sensor reads above the setpoint and off when the sensor reads below. The owner sets the dial to twenty-one degrees Celsius and leaves for work. The thermostat does its job. The temperature in the room where the thermostat is mounted stays close to twenty-one degrees through the day. The owner returns to a comfortable house.

Suppose the owner buys a second house, larger than the first. The same thermostat is mounted in a hallway near the entrance. The dial is set to twenty-one degrees. The owner leaves. The thermostat does its job: the temperature near the thermostat stays close to twenty-one degrees. The owner returns to find the bedroom upstairs at twenty-eight degrees, the kitchen at nineteen, the basement at fourteen. The thermostat has operated correctly throughout the day. The sensor reads twenty-one degrees. The switch has turned the air conditioning on and off in response to the sensor's readings. By every measure the thermostat itself contains, the regulation has succeeded, while the house in which the regulation was conducted is uninhabitable across the rooms the thermostat was never coupled to.

This is the case the chapter operates on, with the thermostat as the regulator and the house as the system. The regulator's task is to hold the system within a specified state, in this case a temperature near twenty-one degrees throughout the volume of the house. The regulator has performed its task where its sensor sits. It has not performed its task where its sensor does not sit. The reason is simple at the level of statement, and the chapter's work is to give the simplicity its formal content. The sensor reads one location while the system has many locations. The thermostat's representation of the house, which is whatever the sensor reads at any moment, has lower resolution than the variety the house actually presents. The thermostat stabilises only the part of the house its representation covers. The rest of the house varies according to its own dynamics: the architecture, the position of the sun, the heat from the kitchen, the cool of the basement. The regulator does not see what it does not measure. What the regulator does not see, it cannot stabilise.

The case generalises. What the thermostat lacked is what cybernetics calls *variety*: the number of distinct internal states the regulator can occupy and bring to bear on the system it manages. The thermostat had variety two: on and off. The house presented variety many: morning sun on the east, afternoon sun on the west, heat rising from the kitchen, cool radiating from the basement, the structure's thermal gradients, the bedroom upstairs warming through the day, the basement holding the ground's temperature. A regulator with variety two cannot absorb variety many. The states the regulator cannot distinguish are the states it cannot stabilise. The states it cannot stabilise vary according to their own dynamics. The rest of the house went uncooled because the regulator's repertoire was smaller than the variety the house presented.

The thermostat is the test case for the work the chapter now builds. The case generalises in two directions. In one direction, the chapter builds the variety condition the thermostat exhibited at higher resolution: what variety the regulator can produce, what variety the system presents, and what follows when the two are mismatched. In the other direction, I extend the variety condition into a condition on what the regulator must contain in its own internal states for the variety to be operationally available, and the extension reaches a result that has the time dimension the thermostat case has so far left implicit. The contemporary economic order is full of regulator-system pairs the results will bring into view: financial regulators against the productive economies whose engineering cultures and supplier ecosystems their action-cycles do not reach, executive-compensation cycles against the firm capabilities they purport to reward, central-bank meeting cycles against the labour-market dynamics they aim to address, electoral cycles against the ecological-and-developmental processes whose damage emerges across decades. The thermostat is the case the reader walks through. The other cases are the thermostat at different scales, operating across different temporal horizons, with the same formal structure.

The chapter's task is bounded. The chapter builds the cybernetic results from primary sources. At §§5.4 through 5.7 the chapter applies them diagnostically to the contemporary financialised price-mechanism, asking whether the price-mechanism's operating architecture satisfies the conditions under which it could be doing the work the libertarian tradition's contemporary defenders invoke it as doing. The diagnostic finding is the chapter's terminus. The chapter does not propose alternative architectures, does not specify what the contemporary order should do, and does not address whether the order's features are reversible by institutional intervention.

The reader who has not encountered cybernetics before is in the position the chapter is built for: prior familiarity is not assumed, and the foundational results are built from the texts. The reader who has encountered cybernetics elsewhere will recognise the work and may move quickly through the foundational sections.

5.1 Ashby's Law of Requisite Variety

The thermostat case sits within a broader question Ashby formulated across his two principal works, *Design for a Brain* (Ashby 1952) and *An Introduction to Cybernetics* (Ashby 1956). The question Ashby pursued, in the form he treated it across both books, is: under what conditions can a regulator stabilise a system against disturbances? The framing applies indifferently to a thermostat regulating a house, an autopilot regulating an aircraft's trajectory, an immune system regulating the body's response to infection, a regulatory agency regulating a financial market, a central bank regulating a national economy; the diagnostic force the analysis carries comes from exactly that scope.

Ashby's answer is the Law of Requisite Variety. The Law, formally stated by Ashby on p. 205 of the *Introduction* and developed across pp. 202-211, can be paraphrased: only variety can destroy variety (Ashby's actual formulation runs 'only variety in R can force down the variety due to D'). Unpacked, the formulation says that a regulator capable of holding a system within a specified set of states against disturbances must contain, in its own internal states, variety equal to or exceeding the variety of disturbances the system encounters (Ashby 1956, pp. 202-207, with the formal demonstration through the table-of-disturbances at pp. 205-207).

The thermostat case is the Law stated concretely. The thermostat had variety two, the house presented variety many, the regulator's variety was less than the disturbance variety, and the regulator failed by construction. The Law states the principle that case demonstrated. The failure is not contingent on the thermostat's quality or the engineer's design. The failure is what the Law specifies as necessary whenever the variety condition is unmet.

Ashby developed the Law's formal statement through a table of disturbances and regulator-responses arranged so that the correspondence between disturbance and response can be made explicit. The table's rows are the regulator's possible states; its columns are the disturbances the system can encounter; its cells are the system-states that result from each regulator-response to each disturbance. The Law's content is that the regulator can hold the system within a specified subset of system-states across all disturbances only if it has at least as many states as the disturbance has variety; otherwise some disturbances must produce system-states outside the specified subset, because the regulator cannot, by construction, distinguish those disturbances from each other and respond

differently to each (Ashby 1956, pp. 205-207, with the table at p. 206 and the formal corollary at p. 207).

Stafford Beer extended Ashby's Law into the analysis of organisations and gave its canonical worked case in the 1973 Massey Lectures, published as *Designing Freedom* (Beer 1974). The case is the departmental store. A customer walks in carrying her full repertoire of possible demands across all the items the store might stock, in all the sizes and colours and quantities she might want. A second customer follows with her own repertoire. A third. The variety entering the store is large. The store has two ways of meeting the Law's variety condition. It can attenuate the customers' variety: stock only one kind and one size of shoe, refuse exchanges, lock the customer in until served. It can amplify the regulator's variety: appoint many salesmen, organise them by departments, calculate how many salesmen each department needs so that the queue does not build past the customer's tolerance. The choice between the two routes is what determines whether the store is a stable system or an unstable one. To attenuate the customers' variety to a single shoe is to fail at being a store. To amplify the regulator's variety by adding salesmen who handle many customers each is to preserve the customers' freedom of choice while satisfying the Law (Beer 1974, the second Massey Lecture, "The Discarded Tools of Modern Man", with the departmental-store treatment as the lecture's principal worked case).

Beer's terminology is the terminology the chapter will continue to use. A *variety amplifier* is any arrangement that increases the regulator's effective variety so that it can absorb a higher variety of disturbances than its raw state-space would permit: training, departments, decentralised authority, recursion. A *variety attenuator* is any arrangement that reduces the system's effective variety so that it falls within what the regulator can absorb: standardisation, queueing, constraints on the kinds of input the system will admit at all. The Law is satisfied when amplifiers and attenuators are deployed together in the right proportion. It is failed when neither is deployed, or when the wrong attenuator is deployed, the locked door, the one-size shoe, because the wrong attenuator destroys the system the regulator was supposed to be regulating.

Beer's larger argument in *Designing Freedom* is that the state and the departmental store map onto the same cybernetic model: government handles its variety reduction by departments just as the store does, and the question of whether a government is stable is the question of whether its amplifiers and attenuators are deployed in proportions that satisfy the Law against the variety of its citizens' actual states (Beer 1974, the third and fourth Massey Lectures, on the mapping of government and the departmental store onto a common cybernetic model). The mapping is what makes the work the chapter is building available beyond thermostats and stores. The thermostat case at §5.0 demonstrates the Law on a regulator with variety two against a system with variety many. Beer's departmental store demonstrates the Law on an organisation whose regulator has variety larger than two but whose customers present variety larger still, and shows where the choice between amplifying the regulator and attenuating the customer lives. The financialised regulator the next paragraph turns to is the same Law deployed on an order whose disturbance-variety is the variety of the productive economy the modern financial order operates against.

The contemporary financialised regulator, in the form Part I documented through the institutional sequence Chapter 2 reconstructed, operates with state-space variety substantially smaller than the disturbance variety the productive economy presents. The regulator's state-space consists of the metrics the regulator tracks: quarterly earnings, share-price movements, return on equity, market capitalisation, debt-to-equity ratios, and the further metrics the order's measurement systems have standardised. The disturbances the productive economy presents include the engineering-culture depletions that occur when senior engineers retire and their tacit knowledge is not transmitted, the supplier-ecosystem fragilities that develop when sole-source suppliers face structural shocks, the human-capital depletions that develop across cohorts of workers whose formation requires decade-scale apprenticeship structures, the research-and-development depletions that develop when fundamental research budgets are reduced in favour of near-term product development, the infrastructure depletions that develop when capital expenditure is redirected toward share buybacks for two decades, the ecological depletions that develop across timeframes the financial regulator's measurement systems do not record. The regulator's variety, in the form its metrics specify, is not equal to or exceeding the disturbance variety. The Law specifies the necessary consequence. The disturbances cannot be absorbed by the regulator; they must be absorbed within the

productive economy itself, with the absorption taking the form of state changes the regulator does not measure and that the regulator's continued operation does not address.

The Law is the first foundational result. The next, established by Ashby with Conant, specifies what is required by construction of a regulator if it is to satisfy the variety condition.

5.2 The Conant-Ashby Theorem: Every Good Regulator Must Be a Model

In 1970, Roger Conant and W. Ross Ashby published a paper in the *International Journal of Systems Science* whose title states the result the paper proves: "Every good regulator of a system must be a model of that system" (Conant and Ashby 1970, *International Journal of Systems Science*, 1(2), pp. 89-97). The proof is formal, conducted within the regulator-system framework Ashby's *Introduction* established. The theorem extends the Law of Requisite Variety from a variety condition into a condition on what the regulator must contain.

The theorem's content can be stated through the thermostat case before the formal proof is reconstructed. The thermostat's failure at §5.0 derived from its having a sensor at one location while the system has many locations. The sensor's reading is the thermostat's model of the system: at any moment, the thermostat's representation of what is happening in the house consists of the temperature at the thermostat's sensor. The model has a single value at each moment, while the system has many values at each moment. The thermostat's model is incomplete: it does not represent the upstairs bedroom's temperature, the kitchen's temperature, the basement's temperature, or the various heat-flows occurring across the structure. That incompleteness is what the Law of Requisite Variety identifies. Conant and Ashby's theorem makes the reading explicit. A regulator that stabilises a system must, by construction, contain a model of the system whose variety is at least equal to the system's variety. A regulator without such a model cannot, by construction, stabilise the system except by accident.

The formal proof Conant and Ashby developed establishes the equivalence between the regulator's stabilising operation and the regulator's possession of a model of the system. Any regulator R stabilising a system S against disturbances D must, by the Law of Requisite Variety, possess variety equal to or exceeding the variety of D's effects on S; the regulator's possession of this variety is, formally, the regulator's possession of a mapping from D's effects to R's responses; the mapping is what Conant and Ashby identify as the regulator's model of the system; the model's form is that the regulator's internal states implement a representation of the relevant system-states the regulator is regulating. The variety condition the Law specifies is, formally, a modelling condition: the regulator's variety must implement a model of the system, with the model's resolution being the regulator's resolution of the system's states (Conant and Ashby 1970, especially pp. 92-95, where the formal apparatus is developed and the theorem is stated and proved).

The contemporary financialised regulator's model of the productive economy is the model implemented by its metrics. The model represents what the metrics measure. It does not represent what the metrics do not measure. The theorem specifies that the regulator can stabilise the productive economy only if its model of the productive economy has variety equal to or exceeding the productive economy's variety. The financial metrics, in the form the order has standardised them, do not produce a model of the productive economy's variety; they produce a model of the financial-flow variety. They measure share prices, earnings, return on equity, debt structures, market capitalisation (the standardisation of these metrics across the financialised order is documented at Krippner 2011, especially Chapter 1 and the Conclusion; Lazonick 2014; Mason 2015). They do not measure engineering-culture depth, supplier-ecosystem resilience, human-capital formation, research-and-development pipeline coverage, infrastructure replacement-cycle position, or ecological state. The reading the theorem gives is that the regulator's model is a model of the financial-flow variety rather than a model of the productive economy's variety; the regulator can stabilise what it models; it cannot stabilise what it does not model. The work the chapter conducts across §§5.5, 5.6, and 5.7 develops this point at the depth the diagnostic requires.

The theorem and the Law together establish the formal foundation. A regulator must have variety equal to or exceeding the disturbance variety; the variety must implement a model of the system; the model's resolution is the

regulator's resolution of the system. A case in which the regulator's model has lower resolution than the system's variety is a case in which stabilisation of the system is impossible by any operation the regulator can perform on the model alone. The next sections extend the work to the temporal dimension the analysis of contemporary orders requires.

5.3 Where the Apparatus Comes From, and Why It Already Surrounds the Reader

The cybernetic results the chapter is building belong to a discipline whose internal lineage is worth holding briefly in view before the chapter deploys them. Cybernetics emerged in the late 1940s out of an interdisciplinary effort centred on the Macy Conferences in New York: the ten meetings held between 1946 and 1953 under the sponsorship of the Josiah Macy Jr. Foundation, with the early meetings titled *Conference on Circular Causal and Feedback Mechanisms in Biological and Social Systems* and the later meetings retitled to name cybernetics directly after Wiener's 1948 publication. The participants included Norbert Wiener, John von Neumann, Claude Shannon, Warren McCulloch, Walter Pitts, Margaret Mead, Gregory Bateson, Heinz von Foerster, W. Ross Ashby, Lawrence Frank, and Arturo Rosenblueth, with a wider circle whose disciplinary memberships included engineering, mathematics, neurophysiology, anthropology, psychiatry, ecology, and the early computer sciences. The field's founding text is Wiener 1948, *Cybernetics: or Control and Communication in the Animal and the Machine*, whose subtitle named the field's central claim: that the same formal results describe regulation in biological organisms, in mechanical control systems, and in social institutions, because the relations at issue are relations of feedback, information, and the variety of states any controller must hold against the variety of disturbances the controlled system encounters.

The field's first decade produced the results the present chapter uses at its core. Ashby's *An Introduction to Cybernetics* (1956) and the earlier *Design for a Brain* (1952) developed the Law of Requisite Variety, the analysis of homeostasis as the central operation of any viable regulator, and the regulator-system pair as the unit of analysis. The Conant-Ashby theorem of 1970 closed the foundational loop with the demonstration that every good regulator must, by formal necessity, embed a model of the system it regulates. The Wiener-Ashby-Conant arc is the field's first-order phase: regulator and system are treated as analytically distinct, with the regulator observing the system from outside and producing its model of the system's dynamics on the strength of that observation.

The field's second phase emerged in the late 1960s and through the 1970s as the second-order register, with the move conducted principally by von Foerster, Bateson, Maturana, and Varela. Von Foerster, the editor of the published proceedings of the later Macy Conferences and the central organiser of the field's institutional memory at the Biological Computer Laboratory in Illinois, identified the central problem of the first-order setup: the regulator's observation of the system is itself an operation conducted by an observer, and the observer's own constitution as an observing system is what determines what counts as a candidate state of the observed. The 1981 collection *Observing Systems* gathered the von Foerster move. Bateson, working from anthropology and psychiatry, developed in *Steps to an Ecology of Mind* (1972) and *Mind and Nature* (1979) the recursive epistemology under which the observer must be included in the observed, and the central analytical move is the registration of "the difference that makes a difference" rather than any objectively specified property of the system. Maturana and Varela, working from biology in Santiago across the 1970s, developed in *Autopoiesis and Cognition* (1980) and the later *The Tree of Knowledge* (1987) the analysis of living systems as organisationally closed, with structural coupling to an environment rather than input-output relations across an organism-environment boundary. The second-order claim is that the observer is constituted by the same operations that constitute the observed.

The chapter's deployment of cybernetics operates at the first-order register. The Law of Requisite Variety and the Conant-Ashby theorem are first-order results. The horizon-mismatch theorem I derive at §5.6 is a first-order result. The analysis of cycle-mismatched regulators the chapter conducts on the financialised order is conducted at the first-order register at which the regulator and the system can be analytically separated and the regulator's variety can be compared with the system's variety as if from a position outside both. The chapter does not, in its

analytical work, occupy the second-order position. The first-order results are what the chapter's diagnostic findings rest on.

A reader unfamiliar with cybernetics may wonder whether the results have any analytical force beyond the conceptual, and whether they have been deployed on cases at any institutional density worth registering before the chapter takes them to the contemporary financialised order. The answer is sharper than the question. The results are not analytically remote from the contemporary economic order. The operating architecture of the contemporary economic order has been cybernetic at industrial scale since approximately the late 1970s, and the reader is already inside it. A brief inventory at the legible scale clarifies what the claim means.

When a reader opens Amazon and the displayed prices and recommended products change between visits, the reader is interacting with a cybernetic regulator: the recommendation-and-pricing engine is a regulator coupled to a behavioural signal stream it models in seconds, its variety being the variety of product-and-price combinations it can serve, the disturbance variety being the variety of behavioural responses the user population can produce. When a reader opens Netflix and the displayed catalogue is not the catalogue another reader sees, the reader is interacting with a regulator whose model of the user's attention is updated at every click and whose variety is the variety of titles it has and can rank. When a reader applies for a credit card and a number returns within seconds, the reader has interacted with a credit-scoring engine that is a regulator with a model of the reader's repayment behaviour; the model's variety is the variety of input features the engine uses. When a reader uses a brokerage app and sees a price quoted, the price has been produced by an algorithmic-market-making system that is a regulator coupled to a price stream it models in microseconds. When a reader uses a satellite-navigation system that re-routes around traffic, the navigation system is a regulator with a model of the road network it updates in seconds. When a reader scrolls a social-media feed, the feed-ordering algorithm is a regulator with a model of the reader's attention it updates in milliseconds. Each of these is a cybernetic regulator. The regulator-system pair is what the chapter's results operate on. The reader interacts with several such pairs every day.

The financial-trading architecture operates at the same register at the highest action-cycle resolution the contemporary order admits. The high-frequency trading networks at the major exchanges are regulators coupled to a price stream they model in microseconds to nanoseconds (the archival reconstruction is at MacKenzie 2021, *Trading at the Speed of Light: How Ultrafast Algorithms Are Transforming Financial Markets*, especially Chapters 2-6). Algorithmic supply-chain optimisers, dynamic-pricing systems in retail, and the algorithmic-market-making engines in the global derivatives markets are regulators coupled to their respective systems at cycles measured in seconds, minutes, or hours. The deployment is documented continuously across the secondary literature (Beer's industrial work from the late 1950s onwards across United Steel, SIGMA, and Pergamon Press, documented across Beer 1972, 1975, 1979, 1985; the wider record of algorithmic deployment in finance, retail platforms, and supply-chain coordination across the contemporary period).

The longer-cycle institutional regulators of the contemporary order operate at the same register at lower action-cycle resolutions. The Federal Reserve's open-market-operations cycle and the equivalent monetary-policy reaction functions at the European Central Bank, the Bank of England, and the Bank of Japan are regulators with models of the macroeconomy. They do not operate at millisecond cycles; they operate at meeting cycles measured in weeks to months, the model's variety being the variety of macroeconomic indicators tracked. The chapter is not claiming that the central banks have been designed as cybernetic regulators in the engineering sense; the claim is that the operating architecture of the institutions, described at the cybernetic level, exhibits the regulator-system features the results name. The same applies to the executive-compensation cycle's relation to firm capabilities, the quarterly earnings reporting cycle's relation to productive capacity, and the electoral cycle's relation to ecological-and-developmental processes. Each is a regulator-system pair operating at its own characteristic cycle. The pairs differ in cycle scale by orders of magnitude. The horizon-mismatch theorem at §5.6 specifies why this matters.

The departmental store at §5.1 is the small-scale instance of an arrangement the contemporary order has scaled to every coordinating site of the global economy. The chapter's task is therefore visibility work rather than

recovery work. The cybernetic results are not being brought to the order from outside; the order itself, at the level of the layer that actually coordinates the activity the libertarian discourse describes, operates as a cybernetic regulator. What the libertarian discourse describes when it describes "the market" is the user-facing surface at which participants encounter the order. What the cybernetic analysis describes is the layer at which the order is actually coordinated. The two are not the same. Mainstream economic analysis after the Second World War converged on an equilibrium-based vocabulary, agents as optimisers of utility functions, markets as coordinators of optimising agents through the price mechanism, institutional architecture as the constraint structure within which optimisation occurs, that describes the user-facing surface and leaves the coordinating layer outside the vocabulary's frame. The libertarian discourse's contemporary defence of the order proceeds through the user-facing vocabulary; the order's actual coordination is conducted at the cybernetic layer the user-facing vocabulary cannot reach. The work of the rest of Part II is to make the coordinating layer visible.

5.4 The Hayek-Cybernetic Connection

Read through the cybernetic results the chapter has now built, Hayek's 1945 paper "The Use of Knowledge in Society" becomes an argument about what the price-mechanism is doing operationally if it is functioning as the coordinator Hayek's analysis claims (Hayek 1945, *American Economic Review*, 35(4), pp. 519-530). The reading is necessary because the libertarian tradition's contemporary articulation invokes Hayek as a description of the user-facing surface at which participants encounter the order, and treats the description as if it also specified what is going on at the coordinating layer. The two are not the same. The cybernetic results make the coordinating layer visible. The reading therefore separates two questions the libertarian discourse runs together: what Hayek's argument describes at the user-facing surface, and what the price-mechanism is actually doing at the coordinating layer.

Hayek's argument operates on the problem of economic coordination across dispersed agents whose knowledge of their particular circumstances is the data the coordination depends on. The argument's claim is that the price mechanism aggregates this dispersed knowledge into signals other agents can read and act on, with the aggregation operating across agents whose decisions reflect the situated knowledge their participation in exchange expresses. The argument is a formal argument about the conditions under which decentralised coordination is possible at all. Hayek's analytical work, in the form the 1945 paper deployed, described the user-facing surface: agents read prices, act on prices, and the prices reflect the local knowledge the agents' situated experience expresses. The paper did not, in its 1945 form, specify the operating architecture the price-mechanism must have if the user-facing description is to be the description of what is actually happening at the coordinating layer.

The Hayekian argument can be restated as an argument about the structural impossibility of centralised aggregation and the corresponding necessity of a distributed alternative. The price-mechanism in Hayek's specification operates as a continuously running referendum across substrate-coupled participants whose dispersed local knowledge cannot, by construction, be assembled into any encodable form a central authority could deploy. The Viennese baker knows the flour cost at his supplier this morning; the New York consumer knows what she will pay for the loaf at this price today; the Shanghai farmer knows his crop yield this season; the Lyon weaver knows the quality of her thread. None of these knowledge-positions exists in a form the central authority could request, receive, and integrate into a coordinated allocation. The price-mechanism aggregates the dispersed positions into signals other participants can read and act on, with the aggregation operating through the participants' substrate-coupled choices themselves. The argument is a cybernetic argument before cybernetics had a name: the variety the substrate presents cannot be absorbed by any centralised regulator whose internal states are bounded by the central regulator's computational capacity, and the price-mechanism is therefore the only available substrate-coupled coordination architecture for an economy whose variety exceeds the central regulator's resolution. The chapter agrees with the argument's structural content. The substrate's variety does exceed any centralised regulator's resolution. The price-mechanism, where it operates as Hayek's argument specifies, performs the aggregation no centralised alternative can perform.

The argument's structural content was developed against the computational architectures Hayek's period knew. The centralised alternative Hayek argued against was the Soviet planning bureaucracy operating with clerks, ledgers, and adding machines. The clerks-and-adding-machines bureaucracy could not reach the substrate's local cycles; the price-mechanism could. The argument did not anticipate, and could not have anticipated, the computational architectures that would emerge across the four decades following the paper's publication. The chapter is not accusing Hayek of an oversight here. The computational concentration that has occurred sits outside the scope Hayek's 1945 position could have addressed. The argument's conditional structure was correct on the question Hayek's period made available. The question the cybernetic results force on the contemporary reader is what happens to the argument when the conditional's antecedent is altered by the appearance of computational architectures whose aggregation capacity exceeds any historical centralised planner's by orders of magnitude.

The contemporary financialised order's coordinating layer is the algorithmic trading and pricing infrastructure built across the four decades the institutional sequence Chapter 2 reconstructed. The infrastructure operates at action-cycles measured in milliseconds and nanoseconds against productive cycles measured in years and decades. The infrastructure is not a continuation of Hayek's distributed referendum at higher resolution. The infrastructure is a small number of computational nodes whose aggregation capacity has displaced the substrate-coupled participants from the price-formation cycle. Amazon's algorithmic pricing infrastructure (documented across the platform-economy literature, see Khan 2017, *Yale Law Journal* 126(3), pp. 710–805; Zuboff 2019, Part II), BlackRock's Aladdin platform (documented as handling approximately 21 trillion dollars in assets across institutional and corporate clients as of 2020, see Henderson and Walker 2020, *Financial Times*, 24 February; Fichtner, Heemskerk, and Garcia-Bernardo 2017, *Business and Politics* 19(2), pp. 298–326 on the BlackRock-Vanguard-State Street triumvirate), Citadel Securities' market-making infrastructure (executing over twenty percent of all U.S. equity trades by the end of 2022, with approximately forty percent of U.S. retail equity volume routed through the firm; see Securities Industry and Financial Markets Association annual reports across the period, with the institutional-history documentation at Patterson 2012, *Dark Pools: The Rise of the Machine Traders*, Crown Business), the high-frequency trading networks at the major exchanges (MacKenzie 2021, especially Chapters 2-4): each is a computational node whose aggregation capacity exceeds, by orders of magnitude, what any single Soviet planning bureaucracy could have approached. The contemporary order's coordinating layer is therefore not the distributed substrate-coupled referendum Hayek's argument specified. The coordinating layer is centralised aggregation conducted by a small number of private computational nodes, with the substrate-coupled human participants displaced from the formation cycle and interacting with the price as recipients of an output rather than as constituents of the formation.

The structural form Hayek's 1945 argument identified as the failure case of centralised planning, the form against which his argument was constructed, has not been avoided in the contemporary order. The structural form has been reproduced inside the order, at the coordinating layer, by private rather than state actors. The user-facing surface continues to display the vocabulary of free markets, choices, prices, and competition. The coordinating layer is conducted by computational regulators whose aggregation operates at action-cycles and concentration scales Hayek's argument did not anticipate and whose features the libertarian vocabulary does not admit as legitimate analytical content. The order's claim to Hayekian legitimacy is therefore a claim about the user-facing surface. The order's coordination is conducted at a layer Hayek's argument, read carefully, identifies as the failure case the argument was constructed against.

The cybernetic results make visible what any actual price-mechanism must be doing if it is functioning as the coordinator Hayek's argument names. The Law of Requisite Variety specifies the variety condition any regulator must satisfy to stabilise the system it regulates, and the price-mechanism is a regulator in the cybernetic sense, with the regulator status being a description of what the mechanism is doing operationally rather than a claim Hayek's argument requires. The Conant-Ashby theorem specifies that the regulator must contain a model of the system whose variety equals or exceeds the system's variety. Together, the two specify what the price-mechanism's operating architecture must be: the price-mechanism's variety must equal or exceed the variety of the dispersed knowledge it aggregates; the price-mechanism must, in its operating states, implement a model of the dispersed

knowledge whose variety is at least equal to its variety. The conditions are operating conditions at the level of what the price-mechanism is doing, not analytical conditions at the level of what the price-mechanism's defender has assumed.

The reading produces a finding that bears on what Part I prepared. The price-mechanism Hayek's argument named was a price-mechanism whose operating architecture was approximately matched to the productive economy it coordinated: human traders operating at human-scale temporal cycles, against firms whose productive positions changed at compatible cycles, with the regulator and the system operating at compatible action-cycles. The contemporary price-mechanism's operating architecture is the algorithmic trading and pricing infrastructure operating at action-cycles measured in milliseconds and nanoseconds against productive cycles measured in years and decades. The cybernetic results make the action-cycle mismatch visible. The mismatch is not visible in the libertarian discourse's vocabulary because the vocabulary describes the user-facing surface, and the coordinating-layer features of the infrastructure are not features the user-facing vocabulary admits.

The libertarian tradition's contemporary defence of the financialised order has been conducted through Hayek's argument deployed as a description of the user-facing surface: a description of markets, prices, choices, and competitive outcomes that the participating agent can recognise from the participant's position. The user-facing description is what the libertarian discourse admits as legitimate analytical content. The coordinating layer the cybernetic results identify is the layer at which the order's actual coordination is conducted, and the coordinating layer is what the libertarian discourse does not admit as legitimate analytical content. The finding is therefore not a refinement of Hayek's argument or a counter-argument to it. The finding is that the order whose user-facing surface Hayek's argument describes is being coordinated, at its coordinating layer, by cybernetic regulators whose features the user-facing description cannot register. The order's claim to Hayekian legitimacy is a claim about the user-facing surface. The order's coordination is conducted at a layer the claim does not address. The remainder of the chapter specifies the coordinating layer's features so that the gap between the two can be examined directly.

5.5 The Embedded Temporal Assumption

The 1945 paper was made against an institutional architecture whose operating features approximately matched the user-facing description Hayek's argument supplied. The price-mechanism's action-cycle was the action-cycle of human traders working at human-scale temporal cycles; the cycles at which firms' productive positions changed were compatible with the human-trader cycle; the two cycles matched at the coordinating layer. I call the matching the embedded temporal assumption: Hayek's argument does not state the assumption explicitly, but the argument's claims about price-mechanism aggregation depend by construction on the assumption holding. The assumption was approximately satisfied in the architecture against which the paper was made. It has been progressively undermined across the four decades the institutional sequence Chapter 2 reconstructed, with the consequence that the operating architecture of the contemporary order is an architecture in which the assumption no longer holds.

The institutional architecture of the 1940s within which Hayek's argument was developed had specific temporal features. Equity trading was conducted by human brokers at exchanges whose operating hours corresponded to human working days. Trade settlement took multiple days. Information about firms' productive positions reached market participants through quarterly earnings reports, occasional press releases, and analyst notes whose preparation took weeks or months. The investment horizons of the dominant equity holders, who were principally individual investors and institutional managers operating with long-term mandates, were measured in years. The price-mechanism's action-cycle, in the architecture Hayek's argument addressed, matched the cycles of the corporate productive position: information about a firm's engineering trajectory, supplier relations, and competitive position reached the market through channels whose temporal cadence corresponded approximately to the cadence at which the productive position itself changed.

The institutional sequence the contemporary order has undergone since the early 1970s has progressively contracted the price-mechanism's action-cycle while leaving the productive cycles unchanged. The principal stages of the contraction can be reconstructed (the historical sequence is documented forensically across MacKenzie 2021, especially Chapters 2-4 on the 1990s-2010s transformation from human-trader floors to automated high-frequency trading; Aquilina, Budish, and O'Neill 2022 quantify the contemporary microsecond-to-nanosecond regime at the empirical level, in *Quarterly Journal of Economics* 137(1), pp. 493-564). The 1970s and early 1980s saw the introduction of computerised order routing and the consolidation of the trading day's volumes into shorter periods; settlement times were reduced from five days to three. The 1990s saw the introduction of electronic communication networks and the expansion of derivative markets whose cycles operated at minute-to-hour scales; the rise of programme trading deployed action-cycles measured in seconds. The 2000s saw the deployment of algorithmic trading at action-cycles measured in milliseconds, with the high-frequency trading apparatus that emerged across the late 2000s operating at microsecond scales. The 2010s and 2020s have seen the further compression to nanosecond cycles in the major exchanges' co-location facilities, where the speed of light in optical fibre is the relevant constraint on action-cycle compression (the nanosecond-scale measurement is documented at MacKenzie 2021, especially the Chicago-to-New York microwave-route material in Chapter 4).

The productive cycles the price-mechanism nominally regulates have not contracted. The engineering-culture cycle operates on decades: engineers' professional formation requires multi-year apprenticeships, the transmission of tacit knowledge across cohorts requires sustained mentorship relationships, the accumulation of an engineering culture's depth requires the multi-decade continuity of an engineering organisation. The supplier-ecosystem cycle operates on years to decades: supplier relationships require sustained contractual commitments, supplier capabilities require investment horizons that match the suppliers' own capital cycles, the resilience of supply chains requires the maintenance of multiple suppliers whose continuing operation depends on receiving sustained orders. The capital-stock cycle operates on decades to half-centuries: industrial plant has replacement cycles of fifteen to forty years, infrastructure has replacement cycles of forty to a hundred years, the long-cycle capital expenditure decisions that produce industrial capacity require investment horizons that match the capital-cycle. The human-capital cycle operates on career scales, which extend across forty-year working lives. The research-and-development cycle operates on multi-decade scales for fundamental research and decade scales for applied research. The infrastructure cycle operates on generational scales. The ecological cycle operates on century-to-millennial scales.

The institutional sequence has produced a mismatch between the price-mechanism's action-cycle and the productive cycles the price-mechanism nominally regulates. The mismatch has accumulated continuously across the four-decade period the sequence covers, with the mismatch ratio (the ratio between the productive cycle and the action-cycle) reaching values that exceed any architecture against which Hayek's argument was made. The contemporary mismatch ratio, computed at the price-mechanism's millisecond action-cycle against the engineering-culture cycle of decades, exceeds 10^11. The ratio against the ecological cycle's century scale exceeds 10^13. The numerical scale of the mismatch is what §5.6 makes formally precise.

5.6 The Horizon-Mismatch Theorem

A note on terminology before the theorem is stated. The cybernetic literature, from Ashby and Conant-Ashby forward, speaks of *regulator-system* pairs; the theorem the present section develops uses the cybernetic vocabulary at the level of formal statement, with *system* (S) and *system-state* and *system-cycle* operating as the technical terms. The rest of the book uses *substrate* in place of *system* to track the specific kind of system at issue: a productive substrate whose replenishment-cycle is longer than the regulator's action-cycle. The two terms are coextensive in the contexts the book deploys them; the choice of *substrate* is methodological rather than mathematical, marking the architectural-economic specificity the diagnostic chapters require. In what follows, *system* and *substrate* are used interchangeably, with *system* preferred at the formal-mathematical statement of the theorem and *substrate* preferred at the deployment of the theorem's consequences against the order's productive register.

The Law of Requisite Variety and the Conant-Ashby theorem, applied to a regulator whose action-cycle is shorter than the system's cycle by orders of magnitude, produce a formal consequence the present section develops. The theorem specifies that under the conditions §5.5 documented numerically, system-coupled regulation is impossible by construction by any operation the regulator can perform within the order's action-cycle, and system depletion proceeds as the necessary signature of cycle-mismatched regulation rather than as a contingent failure institutional reform might remedy.

Statement of the Theorem

Theorem 1 (Horizon-Mismatch). Let R be a regulator with action-cycle T_R, and let S be a system with replenishment-cycle T_Sigma. Suppose T_R is shorter than T_Sigma by more than a factor of order one. Then R cannot, by construction, model S at system-state resolution; and the variety of S's disturbances must be absorbed within S itself, producing system-state changes the regulator does not register and does not address.

The case the reader has just been carrying is the test case the theorem is built for. The price-mechanism's millisecond action-cycle is R; the engineering-culture cycle, replenishing over decades, is S; the ratio between the two, the 10^11 figure §5.5 documented, is the condition under which the theorem's antecedent obtains. The theorem's content is that, in this case, system-coupled regulation is foreclosed by construction. Not difficult, not expensive: foreclosed. The proof that follows specifies why.

The Proof

The proof proceeds through two lemmas and the main inference. The lemmas establish the conditions the Law of Requisite Variety and the Conant-Ashby theorem impose on any regulator-system pair; the main inference applies the conditions to the cycle-mismatched case.

Lemma 1 (Variety-Cycle Bound). A regulator R operating at action-cycle T_R has variety bounded by the variety of disturbances R can register within T_R. The regulator's variety is not unbounded; it is constrained by construction by the temporal resolution at which the regulator operates. A regulator producing a single output per action-cycle has variety equal to the number of distinct outputs it can produce, which is the cardinality of its output space. A regulator whose temporal resolution is T_R can register, within a single action-cycle, only the disturbances that produce distinguishable signals at T_R's resolution; disturbances operating at scales much longer than T_R appear, within a single action-cycle, as approximately constant inputs, with the consequence that the regulator's variety cannot distinguish the long-cycle disturbances from each other within the action-cycle. The lemma is formal and follows from the temporal-resolution properties of any sampled measurement system; the result is standard in the signal-processing and control-theoretic literatures (the relevant background is Wiener 1948 on the temporal-resolution conditions of feedback systems; Ashby 1956 on the variety-temporal-resolution interaction at pp. 202-207; Conant 1969 on the cybernetic specification of the bound).

Lemma 2 (Modelling-Resolution Bound). A regulator R whose internal states implement a model M of a system S has model M at resolution equal to the resolution at which R's internal states can be updated, which is bounded by R's action-cycle T_R. The regulator's model has resolution not finer than the regulator's update cycle; a model updated at T_R cannot have resolution finer than T_R, because the model's state changes are, by construction, the changes that occur in R's internal states across the update cycle. The system S has its own temporal features; if the system's variety operates at T_Sigma, the model M's resolution at T_R cannot represent S's variety at T_Sigma when T_R is shorter than T_Sigma. The lemma follows from the temporal-coupling conditions on regulator-system pairs that Conant and Ashby's 1970 theorem establishes (Conant and Ashby 1970, pp. 92-95).

Main Inference. Let R be a regulator with action-cycle T_R, and let S be a system with replenishment-cycle T_Sigma, with T_R shorter than T_Sigma. By Lemma 1, R's variety is bounded by the variety R can register within T_R; by the temporal features of the cycle-mismatch, this variety does not include the system's variety at

T_Sigma, because the system's T_Sigma-scale variety appears within R's T_R-scale action-cycle as approximately constant inputs R's variety cannot distinguish. By Lemma 2, R's model M of S has resolution not finer than T_R; by the cycle-mismatch, M's resolution cannot represent S's variety at T_Sigma. By the Law of Requisite Variety (§5.1), R's stabilisation of S requires R's variety to equal or exceed S's disturbance variety; the cycle-mismatched regulator's variety does not satisfy this condition. By Conant-Ashby's theorem (§5.2), R's stabilisation of S requires R to contain a model M of S whose variety equals or exceeds S's variety; the cycle-mismatched regulator's model does not satisfy this condition. The two conditions together specify that R cannot, by construction, stabilise S. The variety S presents must be absorbed somewhere; the absorption cannot be by R; the absorption must be within S itself, producing system-state changes R does not register and does not address. This concludes the proof.

Formal Restatement

The proof above is formal. The same content can be displayed as a chain of inequalities, which some readers will find clearer. The notation is fixed once: V_R denotes regulator variety; V_S denotes system variety; V_M denotes model variety; V_D denotes disturbance variety; T_R and T_Sigma are the cycles; N(T) denotes the number of distinguishable signals available at temporal resolution T.

The three prior results that the section composes are, in displayed form:

Ashby (1956): $V_R \geq V_D$

Conant-Ashby (1970): R stabilises $S \Rightarrow V_M \geq V_S, \quad V_M \leq V_R$

Sampling bound (Shannon 1949): $V_R \leq N(T_R)$

The third result is the temporal-resolution bound Lemma 1 establishes; it is the variety form of the Nyquist-Shannon sampling theorem applied to a regulator whose state updates occur at intervals of length T_R.

The cycle-mismatch hypothesis is T_R ≪ T_Sigma, with V_S concentrated at scale T_Sigma. The chain inference is then:

$$V_M \leq V_R \leq N(T_R) < V_S$$

The first inequality is Conant-Ashby; the second is the sampling bound; the third follows from the cycle-mismatch hypothesis, since variety concentrated at scales much greater than T_R is, by the sampling bound, not in N(T_R). The composed inequality contradicts the Conant-Ashby requirement V_M ≥ V_S. The regulator cannot stabilise the system. The system's variety must be absorbed within S itself.

The Mismatch Ratio

The theorem's antecedent is the condition T_R ≪ T_Sigma. The condition can be made specific by the *mismatch ratio*: T_Sigma divided by T_R (the system-cycle over the action-cycle), dimensionless, computable as soon as the two cycles are identified. The ratio is large when the system evolves much more slowly than the regulator acts, which is the antecedent's regime; the ratio is approximately one when the cycles are matched.

Read it on the worked case. The price-mechanism operates at milliseconds. The engineering-culture cycle replenishes over decades. The ratio is roughly 10^11. That number is what the theorem's antecedent looks like for this regulator-system pair. It is not at the edge of the antecedent's range; it is eight orders of magnitude past where the antecedent first applies.

The reader will encounter the mismatch ratio at several diagnostic locations across the book, and the numbers reported at those locations differ across the chapters. The reason is not that the chapters disagree. The book examines several distinct regulators operating against the productive substrates: the price-formation mechanism at the millisecond cycle of algorithmic trading (deployed at §5.5 and §7); the price-formation mechanism at the nanosecond cycle of co-located high-frequency-trading servers (deployed at Chapter 9's casino-architecture analysis); the corporate executive-compensation apparatus at the quarterly cycle (deployed at Chapter 10's

cannibalisation-cascade analysis); the engagement-economy regulator at the second-to-minute cycle of recommendation algorithms (deployed at Chapter 6 §6.5.1 and Chapter 10 §10.9); the electoral cycle at the four-to-five-year scale (deployed at Chapter 10 §10.8's ecological analysis). The mismatch ratio for the same substrate against different regulators differs by orders of magnitude because the regulators' action-cycles differ by orders of magnitude. Each ratio is computed against the regulator specified at the point of computation, and the order of magnitude of the ratio is the order of magnitude appropriate to that regulator-substrate pair. The book is not reporting different facts about the same regulator-substrate pair across the chapters; the book is reporting the same finding (cycle-mismatch foreclosure of substrate-coupled regulation) across multiple regulator-substrate pairs, with the empirical pattern's force compounded across the pairs.

The matched case is the case the theorem's antecedent does not obtain in. The ratio is approximately one. The regulator's action-cycle and the system's replenishment-cycle are at the same temporal scale, so disturbances at the system's scale appear within the regulator's cycle as variations the regulator can distinguish. Ashby and Conant-Ashby are satisfied. Stabilisation is, in principle, possible. This is the architectural condition Hayek's 1945 argument implicitly presupposes; §5.5 documented that the architecture of the 1940s, against which the argument was made, approximately satisfied it.

The mismatched case is the case the theorem applies to. The ratio is large enough that disturbances at the system's scale appear within the regulator's cycle as approximately constant inputs the regulator cannot distinguish. Ashby's variety condition fails. Conant-Ashby's modelling condition fails. The system's variety has nowhere to go but the system itself. What this looks like over time, on the worked case, is the engineering-culture cycle's accumulating depletion: senior engineers retiring without their tacit knowledge transmitted, supplier relationships eroding, certification systems degrading. The condition that produces it is what the theorem specifies.

The transition between the two cases is not a sharp boundary. A regulator with sufficient sampling resolution can stabilise long-cycle systems against short-cycle disturbances when the ratio is moderate, perhaps up to a factor of ten or twenty. Beyond ratios of about 10^3, no sampling strategy can recover the system's variety at the regulator's resolution; the system is, at the regulator's frame, invisible at the regulator's resolution. The 10^11 ratio of the worked case sits eight orders of magnitude into the impossible region.

What the Theorem Excludes

The theorem identifies the conditions under which system-coupled regulation is impossible by construction. It does not prescribe what regulatory architecture should be deployed in place of the cycle-mismatched architecture. It does not predict what the depletion's specific empirical signature will be in any particular order; that depends on the order's specific features. It does not address whether the cycle-mismatched order's depletion is reversible by any institutional intervention; that question lies outside the theorem's analytical scope. The theorem's scope is the conditional analysis of regulator-system coupling. The prescriptive and predictive questions belong to other work the present chapter does not contain.

5.7 The Architecture's Necessary Signature

The horizon-mismatch theorem specifies that depletion proceeds as the necessary signature of cycle-mismatched regulation. The empirical signature has a specific form the theorem permits the chapter to state. The signature is necessary in the formal sense: it is what the theorem predicts must occur in any cycle-mismatched order, with the specific empirical features depending on the order's particular features but the signature's general form being the same across orders.

The signature has three features that together specify what the empirical record will exhibit in any cycle-mismatched order. The three features stand in the formal relation the theorem's antecedent imposes.

The first feature is that depletion proceeds invisibly at the system's cycle while the regulator's metrics improve at the action-cycle. This is the direct consequence of the cycle-mismatch: the regulator's metrics, operating at T_R, register the order's state at the regulator's resolution; the system's depletion, operating at T_Sigma, is invisible at the regulator's resolution; the depletion does not appear in the regulator's metrics until the system's state crosses thresholds that produce effects at the regulator's resolution. The order therefore exhibits, across the depletion's accumulation period, an empirical pattern in which the regulator's metrics trend favourably while the system's state deteriorates; the pattern is what the order's discourse interprets as the order's success at the regulator's resolution. The depletion is registered, when it is registered at all, as a separate question outside the regulator's framework: as a "social" question, an "ecological" question, a "quality" question, a "long-term" question, with the bracketing being the signature of the regulator's inability by construction to model the system at the system's cycle.

The second feature is that the depletion becomes visible to the regulator only through perturbation that crosses the measurement system's threshold. This follows from the first: the regulator's metrics do not register the depletion until the system's state crosses thresholds producing effects at the regulator's resolution. The thresholds are typically crossed when accumulated depletion produces a discrete event: an engineering-culture depletion produces a product failure, a supplier-ecosystem depletion produces a supply-chain disruption, a human-capital depletion produces a labour-market disruption, a research-and-development depletion produces a productivity collapse, an infrastructure depletion produces an infrastructure failure, an ecological depletion produces a climatological disruption, a cognitive-emotional depletion produces a developmental or mental-health pattern visible at population scale. The discrete events are what the order's discourse registers as the depletion's empirical signature; the events are the surface of a pattern the regulator's metrics did not register and could not have registered, by the formal reasons the theorem specifies.

The third feature is that the order's response to the discrete events is constrained by construction by the regulator's framework. The response is the response the framework permits; the framework permits the response to be expressed in the framework's own vocabulary, which is the vocabulary at the regulator's resolution; the response cannot, by construction, address the system's state at the system's own cycle. The response is therefore registered as a regulatory adjustment within the framework, with the adjustment's content being whatever the framework's vocabulary admits. The Sarbanes-Oxley legislation that followed the early-2000s accounting scandals modified the framework's vocabulary while leaving the regulator's action-cycle and the system cycles unchanged. The Dodd-Frank legislation that followed the 2008 financial crisis modified the framework's vocabulary while leaving the action-cycle and the system cycles unchanged. The Basel III international banking regulations that followed the 2008 crisis modified the framework's vocabulary while leaving the action-cycle and the system cycles unchanged. The orders' responses are, in each case, expressions of the framework's continued operation at the regulator's resolution, with the response not addressing the system-cycle dynamics that produced the events the framework is responding to.

The signature is therefore not a list of contingent failures better regulation could prevent. The signature is the architecture's necessary signature in the formal sense: it is what any cycle-mismatched order must exhibit, and the contemporary financialised order exhibits it because the order is cycle-mismatched in the form the theorem specifies. The empirical record Part I documented is therefore the empirical signature of an architecture whose formal features the theorem specifies.

5.8 The Theorem's Philosophical Character

The horizon-mismatch theorem is negative by design. It does not specify what orders will produce desirable system-coupled regulation; it specifies the conditions under which system-coupled regulation is impossible by construction. It identifies, formally, the conditional features any regulator-system pair must satisfy if the regulator is to stabilise the system; it identifies, by negation, the orders in which the conditions are not satisfied and in which system-coupled regulation cannot, by construction, occur. The theorem's character is therefore diagnostic rather than prescriptive: the theorem identifies conditions; it does not propose the architecture that would satisfy them.

This is the character of the cybernetic results the chapter has built. The Law of Requisite Variety identifies the variety condition any regulator must satisfy to stabilise any system; it does not specify any particular regulator or any particular system. The Conant-Ashby theorem identifies the modelling condition any regulator must satisfy; it does not specify any particular model or any particular regulator. The horizon-mismatch theorem identifies the cycle-coupling condition any regulator-system pair must satisfy; it does not specify any particular cycle or any particular system. The results are, in this sense, formal: they operate on the conditional features of regulator-system pairs, without specifying any particular pair. The analytical force comes from the conditional reasoning the results permit.

The chapter has built the cybernetic results. They identify, at the formal level, the conditions under which system-coupled regulation is possible and the conditions under which it is impossible by construction. The thermostat case the chapter opened with returns at its true scale: a regulator with insufficient variety, looking at a system whose disturbance states the regulator's sensor does not resolve, will stabilise the part of the system it can see and leave the rest to vary according to its own dynamics. The financialised regulator is the thermostat at the scale of an economy. The systems it does not measure are the bedroom upstairs at twenty-eight degrees, the kitchen at nineteen, the basement at fourteen. The signature is the architecture's necessary signature: it follows by construction from what the regulator can see and what the system is.

CHAPTER 6

La Technique and What Operates Without a Driver

6.0 Two Cases of Nothing Happening

A senior engineer at Boeing in the period before the 737 MAX certification has a concern. The aircraft's new flight-control system, the Manoeuvring Characteristics Augmentation System, depends on a single angle-of-attack sensor. Every prior Boeing aircraft family had required redundancy for control surfaces of this kind: two sensors, three, voting between them. This one has one. A single sensor failure, on this aircraft, will trigger MCAS against the pilots' intent and push the nose down. The engineer writes it up. The concern goes into the engineering review process in the form the engineering review process specifies.

The form generates a tracking number. The tracking number generates a record. The record triggers an initial-review meeting. The initial-review meeting generates minutes. The minutes generate an action item. The action item names the constitution of a working group. The working group, once constituted, generates a working-group charter. The charter generates a deliverable schedule. The first scheduled deliverable is an issue-characterisation document. The issue-characterisation document, when drafted, generates a circulation list. The circulation list generates reviewers. The reviewers generate comments. The comments generate a comment-disposition log. The comment-disposition log feeds into a second draft. The second draft generates a second circulation list. The second circulation list generates further reviewers. The further reviewers generate further comments. The further comments generate further log entries. The further log entries feed into a third draft. The third draft generates a sign-off record. The sign-off record becomes input to the next scheduled deliverable, a risk-assessment matrix. The risk-assessment matrix generates review requirements. The review requirements generate reviewers in certification engineering. The certification-engineering reviewers generate revisions. The revisions generate a tracking log. The tracking log generates additional reviews by safety analysis. The safety-analysis reviewers generate further revisions. The further revisions generate further log entries. The risk-assessment matrix, in its final form, places the failure mode within the regulatory categories the certification framework treats as addressed by training and procedural mitigations rather than by hardware redesign. The classification is signed off. The sign-off generates a close-out memorandum. The close-out memorandum generates a sign-off chain. The signed close-out memorandum generates a closure record. The closure record closes the action item.

Each output is the next stage's input. Each closed item is the artefact the next item operates on. The concern the engineer raised has not disappeared. It has been converted into a tracked record, a meeting log, a charter, a deliverable schedule, a draft document, a circulation list, a comment log, three revisions, a sign-off, a risk-matrix, three more reviews, three more revisions, a close-out memorandum, a sign-off chain, and a closure record. The architecture is now larger by all of these artefacts than it was when the concern arrived. The procedural mass produced by the concern is itself part of what the next concern will operate within: the precedent the

risk-classification establishes, the workflow the working group's structure validates, the framework-compatibility the close-out demonstrates. The architecture metabolises the concern and grows on it.

The certification proceeds. The MCAS architecture is shipped as designed.

On 29 October 2018, Lion Air Flight 610 crashes into the Java Sea, killing 189 people. On 10 March 2019, Ethiopian Airlines Flight 302 crashes near Bishoftu, killing 157 people. The post-crash investigations document that the engineer's concern had been correct. They also document that the concern had been registered through legitimate channels, at the right time, in the right form, by the right person. The engineering review process had done what an engineering review process does. The working group had done what a working group does. The certification authority had done what a certification authority does. Each agent in the chain had executed their role correctly. Nobody had decided to ignore the engineer. The MCAS architecture had remained as designed. The action the engineer's concern had been raised to produce did not occur, and the architecture's continued operation is now larger by the procedural mass the concern had generated (House Committee on Transportation and Infrastructure 2020, *Final Committee Report: The Design, Development & Certification of the Boeing 737 MAX*, especially Chapters 2 and 5; Komite Nasional Keselamatan Transportasi 2019, the Indonesian air-accident investigation final report on Lion Air Flight 610).

Move now to a different room, a different decade, a different industry. After the 2008 crisis, the U.S. Congress drafts Section 619 of the Dodd-Frank Wall Street Reform and Consumer Protection Act: the Volcker Rule. The Rule's purpose is to prevent banking entities from engaging in the proprietary trading that produced the systemic exposures the crisis revealed. The 2010 statutory text states the prohibition directly: banking entities are prohibited from proprietary trading and from sponsoring or holding ownership interests in hedge funds and private equity funds.

Then the rule-making period begins. The 2010 statutory text generates a notice of proposed rule-making. The notice of proposed rule-making generates a comment period. The comment period generates roughly seventeen thousand comment letters from bank trade associations, member institutions, and counsel. Each comment letter generates a tracking entry. The tracking entries generate a comment-disposition matrix. The comment-disposition matrix generates revisions. The revisions generate the 2013 proposed final regulations. The 2013 proposed final regulations specify exemptions for market-making activities, for risk-mitigating hedging, for trading on behalf of customers, for underwriting, for transactions in government obligations, for permitted trading by foreign banking entities. Each exemption generates implementation guidance. Each implementation guidance generates clarification requests from the regulated institutions. Each clarification request generates an agency response. Each agency response generates further implementation guidance. The 2014 supplementary regulations expand the exemptions' operational reach. The 2014 supplementary regulations generate the next round of compliance manuals at the regulated institutions. The compliance manuals generate the next round of clarification requests. The clarification requests generate the next round of supplementary guidance. The 2018 amendment under Section 203 of the Economic Growth, Regulatory Relief, and Consumer Protection Act exempts banking entities with less than ten billion dollars in consolidated assets. The exemption generates a new round of rule-making to specify the exemption's operational reach. The new round of rule-making generates the 2020 final rule, which further loosens the trading-account specification, the ownership-interest specification, and the covered-fund definitions.

Each rule-making cycle generates the next rule-making cycle. Each clarification generates the next clarification. Each guidance generates the next guidance. The Rule's prohibition is on the books. The trading activities the Rule prohibited continue, conducted under classifications the Rule's exemptions admit. The regulatory architecture is now larger by the comment letters, the matrices, the proposed regulations, the supplementary regulations, the implementation guidance, the clarification chains, the compliance manuals, the amendment rule-makings, and the further final rules than it was when the 2010 statutory text was passed. The regulators, the regulated institutions, the trade associations, the law firms, and the compliance industry have all grown on the procedural mass the Rule's drafting and softening produced. The Volcker Rule's institutional life has become the apparatus that maintains the Rule's institutional life.

The legislative architecture had been deployed at the highest density the U.S. legislative apparatus permits. The rule-making process had been conducted at the highest density the agencies' procedures specify. Each drafter had executed their drafting role correctly. Each agency had completed the rule-making as the rule-making process requires. Nobody had decided to nullify the Rule. The architectural feature the Rule was directed at remained as it had been when the Rule's drafting began, and the architecture's continued operation is now larger by everything the Rule's drafting produced (Krippner 2011, *Capitalizing on Crisis*, especially the Conclusion on the post-crisis legitimation pattern; Coffee 2012, 'The Political Economy of Dodd-Frank: Why Financial Reform Tends to be Frustrated and Systemic Risk Perpetuated', *Cornell Law Review* 97(5), pp. 1019–1082, on the legislative-regulatory record).

The two cases share the feature the chapter is constructed to specify. The feature is not that nothing happened. A great deal happened. The two cases generated, between them, tracking entries, working-group constitutions, draft documents, comment chains, sign-off records, close-out memoranda, rule-makings, exemption schedules, implementation guidance, clarification cycles, compliance manuals, supplementary regulations, and final rules. What did not happen is the substrate-protective action the architecture had been deployed to produce. What did happen, in addition to the documentation, is that each output became the next stage's input. The engineer's concern generated procedural artefacts; the procedural artefacts generated further procedural artefacts; the further procedural artefacts generated yet further procedural artefacts; and the architecture, when the cycle closed, was larger than it had been when the concern arrived. The Volcker Rule's drafting generated rule-makings; the rule-makings generated guidance; the guidance generated clarifications; the clarifications generated amendments; the amendments generated further rule-makings; and the regulatory architecture, when the cycle had run for a decade, was larger than it had been when the 2010 statutory text was passed. The architecture's response to the reform is the recursive production of its own continuation. Each output is the next input. Each closed action is the precedent the next action will operate within. The participating agents act in good faith and within their specified roles. The documentary record the architecture produces is extensive at every stage of the cycle. The procedural mass grows under the weight of what the architecture has produced. The condition the reform was directed at continues to deteriorate. The cases are not failures of any agent's competence or character. The cases are not the products of corruption or malice or the political capture of one process by one interest. The cases are what an institutional architecture of a particular kind produces when reform is attempted from inside it. The architecture processes the reform. The architecture grows on the reform. The architecture continues.

Step back from the two cases and consider what kind of phenomenon they exhibit. The previous chapter built an apparatus for analysing regulators against substrates: the regulator has variety, the substrate presents variety, the regulator's measurement frame has resolution, and the regulator's stabilising operation has limits the formal results specified. The apparatus was constructed for a regulator-and-substrate pair examined as an analytical unit. The two cases the present chapter has just walked through are not regulator-and-substrate pairs examined in isolation. They are something the apparatus was built to handle without making explicit: an institutional architecture composed of many regulators, in which each regulator's outputs are inputs to other regulators in the architecture, and in which the cumulative operation of the coupling is what the architecture does.

What follows from the apparatus, when the regulator-and-substrate analysis is scaled to a coupled architecture, is not an extrapolation. It is a feature the apparatus produces by construction. The unit of analysis the previous chapter built was a single regulator coupled to a single substrate, with the regulator's variety operating against the substrate's variety at a specified resolution and cycle. An institutional architecture is composed of many such regulators arranged in chains and webs, with each one's outputs feeding the next as inputs. Each holds its variety, its measurement frame, and its action-cycle. Each produces outputs that are documents, procedures, decisions, classifications, and records the architecture treats as legitimate operational artefacts. Those outputs are the inputs the next stage operates on. The next stage's measurement frame is calibrated to the artefact-form the prior stage produced. The next stage's variety is the variety of operations it can conduct on that artefact-form. The architecture's continued operation is the operation of all the chained stages, with each one's outputs becoming the

next one's inputs. The architecture as a whole has no regulator. The architecture as a whole has no measurement frame against which its own state could be regulated. What the architecture does is what the coupled operations of its constituent stages produce when each operates as the previous chapter's apparatus specified each one must operate.

The Boeing engineer's concern was registered by a stage whose measurement frame was the engineering-review-procedure form. The form's output was a tracking number; the tracking number was the input to the next stage, the working-group-constitution procedure; the working group's output was a charter; the charter was the input to a further stage, the deliverable-schedule procedure; and the recursion continued through twenty further stages, with each one's output becoming the next one's input, until the final stage produced a closure record. No stage in the chain had a measurement frame at which the substrate the concern named (the safety of the aircraft's flight-control architecture) could appear as a candidate for operation. Each operated within its specified variety on the input the previous stage's variety had produced. The substrate-protective action the concern had been raised to produce was not within any stage's specified variety. The architecture's continued operation was the operation of the chained stages, with the substrate the concern named falling outside the variety of every one of them. The architecture grew on the procedural mass each stage's operation produced. The substrate-protective action did not occur.

The Volcker Rule produced the same architecture's response at a different institutional density. The 2010 statutory text was the input to the first stage, the notice-of-proposed-rule-making procedure. The notice was the input to the comment period; the comments were the input to the comment-disposition matrix; the matrix was the input to the proposed-final-regulations procedure; the regulations were the input to the implementation-guidance procedure. The recursion continued for a decade across rule-makings, exemption schedules, clarifications, supplementary regulations, amendments, and further final rules, with each output becoming the next input. No stage in the chain had a measurement frame at which the substrate the Rule named (the systemic exposure produced by proprietary trading) could appear as a candidate for operation. Each step operated within its specified variety on the input the previous step's variety had produced. The architecture's continued operation was the operation of the chained stages. The substrate the Rule named was not affected.

What the apparatus the previous chapter built produces, at the level of an institutional architecture composed of coupled stages with no regulator over the coupling, is the phenomenon the two cases exhibit, which is neither anomalous nor the product of bad design, bad agents, or captured institutions; it is the predictable operating shape of an architecture in which each stage operates as a regulator must, and the coupling of the stages has no regulator. The architecture's continued operation is what the chained stages produce. The substrate-protective action is what no stage in the coupled architecture's variety can produce, because the substrate the action would protect is not within the variety of any stage the coupling contains.

This is the chapter's central reading, and the rest of the chapter develops it. The reading is that the configuration the two cases exhibit is what the cybernetic apparatus the previous chapter constructed already specifies, scaled from a single regulator-and-substrate pair to a coupled institutional architecture composed of many such regulators. The architecture does have a hegemony in the sense that it operates as if a single intention were running through it: each stage produces the next stage's inputs, the chain proceeds without interruption, the substrate-protective action is absent at every stage, and the architecture's continued operation has the consistency one would otherwise attribute to a coordinating mind. The hegemony is not, however, located at any agent, any institutional position, or any group of agents. The hegemony is the substrate-decoupled optimisation itself, conducted at every node of the chain by an apparatus whose measurement frame does not contain the substrate the optimisation was supposed to serve. The Boeing engineer's concern was processed by an apparatus whose measurement frame contained the engineering-review-procedure form, the working-group constitution, the deliverable schedule, and the closure record; it did not contain the substrate the concern named, which was the safety of the aircraft's flight-control architecture. The Volcker Rule's drafting was processed by an apparatus whose measurement frame contained the rule-making procedure, the comment-disposition matrix, the implementation guidance, and the supplementary rule-makings; it did not contain the substrate the Rule named,

which was the systemic exposure produced by proprietary trading. The optimisation operates at every stage; the substrate the optimisation is for is at no stage. The architecture has a mind of its own in the precise cybernetic sense that the optimisation operation, conducted at action-cycles the substrate cannot reach, converges by mathematical necessity on the region of the substrate's response distribution that produces the highest-amplitude, lowest-variance, most-predictable signal at the optimiser's measurement frame; the convergence is the substrate-decoupled optimisation's own attractor, derivable from Chapter 5's results, and the present chapter develops the cybernetic specification of it at §6.5.1 under the heading of the lowest-common-denominator attractor. The architecture cannot be reformed from inside because the hegemony has no agent-amendable locus: every position from which reform could be conducted is itself a node of the same substrate-decoupled optimisation, and every reform proposal advanced from any such position is itself processed by the optimisation as the apparatus's next input. The chapter's three-mechanism apparatus at §6.9.1 specifies the form the processing takes. The configuration's empirical signatures, at the financialised price-formation system and at the cascade across the productive substrates, are developed at Chapters 10 and 11. The reading is one reading the empirical material admits, and the responsibility for it is mine rather than the claim that it is the only reading the material licenses.

The configuration has a literature. A French philosopher and sociologist, writing in the 1950s through the 1980s, developed a body of work that specified the configuration's features at the empirical density the present chapter requires, before the cybernetic apparatus was available to specify the configuration formally. His work is my analytical foundation. My distinctive extensions are conducted on his work rather than as alternatives to it. The next section introduces the work and the figure who built it.

6.1 The Architecture and the Work That Specified It

Jacques Ellul, writing in *La Technique ou l'enjeu du siècle* (Ellul 1954, the work translated by John Wilkinson and published as *The Technological Society* in 1964 by Alfred A. Knopf, with the introduction by Robert K. Merton), specified the institutional architecture the chapter's two cases exhibit at the level the chapter requires. The reader is asked to register Ellul's specification first, with the cybernetic reading the prior section completed held in view.

Ellul's claim is that the architectural feature the chapter's cases exhibit is not the product of any agent's intent. The architecture operates without a driver. The architecture's continued operation is not the result of any decision made at any specifiable point in the architecture's institutional structure. Ellul writes, in the chapter on self-augmentation: "There is an automatic growth (that is, a growth which is not calculated, desired, or chosen) of everything which concerns technique" (Ellul 1954/1964, p. 87). And: "In this decisive evolution, the human being does not play a part. Technical elements combine among themselves, and they do so more and more spontaneously. In the future, man will apparently be confined to the role of a recording device; he will note the effects of techniques upon one another, and register the results" (Ellul 1954/1964, p. 93). And: "It is not the 'wishes' of the 'producers' which control, but the technical necessity of production which forces itself on the consumers. Anything and everything which technique is able to produce is produced and accepted by the consumer. The belief that the human producer is still master of production is a dangerous illusion" (Ellul 1954/1964, p. 94).

The architecture has no agent at the position from which the architecture's continuation could be redirected. The Boeing engineer's documented concern produced documented activity that left the architectural feature unchanged because no agent at any institutional position had the architectural authority to direct the feature's reconfiguration; the post-2008 legislative record produced legislative activity that left the architectural feature unchanged because no agent at any institutional position had the architectural authority to direct the feature's reconfiguration. The architecture continues because the architecture's continuation is not under any agent's control. Ellul's name for the architecture is *la technique*. The Wilkinson translation renders the term as "technique" without an article, with the warning at the start of *The Technological Society* that the English-language reader is likely to confuse the term with "technology" or "applied science" and that the confusion is the chapter's

first obstacle. *La technique* is not technology in the colloquial sense. *La technique* is not the body of mechanical devices or applied scientific procedures contemporary discourse usually means by the word "technology." *La technique* is the integrated institutional-administrative-financial-organisational architecture within which contemporary technical-administrative life is conducted, with the architecture's continued operation being the feature Ellul's analysis specifies.

The chapter will continue using the French *la technique* alongside the English "technique" as I extend the analytical machinery on Ellul's foundation. The English term is unavoidable in expository prose; the French term is preserved on first use of any specific feature so that the reader can hold the demarcation between the colloquial English usage and Ellul's analytical specification.

A note on my relation to Ellul's work is in order before the analysis proceeds. I take Ellul's empirical specification of the seven features and his analytical observations about reform-failure as my analytical foundation. Where I develop apparatus that goes beyond what Ellul himself wrote (the cybernetic specification of self-augmentation at §6.5.1 under the heading of the lowest-common-denominator attractor, the three-mechanism formalisation at §6.9.1, the N-th Order Epistemic Acknowledgment State at §6.11, the homeostatic triad at §6.12), the apparatus is my construction, developed on Ellul's foundation but not claiming to recover what Ellul himself would have written had he used the cybernetic vocabulary Chapter 5 constructed. Ellul wrote in the vocabulary of social theory and philosophy of technology that the post-war French intellectual tradition made available. I read his work through the cybernetic vocabulary of Chapter 5. The reading is one reading among others that Ellul's work admits, and other readings in other formal vocabularies are possible; the reading is mine to defend.

6.2 The Seven Characteristics

Ellul's analysis in *The Technological Society* Chapter 2, "The Characterology of Technique," specifies seven features of *la technique* as it operates in the contemporary period:

1. Rationality. Technique brings mechanical procedure to bear on what was formerly spontaneous or local: the systematisation of operations, the division of labour, the specification of standards, the reduction of method to its logical dimension (Ellul 1954/1964, pp. 79–80).

2. Artificiality. Technique is opposed to nature; it destroys, eliminates, or subordinates the natural world and substitutes for it an environment in which natural conditions cease to be the conditions under which agents act (Ellul 1954/1964, p. 79).

3. Automatism. The choice among methods, instruments, and arrangements is not made by any agent. The choice is the mathematical output of efficiency comparison: "the one best way" is selected procedurally, and the agent who appears to choose is registering the comparison's result (Ellul 1954/1964, pp. 80–84).

4. Self-augmentation (*autoaccroissement*). The architecture's continued operation produces, at each iteration, the institutional conditions for the next iteration. Technical progress is irreversible in direction and geometric in pace (Ellul 1954/1964, pp. 85–94).

5. Monism. The technical phenomenon forms an integrated unity: its separate techniques cannot be analytically isolated, and no component admits independent reform without the others (Ellul 1954/1964, pp. 94–111).

6. Universalism. The technical phenomenon has propagated across all geographical regions and across all domains of human activity, with the consequence that the technical phenomenon is coextensive with the institutional-administrative reality of contemporary human life (Ellul 1954/1964, pp. 116–133).

7. Autonomy. The technical phenomenon's continued operation is independent of the human, political, social, economic, and moral frameworks within which it was historically embedded. The architecture continues without requiring any agent's consent at any specifiable position (Ellul 1954/1964, pp. 133–147).

Ellul groups the seven into the two "well-known" features (rationality and artificiality), which he treats briefly because they are uncontested across the existing literature, and the five remaining features, which require analytical work to render visible at the institutional-architectural level. The chapter's treatment follows Ellul's order.

6.3 The Two Well-Known Features: Rationality and Artificiality

Ellul's two "well-known" features of *la technique* are the features his analysis takes as established in the existing literature on modernity and on technological civilisation, and treats briefly to ensure the reader holds them in view. The first of the two features is rationality, by which Ellul names the way technique, in any domain in which it is applied, brings mechanical procedure to bear on what was formerly spontaneous or local: the systematisation of operations, the division of labour, the specification of standards, the production of norms. The procedural reduction Ellul specifies under the heading of rationality operates along two axes. The first reduction is the use of explicit discourse in every operation, which Ellul names as excluding spontaneity and personal creativity. The second is the reduction of method to its logical dimension, with every intervention of technique being a reduction of facts, forces, phenomena, means, and instruments to the schema of logic (Ellul 1954/1964, pp. 79–80, the rationality specification at the start of "The Characterology of Technique"). The feature is contested in the existing literature primarily at the level of whether the rationalisation is desirable, not at the level of whether it is occurring; the chapter takes the empirical claim of rationalisation as established and proceeds.

The second well-known feature is artificiality. Technique is opposed to nature, in the operational sense that technique destroys, eliminates, or subordinates the natural world, and substitutes for the natural world an environment in which natural conditions cease to be the conditions under which agents act. Ellul writes that the artificial world the technique produces is "radically different from the natural world. It destroys, eliminates, or subordinates the natural world, and does not allow this world to restore itself or even to enter into a symbiotic relation with it" (Ellul 1954/1964, p. 79). The feature operates at the institutional-architectural level the chapter is concerned with. The institutional architecture of contemporary administrative life does not mediate between agents and a natural-substrate condition; the architecture is itself the substrate within which agents operate, with the substrate's properties being the artificial properties technique has installed.

The two features are taken as established. The chapter proceeds to the five features at the level Ellul's analysis treats them.

6.4 Automatism

Automatism is the feature through which the chapter's two cases at §6.0 admit Ellul's specification. The feature is that within technique's operation, the choice among methods, instruments, and arrangements is not made by any agent. The choice is the mathematical output of efficiency comparison. Ellul names the principle as "the one best way": the formula to which technique corresponds at any moment in any domain (Ellul 1954/1964, p. 80, the automatism section opening). The agent appears to choose; the agent does not choose; the agent registers the result of the comparison the technique has conducted between methods and selects the method the comparison has identified as the more efficient. The selection is procedurally indistinguishable from the agent's prior judgement, which is why the agent within the technique experiences themselves as choosing. The selection is, however, the procedural execution of the comparison rather than a judgement at the level the agent's prior framework operated at.

Ellul's central observation at this register is that the agent ceases to be the locus of decision. "The human being is no longer in any sense the agent of choice" (Ellul 1954/1964, p. 80). The observation operates at every scale at which the technique is deployed. At the engineering level, the engineer who reviews competing design specifications selects the specification that scores highest on the optimisation criterion the engineering review process has standardised; the engineer experiences themselves as choosing between options, while the

comparison's output has already specified the option the technical apparatus admits. At the administrative level, the administrator who reviews competing budget allocations selects the allocation that scores highest on the optimisation criterion the budgeting process has standardised; the administrator experiences themselves as choosing between options, while the comparison's output has already specified the option the administrative apparatus admits. At the legislative level, the legislator who reviews competing regulatory specifications selects the specification that admits the comparison the legislative drafting process has standardised; the legislator experiences themselves as choosing, while the comparison's output has already specified the specification the regulatory architecture admits.

The Boeing engineer's case at §6.0 is the engineer's experience of automatism in operation. The engineer registered a substrate-protective concern. The engineering review process processed the concern. The processing produced documentation, meetings, clarification requests, and engineering responses. At every node of the processing, the participating agent registered the agent's experience of choosing between competing technical specifications under the engineering review apparatus's optimisation criteria. At every node of the processing, the agent's choice was the procedural execution of the apparatus's comparison between specifications the apparatus admitted as candidate options. The substrate-protective concern was not a candidate option the apparatus's comparison admitted; the concern's substrate-protective content operated at a register the apparatus's optimisation criteria did not admit. The processing produced documentation that registered the concern at the apparatus-compatible level (engineering review documentation registering that a concern had been raised, processed, and responded to) without producing the architectural reconfiguration the concern's substrate-protective content called for at the level the substrate-protective register operates at.

Ellul's automatism is the structural condition under which the no-driver phenomenon §6.0 documented obtains. The agents at every node of the institutional chain are executing their roles correctly under the technique's optimisation criteria. The optimisation criteria do not admit the substrate-protective content as a candidate decision variable at the comparison level the criteria operate at. The processing leaves the architectural feature intact because the architectural feature's reconfiguration is not a candidate output the optimisation criteria's comparison can produce. The architecture continues because the architecture's continuation is not an option the comparison admits as one alternative among competing alternatives; the architecture's continuation is the procedural baseline against which competing alternatives are compared, and the comparison's output is what continues. Ellul writes: "The worst reproach modern society can level is the charge that some person or system is impeding this technical automatism. When a labor union leader says: 'In a period of recession, productivity is a social scourge,' his declaration stirs up a storm of protest and condemnation, because he is putting a personal judgment before the technical axiom that what can be produced must be produced" (Ellul 1954/1964, p. 81). The technical axiom Ellul names is the institutional condition under which the no-driver phenomenon obtains.

6.5 Self-Augmentation: Ellul's Two Laws

The architecture's continued operation produces, at each iteration of the architecture's deployment, the institutional conditions for the next iteration's deployment. Ellul names this *autoaccroissement*, which Wilkinson translates as "self-augmentation" (Ellul 1954/1964, pp. 85–94, the self-augmentation chapter). Ellul's specification of self-augmentation is at two levels: a phenomenological level at which the architecture's continued operation is observed to produce its own next-iteration's enabling conditions, and a formal level at which Ellul states the two laws of self-augmentation explicitly.

The phenomenological level: "There is an automatic growth (that is, a growth which is not calculated, desired, or chosen) of everything which concerns technique. This applies even to men. Statistically, the number of scientists and technicians has doubled every decade for a century and a half. Apparently this is a self-generating process: technique engenders itself. When a new technical form appears, it makes possible and conditions a number of others" (Ellul 1954/1964, p. 87). Ellul gives the internal-combustion engine as an example: the engine made possible and conditioned the automobile, the submarine, and the further technical forms each of those

produced in turn. The example operates at the technical-mechanical level. The institutional-architectural level operates by the same logic. The institutional architecture the chapter's two cases at §6.0 exhibit is what Ellul names a self-generating process: the architecture's continued operation produces, at each deployment, the institutional conditions for the next deployment. The Boeing engineering review apparatus's continued operation produces, at each review cycle, the institutional condition under which the next review cycle is conducted at the same optimisation criteria. The post-2008 financial-regulatory architecture's continued operation produces, at each regulatory cycle, the institutional condition under which the next regulatory cycle is conducted at the same regulatory frame.

The formal level: Ellul states two laws of self-augmentation explicitly. "1. In a given civilization, technical progress is irreversible. 2. Technical progress tends to act, not according to an arithmetic, but according to a geometric progression" (Ellul 1954/1964, p. 89). The two laws operate at the level of the integrated technical phenomenon rather than at the level of any particular technique. The first law specifies that the architecture's continued operation does not admit reversal at the level the architecture's institutional features operate at; specific techniques can be abandoned, but the technical phenomenon as a whole does not retreat. The second law specifies that the architecture's continued operation produces, at each iteration, accelerating conditions for the next iteration's deployment. The two laws together specify that the architecture's trajectory is irreversible in direction and accelerating in pace, with the continuation being what the architecture's institutional structure is constituted to reproduce.

A reader trained in second-order cybernetics may at this point ask whether *autoaccroissement* is what Maturana and Varela named *autopoiesis*: the recursive self-production through which a living system maintains its organisation in continuous relationship with the environment that supports it (Maturana and Varela 1980; the wider lineage runs through von Foerster, Spencer Brown, Kauffman, and Rosen). The question deserves a direct answer because the two share the formal property of recursive self-reference and a reader who carries the autopoietic association into the chapter's analysis will misread what *autoaccroissement* names. Autopoietic self-reference is the condition through which a living system stays coupled to its environment: the cell maintains itself by continuously producing the molecular processes that maintain the membrane that distinguishes the cell from what is outside it, and the membrane is what makes the coupling between the cell's interior chemistry and its environment possible at all. The recursion is what permits viability. *Autoaccroissement* is recursion of a different kind. Ellul's architecture reproduces itself across iterations without remaining coupled to the substrates whose state its operation depletes. The recursion produces apparatus while the coupling to substrate has been lost. The form is the same; what runs through the form is the opposite. Autopoiesis is recursion with the substrate-coupling that makes the recursion viable. *Autoaccroissement* is recursion that has discarded the substrate-coupling and produces its own continuation independent of what its operation does to the substrate. The two terms must not be confused.

Ellul's two laws operate at the institutional-totality scale. The laws specify the trajectory's structural form in the vocabulary the social-theoretical tradition Ellul worked within made available; they do not deploy the cybernetic vocabulary the previous chapter of the present monograph constructed. My first analytical extension on Ellul's foundation, developed at the subsection that follows, is a cybernetic reading of one mechanism through which the geometric progression Ellul's second law named can be analysed at the substrate-coupling level. The reading is mine, conducted on Ellul's foundation using the cybernetic apparatus as the formal vocabulary; it does not claim to recover what Ellul would have said had he used a different vocabulary, and other readings of Ellul's two laws in other formal vocabularies are possible.

6.5.1 The Lowest-Common-Denominator Attractor: A Cybernetic Specification of Self-Augmentation

The present subsection develops a cybernetic specification of the mechanism through which Ellul's self-augmentation operates at the substrate level. The specification, including the term *lowest-common-denominator attractor* the subsection coins, is my theoretical construction built on Ellul's foundation. Ellul named *autoaccroissement* and stated the two laws at the level of the architecture's institutional trajectory; I specify, at the substrate-coupling level the cybernetic results from Chapter 5 admit, the mechanism through which the geometric progression Ellul's second law named occurs. The analytical responsibility for the construction is mine. Ellul's analytical responsibility extends to what Ellul wrote; the present construction is mine.

The mechanism is necessary by construction, not contingent on any agent's intent. The specification matters for two reasons. First, the term "lowest common denominator" is in colloquial circulation in a metaphorical-pejorative sense (appealing to the worst in people, pandering, sensationalism) that would be the wrong sense for the cybernetic argument the section requires. Second, the contemporary debate about social-media platforms, recommendation algorithms, attention-economy dynamics, and AI-training corpora has accumulated a vocabulary of platform-bias, algorithmic-incentive, and content-moderation language that obscures the formal-mathematical mechanism the cybernetic apparatus permits. The mechanism is not a bias. The mechanism is not a moral failing of platform engineers. The mechanism is not a contingent feature of a particular regulatory regime. The mechanism is the mathematical output of optimisation operations executed against a substrate whose response distribution has a specific feature, and the section's task is to derive the mechanism from first principles using the cybernetic results from Chapter 5.

The specification, stated precisely: the lowest-common-denominator attractor is the region of a substrate's response distribution that produces the highest-amplitude, lowest-variance, most-predictable signal output per unit of regulator input, and unbounded optimisation against the signal converges on this attractor by mathematical necessity regardless of the regulator's intent. The mechanism is derivable from Ashby's Law of Requisite Variety (Chapter 5 §5.1) and the Conant-Ashby theorem (Chapter 5 §5.2) applied to any order in which the substrate's response distribution is heterogeneous in the way that mammalian neurological response to stimulus is heterogeneous. The derivation specifies a formal-mathematical property of optimisation operations. The section walks the property through the platform-substrate case as the worked instance, with the financial-substrate twin appearing at the section's close.

The cybernetic derivation, stated precisely. Ashby's Law of Requisite Variety establishes that a regulator's variety must equal or exceed the variety of disturbances it absorbs. The Conant-Ashby theorem establishes that a regulator that successfully regulates a system must be a model of that system. In the social-media platform case, the regulator is the recommendation algorithm; the disturbances are the entire space of possible content-engagement patterns the algorithm absorbs across the platform's user population; the algorithm's objective function is engagement maximisation operationalised through measurable behavioural signals (dwell time, click-through, share rate, comment rate, return frequency); the substrate the regulator nominally couples to is human attention and, implicitly, the developmental substrate of adolescents, the social-trust infrastructure of communities, and the epistemic substrate of public discourse on which the platform's content propagates.

The horizon-mismatch theorem (Chapter 5 §5.6) applies directly to the order the recommendation algorithm operates within. The regulator's action-cycle is measured in milliseconds (each user-content interaction registers within milliseconds of occurring; the algorithm updates its recommendations within seconds; the platform's content distribution restructures within hours of an attention pattern emerging). The substrates the regulator's outputs deplete operate at cycles measured in years (developmental substrates for adolescents) to decades (epistemic-infrastructure substrates for public discourse) to generations (social-trust infrastructure across populations). The mismatch ratio for the engagement-economy regulator operating against developmental and social-trust substrates is between 10^7 and 10^9. The unmodelled variety, everything that matters about human cognitive-emotional integrity, developmental sedimentation, social-trust infrastructure, and epistemic capacity, is not in the regulator's model and cannot be, because the regulator operates at a cycle that cannot reach those

substrates. What the regulator can model is the engagement-signal substrate at its own action-cycle.

The substrate's response distribution has a feature that requires precise statement. Human cognitive-emotional response to stimulus is heterogeneously distributed across the population in ways that align with what the neurological literature documents as lower-cortical activation patterns: novelty, threat, sexual stimulus, in-group/out-group identification, status-comparison, disgust, moral outrage, parasocial attachment. The neurological literature on these response patterns is documented across affective neuroscience, evolutionary psychology, attention research, and clinical psychiatry, with mechanisms involving the amygdala, the ventral striatum, the anterior cingulate cortex, and the brainstem arousal systems whose operation predates the cortical structures that mediate higher-order cognitive engagement. The lower-cortical activation patterns are characterised by short latency (responses occur within hundreds of milliseconds of stimulus presentation), high amplitude (responses produce measurable behavioural effects across the entire population distribution), low individual variance (responses occur across cultural, individual, and developmental variation in ways that resist suppression), and minimal cognitive mediation (responses occur prior to and partially independent of higher-order cognitive processing). The cognitive-mediated response patterns, sustained reasoning, complex narrative engagement, deliberative reflection, sustained attention to novel propositions, are characterised by longer latency, lower amplitude, higher individual variance, and substantial cognitive mediation. The asymmetry between the two response classes is not cultural and is not pedagogical. The asymmetry is a feature of mammalian nervous-system architecture that predates the cultural and linguistic structures human populations have developed.

The cybernetic mechanism the section is deriving operates as follows. The recommendation algorithm's optimisation against engagement signal is the operation of selecting, from the space of available content, the content whose distribution to a given user is predicted to produce the highest engagement-signal response. The optimisation operates at the algorithm's action-cycle (milliseconds to seconds). The substrate's response distribution, at the algorithm's measurement frame, is the engagement-signal distribution across the available content. The engagement-signal distribution has the following feature: the signal-amplitude is highest, the signal-variance lowest, and the signal-predictability most reliable for content that activates the lower-cortical response patterns. The optimisation, executed at the algorithm's action-cycle without a stopping condition specified by an agent at any node of the algorithm's institutional architecture, converges on the region of the substrate's response distribution that produces the highest-amplitude, lowest-variance, most-predictable signal: the lower-cortical-activation region. The convergence is the architectural-necessary signature of unbounded optimisation against engagement signal, and the convergence operates regardless of any platform engineer's intent to produce or to avoid the convergence. The platform engineer who attempts to direct the optimisation away from the lower-cortical-activation region is operating against the optimisation's mathematical structure; the engineer's intervention is registered by the architecture as a constraint, with the constraint admitted to the selection mechanism if it does not reduce the architecture's measurable engagement-signal performance, and rejected if it does. The optimisation's continued operation, across iterations, is what produces Ellul's geometric progression at the substrate level the cybernetic results admit.

The same mechanism operates at the financial substrate. The high-frequency-trading architecture optimises against price-spread signal at action-cycles measured in nanoseconds; the substrate's response distribution is the distribution of price-discrepancies across exchanges, instruments, and time intervals; the convergent attractor is the lowest-latency arbitrage region of that distribution, where the highest-amplitude, lowest-variance, most-predictable spread-capture per unit of capital deployed becomes available to whichever trading system reaches the spread first. The optimisation does not require any trader's intent to extract spread without producing substrate-coupled price discovery; the optimisation is the operation that, executed against the available signal at the cycle's limit, converges on the attractor regardless of intent. The two orders, engagement-optimisation operating on human cognition and latency-arbitrage operating on price-formation, are identically structured at the architectural level despite operating on substrates whose mismatch ratios and response distributions exhibit different mathematical properties.

The cybernetic specification the subsection has now developed is my analytical extension on Ellul's foundation. Ellul named *autoaccroissement* and stated the two laws at the institutional-architectural level; the cybernetic specification at this subsection develops the formal-mathematical mechanism through which Ellul's geometric progression occurs at the substrate level the cybernetic results from Chapter 5 admit. The cybernetic mechanism is the formal-mathematical specification of how the architecture continues without a driver at the substrate level the architecture operates against.

6.6 Monism

The third feature of *la technique* Ellul specifies is monism, the observation that the technical phenomenon as a whole forms an integrated unity in which the separate techniques cannot be analytically isolated from one another. Ellul writes: "The technical phenomenon, embracing all the separate techniques, forms a whole. This monism of technique was already obvious to us when we determined, on the basis of the evidence, that the technical phenomenon presents, everywhere and essentially, the same characteristics" (Ellul 1954/1964, p. 94). The features Ellul has named (rationality, artificiality, automatism, self-augmentation) are not features that some techniques exhibit and others do not; the features are constitutive of *la technique* as a phenomenon, with the consequence that the technical phenomenon is one phenomenon rather than a collection of independently variable techniques.

The institutional consequence of monism is that the technical phenomenon admits no analytical or institutional partition that would permit one of its components to be reformed independently of the others. Ellul puts the point sharply: "It is impossible to analyze this or that element out of it—a truth which is today particularly misunderstood. The great tendency of all persons who study techniques is to make distinctions. They distinguish between the different elements of technique, maintaining some and discarding others. They distinguish between technique and the use to which it is put. These distinctions are completely invalid and show only that he who makes them has understood nothing of the technical phenomenon. Its parts are ontologically tied together; in it, use is inseparable from being" (Ellul 1954/1964, p. 94).

Monism's analytical consequence is that the architecture cannot be reformed by selecting one of its features for reconfiguration while leaving the others intact. The Boeing case at §6.0 admits the analytical reading: the engineering review apparatus's processing of the engineer's concern, the Federal Aviation Administration's certification process, the Boeing senior management's product-development structure, the airline industry's certification-acceptance process, and the international aviation safety architecture are not separable institutional components admitting independent reform. The components operate together as the technical phenomenon's integrated architecture, and reform proposals directed at one component are processed through the architecture's other components in ways that leave the architectural feature the reform was directed at intact. The post-2008 financial-regulatory case admits the same reading: Dodd-Frank's directives to individual regulatory agencies, the Volcker Rule's prohibitions, the Basel III capital requirements, the Consumer Financial Protection Bureau's authority, and the Federal Reserve's monetary apparatus are not separable institutional components admitting independent reform. The components operate together, and the legislative directives at one component are processed through the architecture's other components in ways that leave the architectural feature intact.

Monism specifies, at the institutional-architectural level, the structural condition under which reform attempts directed at one component of the architecture do not produce the substrate-protective outcome the reform was directed to produce. The reform's content is processed by the architecture's other components, with the content's substrate-protective registers operating at scales the architecture's other components do not admit as candidate decision variables. The architecture's continued operation does not depend on any specific component's continued operation; the architecture's continued operation is the integrated continuation of the components' joint operation, with the joint operation being what monism specifies.

6.7 Universalism

The fourth feature of *la technique* Ellul specifies is universalism, the observation that the technical phenomenon has expanded across all geographical regions and across all domains of human activity, with the consequence that the technical phenomenon is now coextensive with the institutional-administrative reality of contemporary human life. Ellul writes: "Geographically and qualitatively, technique is universal in its manifestations. It is devoted, by nature and necessity, to the universal" (Ellul 1954/1964, p. 131, the universalism chapter, with the geographical expansion documented across the period of the work's composition and the domain expansion documented across Chapters 3, 4, and 5 of *The Technological Society*).

The geographical dimension of universalism specifies the empirical observation that *la technique* has propagated across societies whose pre-technical institutional structures differed substantially. The propagation is not the imposition of one cultural-political structure onto another; the propagation is the establishment of *la technique* as the integrated institutional architecture across societies whose surface-level cultural-political structures continue to differ but whose underlying administrative architectures converge on the same technical phenomenon's central features. Ellul's central illustration at the period of the work's composition is the convergence of the United States and the Soviet Union at the level of the integrated technical-administrative apparatus despite the two societies' surface-level political-economic divergence (Ellul 1954/1964, pp. 79–94 throughout the discussion of automatism and self-augmentation, with Ellul's recurring observation that the two superpowers exhibit identical technical-architectural features at the level the analysis concerns). The chapter's symmetric application to the contemporary Western order and the Chinese order at Chapters 8 and 10 is, at this register, an extension of Ellul's observation: the two orders exhibit identical technical-architectural features at the level the chapter's apparatus concerns despite the two orders' surface-level political-economic divergence.

The domain dimension of universalism specifies the empirical observation that *la technique* has propagated across domains whose pre-technical institutional content differed substantially. The propagation is not the application of mechanical procedures to non-mechanical domains; the propagation is the institutionalisation of *la technique* as the integrated administrative architecture across domains whose surface-level activities continue to differ but whose underlying institutional architectures converge on the same technical phenomenon's central features. The domain expansion is documented across the contemporary record at the educational substrate (the rationalisation of teaching, the standardisation of assessment, the propagation of metric-based accountability), the medical substrate (the rationalisation of clinical practice, the standardisation of treatment protocols, the propagation of metric-based accountability), the cultural substrate (the rationalisation of cultural production, the standardisation of distribution platforms, the propagation of metric-based accountability), and the religious substrate (the rationalisation of religious institutions, the standardisation of theological training, the propagation of metric-based accountability across denominational structures). The domain expansion's institutional consequence is that the contemporary agent operating in any domain is operating within *la technique*'s architectural conditions regardless of the domain's surface-level activity content.

Universalism specifies, at the institutional-architectural level, the structural condition under which alternatives to the technical phenomenon cannot be located in the agent's institutional environment. The agent who would seek an alternative to the architecture cannot find one outside the architecture, because the architecture has propagated across all the institutional environments the agent operates within. Ellul puts the point: "We are today at the stage of historical evolution in which everything that is not technique is being eliminated. The challenge to a country, an individual, or a system is solely a technical challenge. Only a technical force can be opposed to a technical force. All else is swept away" (Ellul 1954/1964, p. 84). Universalism is the institutional condition under which the architecture is the agent's environment rather than one option among environments the agent could choose between.

6.8 Autonomy

The fifth feature of *la technique* Ellul specifies is autonomy, the observation that the technical phenomenon's continued operation is now independent of the human, political, social, economic, and moral frameworks within which the technical phenomenon was historically embedded. The technical phenomenon, having propagated across the geographical and domain dimensions universalism specifies, is no longer subject to the constraints these external frameworks formerly imposed on its development; the technical phenomenon now develops according to its own internal dynamics, with the external frameworks being subordinated to the technical phenomenon's continued operation rather than constraining it. Ellul writes: "Technique has become autonomous; it has fashioned an omnivorous world which obeys its own laws and which has renounced all tradition" (Ellul 1954/1964, p. 14, in the introduction to the Wilkinson translation, where the autonomy thesis is stated as the claim of the work as a whole; the fuller treatment is at pp. 133–147, the autonomy chapter).

Autonomy operates at five registers Ellul develops. The first register is autonomy with respect to economics: the technical phenomenon develops at action-cycles and through institutional logics that are not the action-cycles or the institutional logics of the economic order, with the consequence that the economic order accommodates the technical phenomenon rather than directing it. The second register is autonomy with respect to politics: the technical phenomenon develops at action-cycles and through institutional logics that are not the action-cycles or the institutional logics of the political order, with the consequence that the political order accommodates the technical phenomenon rather than directing it. The third register is autonomy with respect to morality: the technical phenomenon's selection of methods, instruments, and arrangements is not subject to moral judgement at the operative level the methods, instruments, and arrangements are selected at; moral judgement operates at a register the technical phenomenon does not admit as a candidate decision variable. The fourth register is autonomy with respect to the human individual: the technical phenomenon's continued operation does not depend on any individual's consent, intent, or judgement; the individual is integrated into the technical phenomenon as a node in the architecture's institutional structure, with the integration being the institutional condition under which the individual operates. The fifth register is autonomy with respect to history: the technical phenomenon's continued operation has produced its own historical conditions to the extent that the historical alternatives within which the technical phenomenon's continuation could be questioned are no longer available to the agents operating within the architecture.

Autonomy specifies, at the institutional-architectural level, the structural condition under which the architecture's continued operation is not subject to redirection from any of the external frameworks the architecture was historically subject to. The autonomy is not a moral claim or a political claim. The autonomy is an institutional claim: the architecture's continued operation does not require the consent of any agent at any specifiable position, and the architecture's continued operation does not depend on any external framework's continued endorsement, because the architecture's institutional structure has become the condition on which the external frameworks themselves now depend.

Autonomy is the condition under which the no-driver phenomenon §6.0 documented obtains at the institutional-architectural level. Nobody is in charge because the architecture's continuation does not require anybody to be in charge. The architecture continues because the architecture's continuation is what the architecture's institutional structure produces at each iteration of the architecture's deployment, with the deployment being conducted by agents who are executing their roles correctly under the architecture's optimisation criteria, with the criteria having been propagated across the geographical and domain dimensions universalism specifies, and with the criteria's continued application being the institutional condition under which the agents' positions are reproduced.

A reading the diagnosis must engage from the same readership a serious diagnosis of the contemporary order draws is the conspiracy reading. The reading is that an architecture producing the cumulative outcomes Part I documents must be the work of an identifiable group of agents acting in coordinated pursuit of those outcomes. The reading takes various contemporary forms: that the annual Bilderberg meetings direct the order's trajectory; that the World Economic Forum is the order's executive committee; that the asset-manager triumvirate Fichtner,

Heemskerk, and Garcia-Bernardo (2017) documented (BlackRock, Vanguard, State Street together exercising voting power across approximately ninety percent of the S&P 500) constitutes the financial-architectural sovereign; that a Davos-circuit network is conducting the coordination the visible discourse obscures. The reading shares one move with the analysis the present chapter has developed and one move with the broader political-economy literature whose diagnostic impulse the reading expresses (Mills 1956, *The Power Elite*; Domhoff 1967/2014, *Who Rules America?*; Lofgren 2016, *The Deep State*; Wedel 2009, *Shadow Elite*): the move is the recognition that the visible vocabularies are not describing the operations producing the outcomes the diagnosis must take up. The recognition is the first move of any serious diagnosis of the contemporary order. The conspiracy reading gets the recognition right.

The reading gets the mechanism wrong, and the difference matters at the level of what the diagnosis can do with the finding. The named groups concentrate institutional positions whose influence the autonomy analysis documented, and they are not powerless in the trivial sense of having no effect on the operations they conduct. What the architecture does not depend on, for its continued operation, is any group's directing intent. Remove the named groups from their positions and the positions would be filled by other agents whose competence-criteria the selection mechanism has specified, and the optimisation criteria would continue operating at the cycles, the cycle-mismatches, and the substrate-decoupling relations the prior chapters documented. A cabal can be located. A cabal can be dismantled. The architecture cannot be located in any group's intent. The architecture cannot be dismantled by removing any group from its positions. "It's a machine. There is nowhere to put the knife in." The implication is more disturbing than the conspiracy reading, not less: a directing cabal would imply a locatable target, and the architecture implies that the polity faces no such target.

The finding does not exculpate. The absence of any single agent's directing intent is not the absence of moral consequence for the agents who occupy positions inside the order, execute the architecture's operations, and reproduce the conditions under which the architecture continues. The Epilogue develops this point through Arendt's analysis of the *thoughtlessness* condition Eichmann's case documented at the limit. The institutional analysis is not exculpatory of the agents the institutional analysis identifies as the architecture's operators; it specifies the structural conditions under which their continued operation produces the outcomes the empirical record documents, with the moral analysis of the agents' position belonging to the chapter that takes up Arendt directly.

6.9 What Happens When Reform Is Attempted

The five features Ellul specifies (automatism, self-augmentation, monism, universalism, autonomy) together specify the institutional architecture within which the chapter's two cases at §6.0 are processed. The architecture has automatism, with the consequence that the agents at every node of the institutional chain are executing their roles correctly under the optimisation criteria the architecture has standardised; the architecture has self-augmentation, with the consequence that each iteration of the architecture's deployment produces the institutional conditions for the next iteration; the architecture has monism, with the consequence that no component of the architecture admits independent reform; the architecture has universalism, with the consequence that no alternative to the architecture is available in the agent's institutional environment; the architecture has autonomy, with the consequence that the architecture's continued operation is not subject to redirection from any external framework. The five features together specify the no-driver phenomenon at the level the chapter's two cases at §6.0 exhibit.

Ellul observed that *la technique*, as the integrated phenomenon the five features specify, is not amenable to reform from inside its own institutional structure. The observation is recurrent across *The Technological Society* and is developed at greater density in *Le Système technicien* (Ellul 1977, translated as *The Technological System* by Joachim Neugroschel, Continuum 1980). Ellul's claim at this register is that reform proposals advanced from inside the architecture are processed by the architecture's institutional mechanisms in ways that produce apparatus-compatible activity while leaving the architectural feature the reform was directed at intact. Ellul writes,

in *The Technological Society*: "It is also held that technique could be directed toward that which is positive, constructive, and enriching, omitting that which is negative, destructive, and impoverishing... To reason thus is to separate technical elements with no justification" (Ellul 1954/1964, pp. 97–98). And in *Le Système technicien*: the technical system absorbs reform proposals as its own next-iteration's input, with the absorption being the system's central operation against attempts to reform it (Ellul 1977/1980, the argument of Chapters 6 through 8 on the mature operation of the technical system).

Ellul's claim that the architecture is not amenable to reform from inside is established at the level of his analytical specification of the five features. Ellul's claim that reform proposals are processed by the architecture's institutional mechanisms is established at the level of his observation of the post-1945 institutional record. My second analytical extension on Ellul's foundation, developed at the subsection that follows, is a formalisation, in the cybernetic vocabulary the previous chapter constructed, of one structure through which the processing Ellul observed can be analysed: the three-mechanism apparatus through which the architecture, on my reading, processes reform proposals into apparatus-compatible activity that leaves the architectural feature unchanged. The three-mechanism reading is my construction; the empirical observation it formalises is Ellul's; other formalisations of the same observation in other vocabularies are possible. The architecture's foreclosure of reform from inside, on the chapter's cybernetic reading, follows from the structural condition the §6.0 step-back already named: the hegemony of the substrate-decoupled optimisation has no agent-amendable locus, and every position from which reform could be conducted is itself a node of the same optimisation. The reform proposal advanced from any such position registers, at the apparatus's measurement frame, as the apparatus's next input; the three mechanisms process it accordingly.

6.9.1 The Three-Mechanism Architecture

The structure through which the architecture processes reform proposals operates as the joint operation of three mechanisms. I formalise the mechanisms on Ellul's documentation of reform-failure; the formalisation is my analytical insertion at this point in the exposition. The three mechanisms are absorption, attenuation, and decomposition. The mechanisms operate together, not in sequence; the architecture's response to any reform proposal involves all three mechanisms operating simultaneously on different aspects of the proposal.

Absorption is the mechanism through which the architecture takes the apparatus-compatible elements of a reform proposal and converts them into the architecture's continued operational activity. The apparatus-compatible elements are the elements of the proposal whose institutional content can be operationalised under the architecture's existing optimisation criteria: the proposal's call for additional documentation, the proposal's call for additional reporting, the proposal's call for additional review, the proposal's call for additional compliance infrastructure. These elements specify activity that the architecture's existing institutional machinery already conducts; the elements expand the volume of the existing activity rather than reconfiguring the activity's optimisation criteria. The absorption produces what the architecture's measurement frame registers as compliance with the reform: the documentation has been produced, the reporting has been filed, the review has been conducted, the compliance infrastructure has been installed. The architectural feature the reform was directed at is unchanged because the absorption operates on the apparatus-compatible elements at the level the existing optimisation criteria admit, with the absorption's output being the architecture's continued operation at expanded volume.

Attenuation is the mechanism through which the architecture takes the apparatus-incompatible elements of a reform proposal and registers them at a level the architecture's operative discourse does not admit as legitimate institutional content. The apparatus-incompatible elements are the elements of the proposal whose institutional content would require the reconfiguration of the architecture's optimisation criteria: the proposal's call for the architectural feature's substantive reconfiguration, the proposal's call for the redirection of the architecture's continued operation, the proposal's call for the substrate-protective action the architecture's optimisation criteria do not admit as a candidate decision variable. These elements operate at a level the architecture's measurement

frame does not register as legitimate institutional content; the elements are registered, instead, as moral exhortation, normative aspiration, idealistic objection, or political commitment, with the consequence that the elements are not processed as candidate decision variables at the architecture's operative level. The attenuation produces what the architecture's measurement frame registers as the proposal's residual content after the apparatus-compatible elements have been absorbed: the residual content is registered as outside the architecture's institutional discourse and is not processed at the architecture's operative level.

Decomposition is the mechanism through which the architecture takes the hybrid elements of a reform proposal (the elements that contain both apparatus-compatible and apparatus-incompatible content) and separates them into their apparatus-compatible and apparatus-incompatible components, with the apparatus-compatible components processed by absorption and the apparatus-incompatible components processed by attenuation. The decomposition operates at the level of the proposal's institutional formulation: the proposal's individual provisions are examined at the level of their institutional content, with the apparatus-compatible portions of each provision separated from the apparatus-incompatible portions, and the separation conducted at the level the architecture's drafting and rule-making process operates at. The decomposition produces what the architecture's institutional machinery registers as the operationalisation of the reform proposal's text into the regulatory or institutional output the architecture deploys, with the consequence that the reform proposal's apparatus-incompatible content is removed from the operative regulatory or institutional output through the drafting-and-implementation process.

The three mechanisms operate jointly on every reform proposal the architecture processes. The proposal's apparatus-compatible elements are absorbed into the architecture's continued operation at expanded volume; the proposal's apparatus-incompatible elements are attenuated to a level the architecture's operative discourse does not admit as legitimate; the proposal's hybrid elements are decomposed into their apparatus-compatible and apparatus-incompatible components. The mechanisms' joint operation is the architecture's response to attempted reform. The response leaves the architectural feature the reform was directed at intact because the architectural feature's reconfiguration is not the output any of the three mechanisms produces. The mechanisms produce, instead, the architecture's continued operation at expanded volume, with the architecture's continued institutional reproduction being what the three mechanisms' joint operation reproduces.

6.10 Three Documented Cases

The three-mechanism architecture I formalised at §6.9.1 admits empirical examination at the level of the documented record across three distinct domains. The cases are conducted at the financial-regulatory architecture's response to the 2008 crisis, the corporate-governance architecture's response to the early-2000s accounting scandals, and the platform-architecture's response to the documented evidence of cognitive-emotional substrate-depletion across the late-2010s and early-2020s. The three cases together establish that the three-mechanism dynamic is a feature of the architecture's processing of attempted reform rather than a contingent feature of any particular case.

The first case is the financial-regulatory architecture's response to the 2008 financial crisis. The crisis exposed that the financial architecture had decoupled from substrate-coupled regulation. The legislative-regulatory response was the most substantial financial-reform episode since the 1930s. Dodd-Frank, the Volcker Rule, the orderly-liquidation authority, the systemically-important-institutions framework, the Consumer Financial Protection Bureau, the Basel III capital and leverage standards: an extensive architecture of new instruments, deployed across years of legislative drafting, regulatory rule-making, and international coordination (the institutional record across the post-2008 reform episode is documented at the empirical level by the Financial Crisis Inquiry Commission 2011, especially Chapters 1–3 and 22; Krippner 2011, especially the Conclusion on the features the reform episode left in place; Stiglitz 2010, on the analytical reading of the reform's inadequacy).

The three mechanisms operated jointly on this material. Absorption took the apparatus-compatible elements: the new disclosure requirements, the stress-testing regime, the liquidity-coverage ratios, the resolution-planning

documents (the so-called "living wills"). These elements specified additional reporting that the existing institutional machinery could produce; they were absorbed into compliance infrastructure within months. The compliance industry expanded; the apparatus-compatible activity grew; the new requirements became line items in the existing operating model. Attenuation took the apparatus-incompatible elements: the original Volcker Rule's bright-line separation between proprietary trading and depository banking, the original derivatives-clearing requirements that would have made the over-the-counter markets transparent, the original capital requirements that would have substantially shrunk the largest institutions. These elements were progressively softened across the rule-making period: exemptions added, definitions narrowed, implementation deferred. Decomposition took the hybrid elements that contained both: the Consumer Financial Protection Bureau, separated into its agency-creating components (absorbed) and its enforcement authority (attenuated through limited resources and constrained rule-making mandates); the orderly-liquidation framework, separated into its planning requirements (absorbed) and its actual liquidation triggers (attenuated to the point of practical disuse).

The architecture's central features were not reconfigured. The high-frequency-trading machinery that produced the millisecond-cycle action of Chapter 5 §5.5 continued through the post-Dodd-Frank period without architectural alteration. The corporate-governance architecture's quarterly-cycle reporting requirement was preserved across the reform. The substrate-decoupling Chapter 5 §5.5 documented continued, accumulating across the post-2010 period at the same rate it had accumulated before. The reform episode did not change the architectural feature the three mechanisms left in place; the reform episode left the architectural feature in place because the preservation of architectural features in the face of attempted reform is what the three-mechanism dynamic produces by construction.

The second case is the corporate-governance architecture's response to the early-2000s accounting scandals. Enron, WorldCom, and Tyco produced public exposure of corporate-governance failure at scales that compelled legislative action. Sarbanes-Oxley followed, with new audit-committee requirements, new internal-controls documentation, new executive-certification requirements for financial statements (the institutional record is documented across U.S. Public Law 107-204, *Sarbanes-Oxley Act of 2002*, July 30, 2002; on the analytical reading of the Act's selective effectiveness, Romano 2005, *Yale Law Journal* 114, pp. 1521–1611, "The Sarbanes-Oxley Act and the Making of Quack Corporate Governance"; Coates and Srinivasan 2014, *Accounting Horizons* 28(3), pp. 627–671). The same three mechanisms operated jointly. The audit and documentation provisions were absorbed: the Big Four accounting firms developed Sarbanes-Oxley compliance practices that became permanent revenue streams; the executive-certification requirements became standard procedure. The apparatus-incompatible elements (the original proposals would have constrained executive-compensation structures and required the substantial separation of consulting from auditing) were attenuated: the compensation provisions were dropped, the auditing-consulting separation was substantially narrowed. The hybrid Public Company Accounting Oversight Board was decomposed into its inspection function (absorbed as a compliance overlay) and its enforcement authority (attenuated through limited resources and constrained mandate). The corporate-governance architecture's executive-compensation arrangements, including the equity-linked instruments, the quarterly-cycle reporting, the alignment with apparatus-compatible variables at the expense of substrate-coupled productive position, continued unchanged through the reform.

The third case is the platform-architecture's response to the documented evidence of cognitive-emotional substrate-depletion across the late 2010s and early 2020s. The evidence accumulated from multiple domains: the Frances Haugen disclosures from Facebook in 2021 (Haugen 2021, testimony before the U.S. Senate Subcommittee on Consumer Protection, Product Safety, and Data Security, 5 October 2021; the documentary record of the disclosures appeared as the *Wall Street Journal* "Facebook Files" investigative series, with the empirical record across Horwitz 2021), the surgeon-general's advisory on adolescent social-media use in 2023 (U.S. Surgeon General 2023, *Social Media and Youth Mental Health: The U.S. Surgeon General's Advisory*), the multi-jurisdictional litigation from United States state attorneys general, the European Union's Digital Services Act of 2022 (Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market for Digital Services). The legislative-regulatory response is still in progress, but the same mechanisms are visible. The transparency requirements (the Digital Services Act's risk-assessment reports, the

platforms' own published transparency reports, the algorithmic-disclosure provisions in various national frameworks) have been absorbed: the platforms have built compliance teams to produce the reports; the reports document the architecture's operation in apparatus-compatible terms; the underlying optimisation is unchanged. The apparatus-incompatible elements (the original proposals to alter the recommendation algorithms' optimisation targets, the proposals to require chronological feeds as defaults, the proposals to disable engagement-metric optimisation for minor users) have been attenuated. The hybrid content-moderation architectures are decomposed into their public-facing reporting components (absorbed) and their actual selection-mechanism components (attenuated through the fact that no regulator has the technical access to verify what selection mechanism is operating). The recommendation algorithm's optimisation against engagement signal continues; the cycle-mismatch with the cognitive-emotional substrate's replenishment-cycles continues; the substrate-depletion continues.

The three cases together establish that the architecture's foreclosure of substrate-protective architectural change is not contingent on any particular case. The cases operate across three distinct domains (financial, corporate, platform); across three distinct legislative-regulatory architectures; across three distinct substrates (financial, productive, cognitive-emotional). The pattern across the three cases is the same pattern in each: the architecture's reproduction across domains, against legislative-regulatory architectures, despite the substrates' distinct features, with the reproduction operating through the three-mechanism dynamic the chapter has formalised. The diagnostic implication is that reform within the architecture's frame is foreclosed. The reformist who proposes architectural change in defence of these substrates is operating against the reality the three-mechanism dynamic specifies: the frame does not admit such propositions in forms the architecture's discourse can stabilise as legitimate corrective action, and the three mechanisms' joint operation ensures that the agents who attempt the change are processed into apparatus-compatible activity that leaves the architectural feature unchanged.

6.11 The N-th Order Epistemic Acknowledgment State

The three-mechanism apparatus's operation across many reform episodes produces a stable institutional state I develop at this point as my own theoretical construction. Ellul observed at the institutional level that the universal acknowledgement of *la technique*'s features by the agents whose positions place them in contact with the substrate, accompanied by the architecture's continued operation despite the universal acknowledgement, is the institutional condition the technical phenomenon's mature operation produces; Ellul's observation at *Le Système technicien* is that the technical system's mature operation produces this condition as its institutional signature (Ellul 1977/1980, the recurring observation across the work that the technicians know what the system is doing, that the regulators know, that the legislators know, and that the system continues). Ellul did not, however, formalise the recursive-acknowledgement structure or the substrate-knowledge-K-not-contained-in-framework-F formalisation through which the state is here characterised. The construction this section develops, including the term *N-th Order Epistemic Acknowledgment State* I coin and the formal four-feature structure I specify, is my theoretical construction built on Ellul's foundation. Ellul's analytical responsibility extends to what Ellul wrote; the present construction is mine.

The state has four features. The first feature: there exists substrate-knowledge K within the architecture's agents that is not contained in the architecture's measurement frame F. The condition can be stated formally as K not contained in F. The agents within the architecture possess knowledge of the substrate-state that the architecture's measurement frame does not register. The platform engineers know the recommendation algorithm produces the lowest-common-denominator attractor §6.5.1 specified; the financial regulators know the high-frequency-trading apparatus has decoupled price-formation from substrate-coupling; the corporate executives know the share-buyback programmes have substituted for capital expenditure that the productive position requires; the legislators know the post-crisis legislation has not addressed the architecture's central features. The substrate-knowledge K is present across the architecture's agents at the level the chapter's apparatus identifies as constitutive of the first feature.

The second feature: the substrate-knowledge K is recognised universally across the agents within the architecture. The recognition is not partial; it is universal across the agents whose positions place them in contact with the substrate. The platform engineers' knowledge of the attractor is shared across the platform engineering teams, across the platforms, across the industry. The financial regulators' knowledge is shared across the regulatory bodies, across the central banks, across the international institutions. The corporate executives' knowledge is shared across the listed-corporation sector. The legislators' knowledge is shared across the legislative bodies that have addressed the architecture. The recognition is universal among agents whose positions place them in contact with the substrate.

The third feature: the recognition is acknowledged recursively to depth N. Each agent knows that the other agents recognise; each agent knows that each other agent knows that the other agents recognise; each agent knows that each other agent knows that each other agent knows that the other agents recognise; the recursion continues to whatever depth N the analysis can specify. The platform engineers know that the platform executives know that the algorithms produce the attractor; the platform executives know that the regulators know; the regulators know that the legislators know; the legislators know that the platform engineers know. The recursion operates at the level of the architecture's institutional cognitive level rather than at the level of the agents' contingent epistemic positions, with the architecture's features producing the recursion as the architecture's necessary signature.

The fourth feature: the architecture framework F persists across the recursion. The framework's persistence is mandatory at the level of the architecture's operative discourse; the framework cannot be replaced by a framework that admits K, because the architecture's selection mechanisms (specified at §6.12) retain the agents whose preferences align with the framework's continued operation, and the framework's continued operation is the condition under which the agents' positions are reproduced. The framework persists despite the universal recognition of its inadequacy.

The four features together specify the N-th Order Epistemic Acknowledgment State as it emerges under the architecture's good-faith operation. The agents at every position execute their roles correctly; the recursion produces apparatus across iterations; the substrate-knowledge K is present in the participants who hold it; the framework F continues across the recursion because the framework's continuation is what the operation produces. The state is the unintended signature of the architecture's normal functioning. Nobody has chosen it. Nobody has deployed it. It is the consequence of the operation running as designed. The state is the formalisation of what Ellul observed at the institutional level without specifying the recursive structure the present section develops.

A second phase of the state arrives at a different moment in the architecture's history. The moment is the moment at which the architecture itself, at some institutional locus, detects that the substrate's signal has reached a depth where the recursion's continuation in its present form will not survive. The detection does not require any agent to consciously register it. It registers at the architecture's selection mechanisms: certain reform-attempts are no longer the type the three-mechanism apparatus has previously processed; certain substrate-decoupling signals are no longer attenuable through the standard channels; certain agent-articulations have begun to identify the configuration's death-condition. At that moment the architecture's operation undergoes a phase-shift. The recursion that previously produced N-th Order Acknowledgment as the unintended signature of good-faith role-execution begins to produce N-th Order Acknowledgment as the architecture's instrument against the substrate's resolution of the death-condition.

An organism that detects a pathogenic signal produces antibodies whose function is to neutralise the signal before it reaches the cellular processes the signal would otherwise terminate. The antibody is not a deception of the organism's cells. The cells continue to function. The antibody operates at the level of the organism's defence against the threat the cells cannot resolve on their own. The architecture in the second phase deploys N-th Order Acknowledgment as the antibody against the substrate-signal that would resolve into the present configuration's dissolution. The acknowledgement that K is universally recognised, that the recursion of recognitions runs to depth N, that nothing within the framework will change because of any of this, is itself what permits the

architecture to continue while the substrate-signal continues to issue: the acknowledgement absorbs the signal at the discourse level so the signal does not reach the level at which it would precipitate the configuration's change of state.

This is the bad faith I have named throughout, which is not Sartrean bad faith and is not a property of any individual agent's self-deception. The agents at every position continue, in this second phase as in the first, to execute their roles in good faith at the level of their participation. The bad faith resides in the recursive configuration's relation to the substrate-signal of its own death-condition, rather than in any individual agent's relation to that signal. The architecture has acquired, in this second phase, the ability to detect what its dissolution would consist of, and the ability to deploy the recursive acknowledgement as the instrument against the dissolution's resolution.

Solzhenitsyn observed this exact phase in his essay *Live Not by Lies*, written on 12 February 1974, the day before his arrest by the KGB, and circulated in samizdat across the Soviet Union (the essay was published in English on 18 February 1974 in the *Washington Post*; the definitive translation by Yermolai Solzhenitsyn appears in *The Solzhenitsyn Reader*, Ericson and Mahoney, eds., ISI Books, 2006). Solzhenitsyn's analysis at the late-Soviet stage names the relation between violence and falsehood the chapter's analysis names between architecture and acknowledgement:

> *When violence intrudes into peaceful life, its face glows with self-confidence, as if it were carrying a banner and shouting: "I am violence. Run away, make way for me—I will crush you." But violence quickly grows old. And it has lost confidence in itself, and in order to maintain a respectable face it summons falsehood as its ally—since violence lays its ponderous paw not every day and not on every shoulder. It demands from us only obedience to lies and daily participation in lies. All loyalty lies in that. (Solzhenitsyn 1974)*

The architecture in its second phase demands daily participation in the acknowledgement that the substrate-signal has been heard, has been processed through the standard channels, and will produce no change. The daily participation is what the architecture's continuation requires. Solzhenitsyn's response to the configuration is the response of an individual locating themselves at the only level the recursion does not reach:

> *And the simplest and most accessible key to our self-neglected liberation lies right here: Personal non-participation in lies. Though lies conceal everything, though lies embrace everything, but not with any help from me. (Solzhenitsyn 1974)*

The image Solzhenitsyn closes the passage with is, by its own logic, an immunological figure of exactly the kind the present section has developed:

> *Because when people renounce lies it simply cuts short their existence. Like an infection, they can exist only in a living organism. (Solzhenitsyn 1974)*

The architecture's second-phase deployment of N-th Order Acknowledgment exists, like Solzhenitsyn's lie, only in the living organism that supplies the daily participation the deployment requires. The agents who supply the participation are the cells of the organism. The substrate-signal that would resolve the configuration's death-condition is the threat the organism's second-phase deployment is constituted to neutralise. The deployment runs on what the organism's cells continue to provide.

The contemporary order, on my reading, is in the transition between the two phases. Some substrates of the order are still being processed under good-faith recursion: the engineer's concern at §6.0 is a case at the first phase, the Volcker Rule's drafting is a case approaching the second. Other substrates are deeper into the second phase, where the architecture's continued operation has become the defence against the substrate-signal's resolution. The diagnostic finding the chapter delivers is that the phase-shift is the architecture's response to its contact with the

death-condition the substrate's continued depletion is approaching. The bad faith is the antibody. The recursion is what the antibody runs on.

6.12 The Homeostatic Triad

The N-th Order State's persistence across the architecture's continued operation requires institutional mechanisms through which the architecture's selection of agents reproduces the framework F despite the agents' universal recognition of K. The mechanisms are my fourth analytical extension on Ellul's foundation. Ellul documented at the institutional level that the technical phenomenon's selection mechanisms remove or marginalise agents whose substrate-knowledge would license the articulation of substrate-protective propositions; Ellul's observation across *The Technological Society* and *Le Système technicien* is that the system's mature operation reproduces itself across the agents whose positions could in principle articulate its inadequacy. My analytical work at this section is the identification of the three specific mechanisms through which the selection operates at the institutional substrate the architecture's mature operation produces. The triad I develop is my analytical insertion on Ellul's documentation.

The first mechanism is *credentialism*. The architecture's selection mechanisms admit agents to legitimate participation in the operative discourse only through credentialing pathways that the architecture's measurement frame authorises; agents without the credentials cannot articulate substrate-protective propositions in forms the architecture's discourse admits as legitimate; the credentialing pathways select for agents whose preferences align with the architecture's continued operation. The mechanism's function is the foreclosure of agents whose substrate-knowledge would, in principle, license them to articulate substrate-protective propositions but whose lack of architecture-authorised credentials prevents the articulation from reaching the architecture's discourse. The mechanism operates at the level of the institutional gatekeeping the architecture has standardised: the doctoral credential at the academic substrate, the regulatory-agency career trajectory at the regulatory substrate, the corporate-governance credential at the corporate substrate, the platform-engineering career trajectory at the platform substrate. The credentialing pathways' empirical content has been documented across the secondary literature on the contemporary professions and the contemporary regulatory architecture (Brint 1994, *In an Age of Experts*; Abbott 1988, *The System of Professions*; on the regulatory case specifically, Carpenter 2010, *Reputation and Power*).

The second mechanism is *performance amplification*. The architecture's selection mechanisms reward agents whose contributions amplify the architecture's measurable performance under the existing optimisation criteria, and disfavour agents whose contributions would redirect the optimisation criteria themselves. The mechanism's function is the institutional production of incentive structures under which agents whose career advancement depends on measurable performance are systematically directed toward apparatus-compatible activity rather than toward architectural reconfiguration. The mechanism operates at the level of the contemporary professional career structure: the executive-compensation apparatus, the academic-publication-and-grant apparatus, the regulatory-agency promotion apparatus, the engineering-team performance-review apparatus. The career structures' empirical content has been documented across the political-economy literature on contemporary compensation and professional advancement (Lazonick 2014, on executive compensation's alignment with apparatus-compatible variables; Foroohar 2016, *Makers and Takers*, on the financial-architecture's career-structure dynamics; Slaughter and Rhoades 2004, *Academic Capitalism and the New Economy*, on the academic substrate's parallel dynamics).

The third mechanism is *source isolation*. The architecture's selection mechanisms separate the agents whose substrate-knowledge could in principle articulate the architecture's inadequacy from the institutional positions through which the articulation would reach the architecture's operative discourse. The mechanism's function is the institutional production of an architectural distance between the agents who possess K and the agents whose institutional positions admit articulation at the operative level. The Boeing engineer at §6.0 possessed the substrate-knowledge that the architectural feature was inadequate; the engineer's institutional position admitted

the articulation of the knowledge through the engineering review process but did not admit the articulation at the level the architectural feature could be reconfigured. The mechanism operates at the level of the contemporary institutional architecture's vertical structure: the agents at the substrate-coupled positions (engineers, junior regulators, junior researchers, platform-trust-and-safety teams) possess K but lack the institutional position from which the architectural reconfiguration could be directed; the agents at the architectural-direction positions (senior executives, agency directors, senior legislators, platform senior leadership) lack K (in the substrate-coupled-experience sense) but possess the institutional position from which architectural reconfiguration could in principle be directed; the architectural distance between the two agent-classes is what source isolation produces and reproduces.

The three mechanisms together produce the architecture's institutional reproduction across positions, across decades, and across attempted reform. The mechanisms operate independently of any centralised coordination. The mechanisms operate through the architecture's standing institutional logic.

6.13 The Efficiency Paradox

The chapter closes with a feature of the architecture's mature operation that has been implicitly developed across the chapter's prior sections and warrants explicit registration before the chapter ends. The feature is the architecture's central self-description, with that self-description being the most accurate description of the architecture's substrate-depleting operation when read at the level the chapter's apparatus admits.

The architecture's measurement frame registers the architecture's operation as efficient. The frame's measurement criterion is the criterion the architecture has standardised: output per unit of input across the frame's resolution. The architecture's continued operation is, by the frame's criterion, efficient. The substrate-depletion the architecture produces is registered by no measurement frame the architecture's operative discourse admits; the substrate-depletion accumulates across substrate-cycles the architecture's measurement frame cannot reach. The architecture is efficient at producing apparatus-compatible activity; the architecture is inefficient, in the substrate-coupling sense, because the architecture does not couple to the substrates whose state determines whether the architecture's continued operation is sustainable.

The structure of the paradox operates at the institutional level the architecture's measurement frame's operation produces. The architecture's claim to efficiency is registered within the architecture's measurement frame. The architecture's substrate-depletion is registered outside the architecture's measurement frame, in the substrates the architecture's continued operation depletes. The two registrations operate at distinct levels, with the architecture's operative discourse reading the first registration as the architecture's defining feature and reading the second registration as a separate question that belongs to other levels (the social, the ecological, the long-term, the externality, the ethical). The bracketing of the second registration is what sustains the first registration as the architecture's central self-description; the bracketing is the institutional consequence of the architecture's measurement frame's standardisation across the architecture's operative discourse.

The chapter has now constructed the apparatus *la technique* names. The seven characteristics Ellul specified (rationality, artificiality, automatism, self-augmentation, monism, universalism, autonomy), my cybernetic specification of the lowest-common-denominator attractor at §6.5.1, my three-mechanism apparatus at §6.9.1 and the three documented cases at §6.10, my N-th Order Epistemic Acknowledgment State at §6.11, my homeostatic triad at §6.12, and the present efficiency paradox together specify the institutional totality within which the cycle-mismatched regulators of Chapter 5 operate. The two cases at §6.0 admit the apparatus's reading: the Boeing engineer's case is the engineer's institutional encounter with automatism, with the three-mechanism apparatus's joint operation on the substrate-protective concern, with the source-isolation register of the homeostatic triad operating at the engineer's institutional position. The Volcker Rule case is the legislative architecture's encounter with the same architectural reality at the regulatory substrate, with the three-mechanism apparatus operating jointly on the legislative content across the rule-making period, with the credentialism and performance-amplification registers of the homeostatic triad operating at the agency-staff and rule-drafter

positions. The two cases are not failures of any agent's competence or character; the two cases are what the architecture *la technique* names produces when reform is attempted from inside it.

The architecture does not, by itself, identify the mode of revealing under which the architecture appears to those inside it. The architecture's features specify the institutional structure within which the agents operate; the mode of revealing under which the agents' institutional environment appears as the world rather than as one architectural option among others is a different question, addressed at a different register from the cybernetic-institutional register at which the chapter has operated.

Part III: The Second-Pass Test

CHAPTER 7

The Western Order, Second-Pass Test

7.0 What This Chapter Does

Chapter 2 conducted the first-pass test of the contemporary Western order against the thirty-one conditions extracted in Chapter 1. The first pass used the libertarian tradition's own analytical resources, applied to the documentary record on the order's operation across the four decades since the late 1970s. Twelve conditions failed sharply on the tradition's own resources. Several conditions admitted partial defence at levels the chapter identified. Several obtained in defensible forms the defender could maintain at the level of the tradition's vocabulary.

Chapter 2 closed with a question the chapter could not answer on the libertarian tradition's resources alone. The question was why the failures clustered in the specific places the first pass identified, what mechanism produced the pattern, and why the cracks operated where they did rather than elsewhere. Chapter 5 constructed the cybernetic results from their primary sources. Chapter 6 constructed Ellul's analysis of the technological order from its primary sources. The two analytical traditions, together, supply the resources the present chapter deploys.

The chapter conducts the second-pass test of the contemporary Western order. The same thirty-one conditions, the same documentary record, the same evidentiary discipline. The analytical resources available to the examination are those Chapters 5 and 6 have constructed. The findings the second pass produces are findings the first pass could not produce because the first pass did not have these resources in hand.

The chapter does not introduce new conditions, new empirical material, or new analytical frameworks. It returns to material already in the book, with the apparatus already constructed, and conducts the examination that the apparatus permits. The chapter does not yet deploy the phenomenological-ontological register Heidegger's analysis supplies; that is constructed in the Epilogue.

7.1 What the Apparatus Supplies

The cybernetic apparatus constructed in Chapter 5 supplies three formal results and the analytical relations among them. Ashby's Law of Requisite Variety specifies that the variety of a regulator must equal or exceed the variety of disturbances against which the regulator stabilises the system it is coupled to (Ashby 1956, *An Introduction to Cybernetics*, pp. 204–207). The Conant-Ashby theorem specifies that any effective regulator must contain a model of the system it regulates (Conant and Ashby 1970, *International Journal of Systems Science* 1(2), pp. 89–97, with the modelling proof at pp. 92–95). The horizon-mismatch theorem derived at §5.6 specifies that a regulator whose action-cycle is shorter than the substrate's replenishment-cycle by a factor greater than approximately 10^3 cannot, by construction, satisfy the Conant-Ashby modelling condition at the substrate's resolution; substrate-coupled regulation is foreclosed when the cycles are mismatched; the substrate's variety at its own cycle must be absorbed within the substrate itself.

The Ellulian analysis constructed in Chapter 6 supplies the resources for the institutional totality the cybernetic regulators operate within. The seven characteristics Ellul identified (rationality, artificiality, automatism, self-augmentation, monism, universalism, autonomy) specify the form of the technological order as an institutional totality (Ellul 1954/1964, *The Technological Society*, especially Chapter 2 on the characterology of technique). The two laws of self-augmentation, that technique progresses without decisive intervention from human agency, and that the progression follows geometric rather than arithmetic patterns, specify the trajectory of the institutional totality without specifying the formal mechanism through which the trajectory operates (Ellul 1954/1964, pp. 85–94 on the two laws). Chapter 6's authorial extensions on Ellul's foundation supply four additional results the analysis the present chapter conducts deploys: the lowest-common-denominator attractor at §6.5.1 (the cybernetic specification of the mechanism through which Ellul's self-augmentation operates at the substrate level), the three-mechanism architecture at §6.9.1 (absorption, attenuation, decomposition, the formal-mathematical structure of reform absorption), the N-th order epistemic acknowledgment state at §6.11 (the two-phase recursive recognition pattern), and the homeostatic triad at §6.12 (credentialism, performance amplification, source isolation as the architecture's stabilisation mechanisms).

The two traditions together supply the analytical resources required for the work the chapter conducts. The cybernetic results specify the formal-mathematical conditions on regulator-substrate coupling; the Ellulian analysis specifies the institutional totality within which the cybernetic regulators operate. The two traditions operate at distinct levels and are not reducible to one another. The chapter deploys both, with attention to what each supplies that the other does not.

The chapter's analytical procedure is the following. Each condition that Chapter 2's first pass found obtaining in defensible form is re-examined with the new resources in hand, with attention to whether the defensible form survives the second-pass examination. Each condition that the first pass found failing sharply is re-examined with the new resources in hand, with attention to the structural mechanism the analysis identifies as producing the failure. The findings are registered against the documentary record from Chapter 2's empirical work, with the analytical resources the second-pass examination deploys supplying the structural-mechanism specification the first pass could not produce.

The chapter does not adjudicate beyond what the analysis permits. The structural mechanism findings the chapter produces are findings the resources the prior chapters have constructed permit. The findings stand at the structural-mechanism level. The diagnostic findings the structural mechanisms place in view belong to Part IV of the book.

7.2 Smith's Conditions Re-Examined

The first pass found S1 (moral embeddedness) and S2 (local proximity) obtaining in defensible substituted form, with reservations about substantive moral psychology and functional substitution. S3 (legal disfavour of producer coordination) admitted a narrow reading on which it obtained and a broad reading on which it did not. S4 (reputational propagation) obtained at the producer-consumer level and did not obtain at the platform level. The second pass re-examines the four findings.

S1 and S2 Re-Examined: The Cycle-Coupling Analysis

The defender's case on S1 at the first pass was that platform-mediated commerce has developed institutional substitutes for the moral architecture Smith specified: star ratings, written reviews, return policies, dispute-resolution mechanisms, seller-performance metrics, and platform-enforced policies on counterfeit goods and abusive conduct. The substitution thesis on S1 claimed that the moral-disciplinary function Smith's condition specified continues, conducted now through algorithmic intermediation rather than through face-to-face acquaintance. The empirical record supported the defender at the level of structural-disclosure availability; the reservation was whether the architecture's substitute produced the internalised impartial-spectator standpoint Smith's condition required or only behavioural conformity to the metrics the architecture rewards.

The cybernetic results from Chapter 5 supply the resources for the reservation's resolution. The architecture's substitute for the impartial-spectator standpoint is a regulator: the platform's rating-and-reputation system operates as a cybernetic regulator coupled to the substrate of consumer-producer exchanges. The regulator's action-cycle is the cycle at which the rating system updates (typically seconds to hours). The substrate's replenishment-cycle is the cycle at which the moral-psychological substrate Smith's condition specified is formed and sustained. The moral-psychological substrate, on the Smith scholarship the first pass invoked (Otteson 2002, pp. 100–169; Hanley 2009, pp. 99–135; Werhane 1991, Chapter 3), is formed through repeated face-to-face encounters within a community of mutual recognition, with the formation operating across years and decades. The cycle ratio is approximately 10^7 to 10^9. The horizon-mismatch theorem's antecedent obtains by several orders of magnitude.

The structural-mechanism finding is that the architecture's substitute for the impartial-spectator standpoint cannot, by the formal-mathematical reasoning the horizon-mismatch theorem specifies, produce the moral-psychological substrate the condition required. The platform's rating system can produce behavioural conformity to the metrics it operates on; the metrics operate at the regulator's action-cycle; the moral-psychological substrate operates at its own substrate-cycle; the cycle-mismatch forecloses the cybernetic coupling that would permit the regulator to model the substrate at the substrate's resolution. The substitution thesis the defender invoked at the first pass is, on the cybernetic results, a substitution that does not perform the function Smith's condition required.

Ellul's analysis extends the finding. The platform's rating system is, in Ellul's vocabulary, a technical apparatus that operates with the seven characteristics technique exhibits. The system is rational (it operates according to formal procedures that produce reproducible outputs from defined inputs), artificial (it has been constructed deliberately for the purpose of rating producers and consumers), automatic (the rating's effect on producer visibility and on consumer choice is conducted without further deliberation by participants), self-augmenting (the system's continued operation expands its reach into adjacent areas of consumer-producer relations), monistic (the form of rating-and-discipline the system produces is the form available in the architecture; alternative forms of moral discipline are not implementable within the architecture's structure), universalising (the system operates identically across producer categories, jurisdictions, and consumer populations), and autonomous (the system operates without direction from any participant in the order). The seven characteristics are the institutional-totality signature of the rating system the architecture deploys. The system operates as the technical substitute for the moral architecture Smith's condition required; the substitute does not produce the moral architecture; the substitute produces only its own technical signature.

The structural-mechanism finding on S1 is therefore that the architecture's substitute for the impartial-spectator standpoint is foreclosed at the cybernetic level and exhibits the technical-apparatus signature at the institutional level. The first pass's reservation on the substitution's functionality is resolved at the structural-mechanism level: the substitution cannot perform the function Smith's condition required, on the cybernetic results and on Ellul's analysis jointly.

S2 (local proximity) re-examines identically. The defender's substitution thesis on S2 at the first pass claimed that bandwidth and logistics compress distance, producing effective proximity at global scale. The cybernetic results supply the same finding the analysis of S1 produced. The substitute architecture operates at action-cycles measured in seconds to hours against a substrate-cycle (the formation of moral character through sustained face-to-face encounter) measured in years to decades. The cycle ratio is approximately 10^7. The substitution cannot produce the substrate the condition required. Ellul's analysis supplies the same institutional-totality signature: the bandwidth-and-logistics architecture is the technical apparatus that operates with the seven characteristics, with the institutional form available to participants being the form the apparatus admits.

The structural-mechanism finding on S1 and S2 jointly is that the architecture's substitutes for the moral architecture Smith's conditions specified are foreclosed at the cybernetic level and exhibit the technical-apparatus signature at the institutional level. The first pass's defensible-substitution finding on S1 and S2 does not survive the second-pass examination; the substitution is, on the resources the chapter has in hand, a substitution that does not perform the function the conditions required.

S3 Re-Examined: The Apparatus-Reform Test

The first pass found S3 admitting a narrow reading on which it obtained (the consumer-welfare-standard interpretation of antitrust enforcement) and a broad reading on which it did not (the Smith of *Wealth of Nations* IV.viii–IV.ix on the legal-institutional architecture's facilitation of producer interest against consumer interest). The second-pass analysis permits the broad-reading finding to be specified at the structural-mechanism level.

The legal-institutional architecture is, in cybernetic vocabulary, a regulator coupled to the substrate of producer-consumer relations. The architecture's stated function is to disfavour the producer coordination Smith's S3 specified. The architecture's action-cycle is the legislative-regulatory cycle through which antitrust enforcement is conducted. The substrate-cycle is the cycle at which producer coordination develops and consolidates. The cycles are partially matched at the level of explicit cartel conduct, where the legislative-regulatory cycle can address explicit price-fixing within timescales the cartel's operation occurs on. The cycles are sharply mismatched at the level of structural concentration developing through acquisitions, network effects, capital advantages, and data accumulation, where the structural concentration consolidates over years and decades while the antitrust enforcement framework operates on case-by-case timescales matched to explicit cartel detection.

Ellul's analysis identifies the mechanism signature directly. The legal-institutional architecture exhibits the seven characteristics of technique. The narrow reading the first pass found defensible is the reading the architecture's technical-procedural level admits. The broad reading the first pass found failing is the reading the architecture's technical-procedural level cannot reach, because the institutional-totality structure within which the architecture operates is the structure Ellul's analysis identifies as autonomous: the architecture operates according to its own technical-procedural rules, with the broader institutional-architectural questions the broad reading addresses being questions the architecture does not contain resources for. The narrow reading is what the architecture produces; the broad reading is what its structure excludes.

The three-mechanism analysis from §6.9.1 supplies the further finding on S3. The first pass registered that the consumer-welfare standard's interpretive framework has substantially excluded structural concentration as a legitimate object of antitrust intervention (Khan 2017, *Yale Law Journal* on the consumer-welfare standard's failure to address concentration that does not raise short-run prices; Wu 2018, *The Curse of Bigness*, Chapters 5–7 on the historical reorientation). The three-mechanism analysis identifies the absorption-attenuation-decomposition pattern Ellul's analysis specified: the consumer-welfare standard absorbed

the apparatus-compatible elements of antitrust enforcement (price-fixing prosecutions, explicit cartel cases, the technical-procedural level at which it operates), attenuated the apparatus-incompatible elements (the broader structural-concentration concerns the Brandeis-Sherman tradition addressed, the political-economic dimensions of concentration the broader reading of Smith S3 specifies), and decomposed the hybrid elements (the cases in which structural concentration produced consumer-welfare effects that the framework could not register as apparatus-compatible or apparatus-incompatible without reading them through its own interpretive framework).

The structural-mechanism finding on S3 is that the broad reading of the condition fails through a structural mechanism identifiable at the cybernetic level (the cycle-mismatch foreclosing structural-concentration regulation), at the Ellulian level (the seven characteristics of the technical-procedural framework that operates the antitrust system), and at the three-mechanism level (the absorption-attenuation-decomposition pattern through which the broader institutional concerns have been processed across the four-decade history). The defender's narrow-reading defence at the first pass is registered as a reading that operates within the framework's technical-procedural level; the broad reading the first pass found failing is registered as a reading the framework's structure excludes by the structural mechanism the second-pass analysis identifies.

S4 Re-Examined: The Platform-Level Foreclosure

The first pass found S4 obtaining at the producer-consumer level and failing at the platform level. The cybernetic results supply the mechanism's specification of the platform-level foreclosure.

The platform is, in cybernetic vocabulary, a regulator coupled to the substrate of consumer-producer relations. The platform's stated function includes the propagation of reputational information at velocity and fidelity sufficient to discipline producer conduct (Smith's S4 specification). The platform's action-cycle (seconds to hours, at which the rating system updates) is matched to the producer-consumer substrate's cycle of individual transactions and disputes. At this level, S4's variety condition is approximately satisfied: the regulator's variety (the rating-system's response space) approximately matches the disturbance variety (the variety of producer-consumer transaction outcomes the system processes).

At the platform level, the variety condition fails. The platform itself is the regulator; the platform's continued operation depends on advertising revenue and structural-positioning decisions made by the platform's own management; the consumers and producers whose ratings the platform processes are not the agents whose conduct the platform's continued operation depends on. The Conant-Ashby theorem applies: the regulator's model is the platform's own internal model of its operating environment; the platform's internal model registers consumer-producer transactions as inputs to the optimisation operations the platform conducts against its own metrics; the substrate the platform claims to regulate (consumer-producer relations as a category) is modelled at the resolution the platform's internal metrics admit, not at the resolution the substrate's own cycles operate on. The cycle-coupling at the platform level is sharply mismatched between the platform's operational action-cycle (milliseconds for advertising auctions, seconds for recommendation-engine updates, minutes for compliance-system updates) and the substrate-cycle of consumer-trust formation, market-architecture development, and structural-positioning dynamics (years to decades).

The LCD attractor from §6.5.1 supplies the further finding. The platform's optimisation operations, conducted at the regulator's action-cycle against the substrate's response distribution, converge by mathematical necessity on the response distribution's lowest-common-denominator attractor: the region of the substrate's response distribution that produces the highest-amplitude, lowest-variance, most-predictable signal output per unit of regulator input. The platform's recommendation algorithms, content-moderation systems, dispute-resolution mechanisms, and pricing systems each operate as optimisation regulators against the substrate the platform is coupled to; each converges on the LCD attractor of the substrate's response distribution; the convergence is the cybernetic mechanism through which the platform produces the structural patterns the consumer-protection literature documents (Khan 2019 on the structural-positioning analysis; Pasquale 2015 on the architectural opacity of platform-mediated reputation; Zuboff 2019, Part II, on the information-asymmetries

of platform-mediated exchange).

The structural-mechanism finding on S4 is that the platform-level foreclosure the first pass registered is the cybernetic consequence of the cycle-mismatch between the platform's action-cycle and the substrate-cycle at which the platform-level dynamics operate, with the LCD attractor mechanism specifying the formal-mathematical signature of the platform's optimisation operations at the substrate level. The first pass's empirical finding is registered at the structural-mechanism level the second-pass analysis supplies.

7.3 Ricardo's Conditions Re-Examined

The first pass found R1 (capital immobility) failing on Samuelson 2004's concession from inside the trade-theory canon. R2 (asymmetric labour mobility) formally obtained but operated under R1's failure as the failure case Ricardo himself identified. R3 (bounded national economies) failed on Baldwin's analysis of global value chains from within trade theory. The second-pass analysis permits the mechanism's specification of the three findings.

R1 Re-Examined: The Algorithmic Trading Architecture

The first pass documented the empirical record on contemporary capital mobility: Bank for International Settlements triennial survey data on foreign-exchange turnover at 7.5 trillion U.S. dollars daily in April 2022, against annual cross-border trade in goods and services at approximately 32 trillion dollars (Bank for International Settlements 2022, *Triennial Central Bank Survey*, p. 4; World Trade Organization, *World Trade Statistical Review*, 2023 edition). The ratio is approximately 60:1.

The cybernetic results identify the mechanism signature of the failure. The contemporary capital-allocation architecture is the algorithmic-trading infrastructure that has been built across the four decades since the late 1970s elimination of capital controls. The infrastructure operates at action-cycles measured in microseconds (high-frequency-trading systems), milliseconds (most algorithmic trading), and seconds (most institutional trading). The substrate the infrastructure operates against is the productive economy: firms, workers, productive capacities, supply chains, infrastructure systems, the natural systems that productive operations are conducted against. These elements operate at the scales their own replenishment requires: years for working-capital cycles, decades for capital-equipment cycles, decades to centuries for infrastructure cycles, decades to millennia for ecological cycles. The cycle ratio between the algorithmic-trading infrastructure's action-cycle and the productive economy's cycle is approximately 10^11.

The horizon-mismatch theorem applies. The algorithmic-trading regulator cannot, by construction, model the productive substrate at the substrate's resolution. The Conant-Ashby modelling condition is foreclosed when the cycles are mismatched. The capital-allocation function the regulator nominally performs is conducted at the regulator's action-cycle, against the metrics the regulator's internal model admits; the substrate-coupling that Hayek's 1945 argument presupposed (Chapter 5 §5.4) is, on the cybernetic results, foreclosed at the contemporary infrastructure's operating cycle.

The structural-mechanism finding on R1 is that the failure the first pass registered on Samuelson's 2004 concession is the cybernetic consequence of the algorithmic-trading infrastructure's cycle-mismatch with the productive substrate the trade-theory canon presupposes the price mechanism to coordinate. R1's failure is not a contingent feature of the post-1980 elimination of capital controls; the cycle-mismatch is the structural mechanism through which the failure operates. The defender's appeal at the first pass to the trade-theory tradition's generalisation beyond Ricardo's immobility condition operates against the empirical record on the algorithmic-trading infrastructure's operating cycles; the cycle-mismatch is what the empirical record indicates the infrastructure operates at.

R2 and R3 Re-Examined: The Inherited Mechanism

R2 (asymmetric labour mobility) and R3 (bounded national economies) inherit the structural-mechanism finding from R1. The cycle-mismatch at the algorithmic-trading infrastructure operates on the labour and bounded-economy conditions through the same mechanism: the infrastructure cannot model labour markets or national productive economies at their own cycles; the substrate-coupled labour-mobility patterns and the substrate-coupled bounded-economy patterns the conditions require are not features the infrastructure registers; the patterns operate within labour markets and within national productive economies themselves, with the infrastructure's responses operating against the metrics the infrastructure's internal model admits rather than against the workers, firms, and national productive structures the conditions specify.

Ellul's analysis identifies the institutional-totality level. The contemporary trade-financial architecture exhibits the seven characteristics of technique: it is rational (operating according to formal procedures), artificial (constructed deliberately), automatic (operating without further deliberation by participants), self-augmenting (the geometric-progression dynamics Ellul's second law specifies), monistic (the form of trade-financial operation the architecture admits is the form available), universalising (operating identically across jurisdictions), and autonomous (operating without direction from participants). The architecture's institutional-totality signature is the signature of technique operating at the trade-financial level.

The composite structural-mechanism finding on the Ricardian conditions is that the failures the first pass registered operate through the cycle-mismatch the cybernetic results specify and exhibit the institutional-totality signature Ellul's analysis identifies. The Ricardian inversion Chapter 3 §3.6 registered (the Chinese order satisfying R1, R2, R3 through architectures the libertarian tradition opposes) is the empirical consequence of these findings: the conditions Ricardo specified are reconstructable at scale only where the regulator-substrate cycle-coupling the conditions require is maintained as a deliberate institutional architecture, and the algorithmic-trading infrastructure operating in the contemporary Western order forecloses that cycle-coupling at the structural-mechanism level the cybernetic results identify.

7.4 Bastiat's Conditions and the Austrian Conditions Re-Examined

Bastiat's Conditions Re-Examined

The first pass found B1 (visibility structure) obtaining at the structural-disclosure level and failing at the moment-of-evaluation level. B2 (productive versus extractive expenditure) failed on the empirical record of aggregate capital formation; the redeployment thesis was falsified at the system-level test. B3 (foreclosed-trajectory registration) failed on Bastiat's own analytical framework.

B1's finding follows from the cybernetic results. The disclosure architecture the defender invokes (the SEC disclosure regime, the EU's Corporate Sustainability Reporting Directive, the journalism on supply-chain conditions) operates at sites temporally and informationally decoupled from the moment-of-transaction at which the consequence-propagation Bastiat's condition specifies must occur. The consumer's interface at the moment of evaluation is the platform's user interface, which is a regulator coupled to the substrate of consumer attention and decision. The platform's action-cycle (milliseconds for the conversion-optimisation algorithms the interface deploys) is matched to the substrate's response cycle (the attention-and-decision cycle of the individual transaction). The disclosure architecture operates at substrate-cycles (years for annual reports, months for investigative journalism, years for academic studies) the platform's interface does not coordinate with. The cycle-mismatch between the disclosure architecture and the platform interface's optimisation is the mechanism's specification of the gap between B1's structural-disclosure level and B1's moment-of-evaluation level. The LCD attractor mechanism from §6.5.1 specifies the formal-mathematical character of the optimisation at the moment of evaluation: the platform's interface converges by mathematical necessity on the region of the substrate's

response distribution that produces the highest-amplitude conversion signal, and the convergence forecloses the integration of consequence-propagation information at the moment Bastiat's condition specifies.

B2's finding follows from the analysis of the corporate-governance regulator. The corporate-governance architecture (equity-linked compensation, quarterly reporting, the institutional infrastructure of shareholder primacy) is a regulator coupled to the substrate of corporate productive operations. The regulator's action-cycle is quarterly (the cycle at which the regulator's metrics update against which executive compensation and capital-market responses are calibrated). The substrate-cycles are the cycles at which corporate productive operations occur: engineering-culture replenishment across decades, supplier-ecosystem development across years, infrastructure maintenance across decades, research-and-development across years to decades. The cycle ratio is approximately 10^2 between the quarterly action-cycle and the working-capital substrate cycle, and substantially larger for the longer substrate cycles. The horizon-mismatch theorem applies at the longer substrate cycles. The Conant-Ashby modelling condition specifies that the regulator's response to disturbances at the longer substrate cycles is foreclosed; the regulator's responses are produced against the metrics the regulator's internal model admits; the substrate-coupling that B2's condition required (the productive-versus-extractive distinction at the system-level) is the substrate-coupling the regulator's cycle-mismatch forecloses.

The empirical pattern Lazonick documented (Lazonick 2014, *Harvard Business Review*, on the buyback-and-dividend pattern exceeding capital expenditure at the listed-corporation sector level) is the cybernetic consequence of the cycle-mismatch: the regulator's metrics (share price, earnings per share, return on equity) are optimised against, with the substrate-coupled investment the regulator's metrics do not register being foreclosed by the optimisation operations the regulator conducts. The redeployment thesis at the system level fails for the same cybernetic reason: the system-level capital flows respond to the same regulator's metrics, with the substrate-coupled productive investment the system-level test requires being the substrate-coupling the cycle-mismatch forecloses at the system level.

B3's finding follows from the analysis of the antitrust-architecture regulator. The platform-acquisition pattern the first pass documented (Meta-Instagram, Meta-WhatsApp, Alphabet-YouTube, Alphabet-DoubleClick, Microsoft-LinkedIn, Microsoft-GitHub, Microsoft-Activision, Salesforce-Slack, the broader pattern) operates against the consumer-welfare-standard antitrust framework whose mechanism signature S3's broad-reading examination at §7.2 identified. The acquisition pattern is the pattern Bastiat's analytical framework addresses (the foreclosed trajectory the visible transaction does not register). The structural-mechanism finding is that the antitrust regulator's framework cannot register the foreclosed trajectory because the framework's metrics operate at the regulator's action-cycle (case-by-case enforcement timescales) against the metrics the framework's internal model admits (short-run consumer prices), with the foreclosed trajectory operating at the substrate-cycle (the years-to-decades dynamics of competitive entry and structural-positioning the trajectory would have followed) the regulator's cycle-mismatch forecloses.

The Austrian Conditions Re-Examined

The first pass found A1 (calculation through prices generated by exchange) obtaining at the formal-architectural level. A2 (knowledge dispersed in substrate-coupled form) obtaining. A3 (price mechanism aggregating dispersed knowledge) failing on Shiller's variance-decomposition result from inside the finance canon. A4 (entrepreneurial alertness) obtaining at the adjacent-entry level and failing at the level of the order's dominant industries. A5 (dynamic market process) inheriting from A3 and A4. A6 (the order produced as *kosmos* rather than *taxis*) admitting both readings.

A3's structural-mechanism finding is the canonical case the analysis the chapter has constructed was built to address. Hayek's 1945 argument specified the price mechanism as the regulator that aggregates the dispersed substrate-coupled knowledge of situated agents into coordinating signals. The argument presupposed, on the cybernetic reading the chapter §5.4 made explicit, that the price mechanism's regulator-substrate coupling satisfies the conditions Ashby's Law and the Conant-Ashby theorem specify. The contemporary price-formation

infrastructure (the algorithmic-trading systems, the high-frequency-trading networks, the dynamic-pricing engines, the algorithmic supply-chain optimisers) operates at action-cycles measured in microseconds to seconds against substrate-cycles measured in years to decades. The cycle-mismatch is approximately 10^11; the horizon-mismatch theorem applies, and the Conant-Ashby modelling condition is foreclosed. The price mechanism's aggregation of dispersed substrate-coupled knowledge cannot, by the formal-mathematical reasoning the theorem specifies, occur at the contemporary infrastructure's operating cycle.

The Shiller variance-decomposition result the first pass invoked is the empirical signature of the cycle-mismatch. The substrate-tracking line the variance-decomposition compared the actual price line against is the line the price mechanism would produce if the regulator-substrate coupling satisfied the conditions Hayek's argument required. The departure between the substrate-tracking line and the actual price line is the empirical record of the foreclosure the horizon-mismatch theorem specifies as the cycle-mismatch's necessary consequence. The behavioural-finance residual categories (sentiment, narrative dynamics, herding, momentum, noise-trading) that the first pass noted as the academic-finance literature's analytical response to the Shiller result operate at the regulator's action-cycle; the substrate-coupled variations the price mechanism's argument required the regulator to register are not registered, and the residual categories register what the regulator is actually responding to: features internal to the price-formation system itself, operating at the regulator's action-cycle, on the substrate the regulator's internal model admits.

A4's finding follows from the LCD attractor analysis at §6.5.1 and the three-mechanism apparatus at §6.9.1. The platform-acquisition pattern the first pass registered as foreclosing entrepreneurial entry in the order's dominant industries is the empirical signature of the LCD attractor operating at the platform-substrate register: the dominant platforms' optimisation operations against the substrate of consumer-producer relations converge on the lowest-common-denominator attractor of the substrate's response distribution, with the convergence foreclosing the entrepreneurial alertness Kirzner's condition specified (Kirzner 1973, pp. 30–87 on the entrepreneurial-discovery process). The three-mechanism apparatus identifies the structural mechanism through which entrant competitors are absorbed (acquired before reaching competitive scale), attenuated (compete in adjacent technological domains that do not threaten the dominant platforms' core positions), and decomposed (the hybrid entrants whose features cannot be cleanly absorbed or attenuated are split across the absorption and attenuation registers). The empirical record on declining business dynamism the first pass documented (Decker, Haltiwanger, Jarmin, and Miranda 2014; Akcigit and Ates 2021) is the empirical signature of the LCD-attractor and three-mechanism dynamics operating at the order's dominant-industry level.

A5 (dynamic market process) inherits the structural-mechanism findings from A3 and A4. A6 (the order produced as *kosmos* rather than *taxis*) is resolved at the structural-mechanism level the chapter has now produced: the contemporary order's architectural layer at which coordination is conducted is the algorithmic-and-platform infrastructure whose institutional features the cybernetic and Ellulian apparatus has identified; the architecture is *taxis* in Hayek's vocabulary, constructed deliberately by identifiable agents pursuing specific purposes; the surface appearance of distributed coordination through dispersed market discovery is the *kosmos*-form the *taxis*-architectures present to users. The first pass's open finding on A6 is resolved at the structural-mechanism level: the architecture's operational layer is *taxis*; the surface appearance is the user-facing register the architecture's operation produces.

7.5 Friedman, Sowell, Rothbard, Rand Re-Examined

The first pass found F1 (monetary stability) obtaining at the consumer-price level and failing at the asset-price level. F2 (substantive consumer sovereignty) failed on the empirical record. F3, F4, F5 failed across their respective dimensions. So2 (profit-and-loss discipline) failed at the order's dominant financial institutions. Ro3 (absence of state-granted privileges) failed on Rothbard's own analytical framework. Ra2 (separation of economic and political power) failed on the documentary record. The second-pass analysis permits the structural-mechanism specifications.

F1's finding follows from the cybernetic analysis of the central-banking regulator. The central-banking architecture operates as a regulator coupled to monetary-and-financial dynamics. The regulator's action-cycle is monthly to quarterly (the cycle at which monetary-policy committee decisions are made). Consumer-price dynamics operate at cycles compatible with this in much of the period; asset-price dynamics operate at action-cycles substantially shorter than the regulator's (microseconds to days for asset-price formation, against the regulator's monthly-to-quarterly cycle). The cycle-mismatch between the regulator's action-cycle and asset-price formation is in the opposite direction from the cycle-mismatches the prior sections have analysed: the regulator's action-cycle is longer than the asset-price cycle. The horizon-mismatch theorem applies in the reverse direction: the regulator cannot model asset-price variations at their own resolution because the regulator's action-cycle is too coarse to register state changes at asset prices' own cycle. The structural-mechanism finding on F1's asset-price-level failure is the cycle-mismatch's reverse-direction instance, with the regulator operating on a domain whose variations occur at scales finer than the regulator's resolution.

F2's finding follows from the analyses at §7.2 (the Smith platform-architecture analysis) and §7.4 (the LCD attractor and three-mechanism analyses). The dominant-platform concentration the first pass documented (Khan 2017 on the institutional structure; Philippon 2019 on the empirical record across U.S. industries) is the empirical signature of the LCD-attractor and three-mechanism dynamics identified. The structural foreclosure of substantive consumer sovereignty is the cybernetic consequence of the platform's optimisation operations against the substrate of consumer attention and the institutional-totality consequence of the technique-apparatus dynamics Ellul's analysis identifies. The defender's revealed-preference argument the first pass examined operates within the regulator's framework (consumer choice as registered at the regulator's action-cycle and the regulator's internal metrics), with the structural foreclosure the *United States v. Google LLC* default-payment evidence registered (the USD 20 billion annual default-payment as the empirical measure of the structural-foreclosure value) being the structural mechanism the regulator's framework does not contain resources to register.

F3 (structural openness of competition) and F4 (anti-monopoly vigilance) inherit the structural-mechanism findings from the A4 and S3 analyses. F5 (design against regulatory capture) inherits the findings from the three-mechanism analysis: regulatory capture operates as the absorption-attenuation-decomposition pattern through which the regulatory framework's apparatus-compatible elements absorb industry-aligned content, the apparatus-incompatible elements are attenuated, and the hybrid elements are decomposed. The empirical record on capture the first pass documented (Carpenter and Moss 2014; Krippner 2011; the broader documented case record) is the empirical signature of these dynamics.

So2 (profit-and-loss discipline) failed at the order's dominant financial institutions on the post-2008 bailout pattern the first pass registered. The finding follows from the cybernetic analysis of the financial-regulatory architecture: the regulator's action-cycle operates at a level coordinated with the financial system's own operating cycle, with the discipline of consequences the condition required operating at substrate-cycles the regulator's framework does not register. The bailout pattern is the response the regulator's framework produces when substrate-coupled discipline at the substrate's cycle is foreclosed: the institutions' continued operation is sustained at the regulator's action-cycle through interventions calibrated to the regulator's framework's internal metrics, with the substrate-cycle dynamics the condition required being absorbed onto the central-bank balance sheet and the public fisc.

Ro3 (absence of state-granted privileges) failed on Rothbard's own analytical framework on the contemporary record of subsidies, regulatory frameworks advantaging incumbents, intellectual-property monopolies, and infrastructure provision at below-cost rates. The finding follows from the three-mechanism analysis: the state-granted-privileges architecture is the absorbed-attenuated-decomposed pattern through which the institutional totality operates; the privileges are absorbed into the framework's compatible procedures; the broader anti-privilege architecture Rothbard specified is attenuated; the hybrid elements are decomposed.

Ra2 (separation of economic and political power) failed on the documentary record on corporate lobbying and political-economic integration. The finding follows from Ellul's analysis: the institutional totality the seven characteristics specify produces the integration as the autonomy characteristic operating at the political-economic

level; the political-economic machinery and the corporate machinery operate as components of the same institutional totality, with the separation Rand's condition specified being foreclosed at the structural-mechanism level the institutional-totality analysis identifies.

7.6 The Second-Pass Composite Finding

The chapter has re-examined the thirty-one conditions Chapter 2's first pass examined, with the cybernetic results from Chapter 5 and Ellul's analysis from Chapter 6 deployed against the empirical record. The findings can be presented in composite form.

The first-pass findings registered in Chapter 2's §2.7 composite are unchanged at the empirical level. The conditions that obtained at the first pass continue to obtain at the empirical level. The conditions that failed at the first pass continue to fail at the empirical level. The second pass does not produce new empirical findings on the conditions; the empirical record is the empirical record.

The second pass produces structural-mechanism findings the first pass could not produce. The findings can be summarised in four categories.

The first category is the resolution of the first pass's reservations. The first-pass findings that admitted defensible substituted forms with reservations about substantive functionality (S1, S2 principally) are resolved at the structural-mechanism level: the substitutions cannot perform the functions the conditions required, on the cybernetic results and Ellul's analysis jointly. The first-pass findings that admitted narrow versus broad readings (S3 principally) are resolved at the structural-mechanism level: the narrow reading the framework's technical-procedural level admits is the reading the framework produces, with the broad reading the first pass found failing being the reading the framework's structure excludes by the structural mechanism the analysis identifies. The first-pass open findings on the relevant architectural layer (A6 principally) are resolved at the structural-mechanism level: the architecture's operational layer is *taxis* in Hayek's vocabulary; the surface appearance is the user-facing layer the architecture's operation produces.

The second category is the mechanism's specification of the first pass's sharp failures. The first-pass failures on R1, R3, A3, B2, B3, F2, F4, F5, So2, Ro3, Ra2 each receive a structural-mechanism specification. The cycle-mismatch the horizon-mismatch theorem specifies operates as the structural mechanism through which the trade-theoretic and financial-economic failures (R1, R3, A3, B2, F1 asset-price level) are produced. The LCD-attractor mechanism specifies the structural mechanism through which the platform-substrate-level failures (S4 platform level, B1 moment-of-evaluation level, F2 substantive sovereignty, A4 dominant-industry entry) are produced. The three-mechanism architecture specifies the structural mechanism through which the institutional-architectural failures (S3 broad reading, F4 anti-monopoly vigilance, F5 design against capture, Ro3 state-granted privileges) are produced. The Ellulian seven characteristics specify the institutional-totality signature within which the cybernetic regulators operate (Ra2 political-economic integration, the broader institutional-totality findings across the categories).

The third category is the resolution of the question Chapter 2's closing section placed in view. The question was why the failures clustered in the specific places the first pass identified, what mechanism produced the pattern, and why the cracks operated where they did rather than elsewhere. The structural-mechanism findings the second pass has produced supply the resolution. The failures cluster where the cycle-mismatch, the LCD-attractor mechanism, and the three-mechanism dynamic operate. The conditions that admit defensible-substituted forms at the first pass are the conditions whose substrate-cycles operate at scales the substitute architectures can plausibly claim to address; the structural-mechanism finding is that the plausibility does not survive examination at the cycle-coupling level. The conditions that fail sharply at the first pass are the conditions whose substrate-cycles operate at scales the cycle-mismatch forecloses by the formal-mathematical reasoning the horizon-mismatch theorem specifies.

The fourth category is the relation between the structural-mechanism findings and the Ricardian inversion Chapter 3 §3.6 registered. The inversion was that the Chinese order satisfies R1, R2, R3 through institutional architectures the libertarian tradition opposes, while the contemporary Western order fails the same conditions through the institutional patterns Chapter 2 documented. The structural-mechanism findings the present chapter has produced specify why: the cycle-coupling Ricardo's theorem requires is reconstructable at scale only where the institutional architecture maintaining the coupling is deliberately constructed and maintained, and the contemporary Western order's algorithmic-trading infrastructure has produced the cycle-mismatch foreclosing the coupling at the order's dominant capital-allocation level. The Chinese order's R1-R2-R3 satisfaction operates through institutional architectures the libertarian tradition's broader analysis identifies as the failure case for the broader conditions; the Western order's R1-R2-R3 failure operates through the cycle-mismatch the cybernetic results identify as foreclosing the cycle-coupling the conditions require. The inversion is the empirical consequence of the mechanism dynamics the analysis has identified.

The second-pass composite registers what the first pass could not register. The conditions' failures are not contingent failures that institutional adjustment within the framework would remedy. The failures follow from the regulator-substrate cycle-mismatch operating across the algorithmic-trading-and-platform infrastructure the order has been built into, from the LCD-attractor dynamics operating at the platform-substrate level, and from the absorption-attenuation-decomposition dynamics operating at the institutional-architectural level. The mechanisms operate jointly. The failures the empirical record indicates are the empirical signature the joint operation produces.

The cycle-mismatch foreclosure the horizon-mismatch theorem specifies, operating at the financialised price-formation system, is the casino architecture Chapter 9 documents at the empirical level. The cycle-mismatch foreclosure operating across the productive substrates the order's continued operation depends on is the cannibalisation cascade Chapter 10 documents across eight substrates. The existential-phenomenological register the casino and cascade place in view, the mode of revealing under which the architecture's substrate-decoupled optimisation appears to those operating inside the architecture as the world rather than as one architectural option among others, is the *Gestell* analysis the Epilogue supplies.

The chapter has produced findings the resources the prior chapters constructed have permitted. The findings stand at the structural-mechanism level. The diagnostic findings the structural mechanisms place in view belong to the chapters that follow.

Chapter 8 conducts the parallel second-pass examination on the contemporary Chinese order, with the same resources, the same documentary discipline, the same evidentiary standard. The Chinese second-pass examination will produce findings the Western examination alone cannot produce, because the Chinese order operates through institutional architectures distinct from the Western order's. The two second-pass examinations together produce the empirical-and-structural-mechanism record the diagnostic chapters of Part IV deploy.

CHAPTER 8

The Chinese Order, Second-Pass Test

8.0 What This Chapter Does

Chapter 3 conducted the first-pass test of the contemporary Chinese order against the thirty-one conditions extracted in Chapter 1. The first pass used the libertarian tradition's own analytical resources, applied to the documentary record on the Chinese order's operation across the period since the late 1970s. R1, R2, R3 were found obtaining through state-directed institutional architectures, producing the Ricardian inversion the chapter registered as its central comparative finding. The broader libertarian conditions were found failing through institutional patterns distinct from the Western order's failure patterns: the Chinese order's failures operate through institutional engineering and the integration of state and producer interests; the Western order's failures operate through the institutional sequence Chapter 2 documented.

Chapter 3 closed with a question parallel to the question Chapter 2 placed in view. The question was why the Chinese order satisfies the Ricardian conditions, why the broader libertarian conditions fail in the specific institutional patterns the chapter registered, and what mechanism produces the differential between the Western and Chinese failures of the same conditions. Chapter 7 conducted the second-pass examination of the Western order and produced structural-mechanism findings the first pass could not produce. The present chapter conducts the parallel second-pass examination of the Chinese order.

The chapter deploys the same cybernetic results and Ellul's analysis Chapter 7 deployed. The same evidentiary discipline applies. The chapter does not introduce new conditions, new empirical material, or new analytical frameworks. It returns to the Chinese order with the resources the prior chapters constructed, and conducts the examination they permit.

Two constraints carry from Chapter 3 and must be restated at the chapter's opening. The chapter is strictly diagnostic. The chapter does not claim that the Chinese order is preferable to the Western order on any dimension the chapter does not assess. The protections of individual liberty, the rule of law and constraints on arbitrary state action, the institutional accessibility of public discourse to non-aligned voices, the institutional redress available to those harmed by state action, and the long-cycle questions of stability across leadership transitions are dimensions the comparative-politics literature addresses through analytical resources the present examination does not deploy (Pei 2006, *China's Trapped Transition*, Harvard University Press; Minzner 2018, *End of an Era*, Oxford University Press; Shirk 2007, *China: Fragile Superpower*, Oxford University Press; McGregor 2010, *The Party*, Harper; King, Pan, and Roberts 2013, *American Political Science Review* 107(2), pp. 326–343; Repnikova 2017, *Media Politics in China*, Cambridge University Press). The chapter's findings, whatever they turn out to be, do not licence conclusions about the Chinese order on dimensions the examination does not address.

The chapter does not yet deploy the phenomenological-ontological level Heidegger's analysis supplies; that is constructed in the Epilogue.

8.1 The Architectural Difference at the Cycle-Coupling Level

The cybernetic results identify a structural difference between the Western order's regulator-substrate architecture and the Chinese order's that the first pass did not specify at the cycle-coupling level. The difference is the chapter's analytical entry point.

The Western order's dominant regulator-substrate architecture, as Chapter 7 §7.3 specified, operates through the algorithmic-trading-and-platform infrastructure that has been built across the four decades since the late 1970s. The infrastructure's action-cycles operate at microsecond-to-second resolutions. The substrates the infrastructure operates against (productive capacity, engineering culture, human capital, ecological substrates, infrastructure systems) operate at year-to-decade-to-century cycles. The cycle ratio is approximately 10^7 to 10^11 depending on the substrate. The horizon-mismatch theorem applies. The Conant-Ashby modelling condition is foreclosed when the cycles are mismatched.

The Chinese order's dominant regulator-substrate architecture operates through a different institutional apparatus. The State Council, the Plan-system industrial-policy framework, the cadre-evaluation system, the state-owned-enterprise apparatus, the People's Bank of China's coordination of credit allocation, and the local-government-financing-vehicle architecture together constitute the regulator-substrate architecture the Chinese order operates through (Naughton 2018, *The Chinese Economy: Adaptation and Growth*, MIT Press, second edition, especially Chapters 12, 14, 18, 19; Lardy 2019, *The State Strikes Back*, Peterson Institute, especially Chapters 1–4; Pearson, Rithmire, and Tsai 2021, *Current History* 120(827), pp. 207–213).

The action-cycles of the Chinese state-coordination machinery are substantially longer than the action-cycles of the Western algorithmic-trading infrastructure. The Five-Year-Plan apparatus operates at five-year cycles. The cadre-evaluation system operates at annual-to-multi-year cycles, with the cadre's performance evaluated against metrics aggregated over multi-year periods (Xu 2011, "The Fundamental Institutions of China's Reforms and Development", *Journal of Economic Literature* 49(4), pp. 1076–1151, on the cadre-evaluation architecture; Ang 2016, *How China Escaped the Poverty Trap*, Cornell University Press, on the development-state machinery). Industrial-policy decisions are conducted at multi-year cycles. The People's Bank of China's coordination of credit allocation operates at quarterly-to-annual cycles for the major policy decisions and at multi-year cycles for the broader structural orientation. The local-government-financing-vehicle architecture operates at multi-year cycles for major infrastructure decisions.

The cycle-coupling at the Chinese state-coordination machinery is therefore substantially better matched to substrate-cycles for the substrates it operates against. The infrastructure substrate (capital-equipment cycles, infrastructure development, the institutional architecture of the development state) operates at multi-year cycles that the state-coordination action-cycle is approximately matched to. The industrial-cluster substrate (the bounded productive units the cluster system Chapter §3.3 documented) operates at multi-year-to-decade cycles that the state-coordination is approximately matched to. The human-capital substrate operating through the *hukou* system and the broader educational-and-credentialing architecture operates at decade-cycles that the state-coordination is, in part, calibrated to.

The cycle-coupling at the consumer-goods-sector substrate is, by contrast, less well-matched. The consumer-goods sector in the Chinese order operates through the platform-mediated commerce architecture (Alibaba's Taobao and Tmall, JD.com, Pinduoduo, Meituan) that Chapter 3 §3.4 documented. The platform-mediated architecture operates at the same microsecond-to-second action-cycles the Western platform-mediated architecture operates at, with the same cycle-mismatches against the moral-psychological and reputational-architecture substrates the Smith conditions address. The Chinese consumer-goods-sector regulator-substrate coupling is, on the cybernetic analysis, similar to the Western consumer-goods-sector coupling.

The architectural difference at the cycle-coupling level specifies why the Chinese order satisfies the Ricardian conditions where the Western order does not. The Ricardian conditions concern substrate-cycles (capital-allocation across years and decades, labour-mobility across years and decades, bounded-economy cost-structures across years and decades) the Chinese state-coordination action-cycles are approximately matched to and the Western algorithmic-trading infrastructure's action-cycles are not. The horizon-mismatch theorem applies in opposite directions across the two orders for these substrates. The structural-mechanism specification of the Ricardian inversion is the cycle-coupling difference between the two orders' dominant regulator-substrate architectures.

The architectural difference does not extend to all the libertarian tradition's broader conditions. The state-coordination cycle-coupling produces mechanism dynamics distinct from the Western cycle-mismatch dynamics, with the dynamics producing the structural-mechanism findings the subsequent sections register against the broader conditions.

8.2 The Ricardian Conditions Re-Examined

The first pass found R1 (capital immobility between nations) satisfied through the Chinese state-directed banking architecture. R2 (asymmetric labour mobility) satisfied through the *hukou* system. R3 (bounded national economies as operative unit) satisfied through the industrial-cluster system. The cybernetic apparatus permits the mechanism's specification of the three findings.

R1 Re-Examined

The state-directed banking architecture is a regulator coupled to the substrate of capital allocation across productive uses and across borders. The regulator's action-cycle is the cycle at which the major capital-allocation decisions are made: quarterly for the PBOC's principal monetary-policy decisions, annual-to-multi-year for the broader sectoral-allocation decisions, and multi-year for the structural-orientation decisions the Plan-system apparatus conducts (Naughton 2018, Chapter 19 on the banking architecture; Pettis 2013, *The Great Rebalancing*, Princeton University Press, Chapter 4 on the institutional architecture of capital allocation). The substrate-cycle the regulator is coupled to is the cycle at which productive capital-allocation operates: years for working-capital cycles, decades for capital-equipment cycles, multi-decade for infrastructure cycles, multi-decade for the institutional architecture of the development state. The cycle-coupling at the multi-year-to-decade level is approximately matched.

The Conant-Ashby modelling condition is approximately satisfiable at this cycle-coupling. The regulator's internal model of the productive substrate can represent state changes at the substrate's own cycle, because the regulator's action-cycle is calibrated to the cycles the conditions operate on. R1's satisfaction at the structural-mechanism level is the cybernetic consequence of the cycle-coupling between the state-coordination machinery and the capital-allocation substrate the condition operates on.

The structural-mechanism finding qualifies in two respects.

The first qualification is that the regulator's model is the model the state-coordination machinery's internal metrics admit. The metrics include sectoral-allocation targets, infrastructure-development indicators, employment metrics, productive-capacity targets, the broader Plan-system metrics. The substrate-coupled features the metrics admit are the features the institutional-categorisation framework registers. Ellul's analysis identifies the institutional-totality signature: the state-coordination machinery exhibits the seven characteristics of *technique* (rational, artificial, automatic, self-augmenting, monistic, universalising, autonomous) at the institutional-totality level, with the continued operation producing the categorisation framework through which the substrate is registered.

The second qualification is that the regulator's model produces convergence on the metric-categorisation framework's optimisation targets. The LCD attractor from §6.5.1 applies at the state-coordination level: optimisation operations against the substrate's response distribution converge on the region of the substrate's response distribution that produces the highest-amplitude, lowest-variance, most-predictable signal output per unit of regulator input. The convergence is the cybernetic mechanism through which the state's metrics drive the substrate's response distribution toward the metric-optimal configuration. The configuration is the configuration the metric admits; alternative configurations the metric does not admit are not configurations the continued operation produces.

The structural-mechanism finding on R1 is therefore that the condition is satisfied through the cycle-coupling between the state-coordination machinery's action-cycle and the substrate-cycle the condition operates on, with the satisfaction operating through an institutional architecture whose institutional-totality signature is the *technique* signature Ellul's analysis identifies. The condition's satisfaction is the cybernetic consequence of the cycle-coupling; the institutional features are the *technique* signature operating at the state-coordination level.

R2 Re-Examined

The *hukou* system is a regulator coupled to the substrate of internal labour mobility. The regulator's action-cycle is the multi-year cycle at which the major *hukou* policy decisions are made and at which the local-administrative apparatus operates the public-service-allocation decisions through which the *hukou* classification has institutional consequences (Naughton 2018, Chapter 6; Chan 2010, *Population and Development Review* 36(2), pp. 357–364; on the contemporary operations, Chan and Selden 2014, *Critical Asian Studies* 46(4), pp. 599-620). The substrate-cycle the regulator is coupled to is the labour-mobility cycle: the cycle at which workers relocate between regions, between rural and urban sectors, and between industries. The substrate-cycle operates at year-to-decade timescales.

The cycle-coupling at the multi-year level is approximately matched. The Conant-Ashby modelling condition is approximately satisfiable. R2's satisfaction at the structural-mechanism level is the cybernetic consequence of the cycle-coupling between the regulator's action-cycle and the substrate-cycle the condition operates on.

The same qualifications apply: the regulator's model is the model the state's internal metrics admit; the LCD attractor produces convergence on the metric-categorisation framework's optimisation targets. The labour-mobility patterns the substrate exhibits are the patterns the metrics admit and that continued operation produces.

R3 Re-Examined

The industrial-cluster system is a regulator coupled to the substrate of bounded productive units. The regulator's action-cycle is the multi-year cycle at which the industrial-policy decisions are made and at which the state-coordinated capital allocation, infrastructure provision, and institutional-architecture decisions through which the cluster system is constructed and maintained operate (Naughton 2021, *The Rise of China's Industrial Policy 1978 to 2020*, Centro de Estudios China-México, Universidad Nacional Autónoma de México; Wang Jinmin 2014, *Institutional Change and the Development of Industrial Clusters in China*, World Scientific; Ang 2016 on the development-state machinery). The substrate-cycle is the cycle at which industrial-cluster development occurs: multi-year for cluster establishment, multi-year-to-decade for cluster consolidation and specialisation, multi-decade for the broader industrial-architectural transformation the cluster system has produced.

The cycle-coupling at the multi-year level is approximately matched. R3's satisfaction at the structural-mechanism level is the cybernetic consequence of the cycle-coupling between the regulator's

action-cycle and the substrate-cycle the condition operates on.

Composite Finding on the Ricardian Conditions

The Ricardian conditions are satisfied in the Chinese order through a regulator-substrate architecture whose cycle-coupling at the multi-year level approximately satisfies the Conant-Ashby modelling condition at the substrate's own cycle. The satisfaction is the cybernetic consequence of the architectural difference §8.1 specified. The contemporary Western order's algorithmic-trading infrastructure's cycle-mismatch forecloses the same coupling; the Chinese state-coordination cycle-coupling does not foreclose it.

The institutional-totality signature of the architecture through which the Chinese order satisfies the Ricardian conditions is the *technique* signature Ellul's analysis identifies. The seven characteristics operate at the state-coordination level. The LCD attractor operates at the optimisation level. The three-mechanism dynamic operates at the reform-attempt level the Chinese order's contemporary phase has begun to encounter.

The Ricardian inversion the comparative-empirical record registered is therefore not a contingent feature of the two orders' political-institutional differences. The inversion is the mechanism's consequence of the architectural difference at the cycle-coupling level: the Ricardian conditions are reconstructable at scale only where the regulator-substrate cycle-coupling the conditions require is maintained as a deliberate institutional architecture, and the architectures that maintain the coupling exhibit the *technique* signature at the institutional-totality level.

The finding has a consequence the subsequent sections develop. The condition's satisfaction at the Chinese order does not exempt the satisfying architecture from the institutional-totality signature. The architecture that satisfies R1, R2, R3 satisfies them through an institutional totality whose operations exhibit the seven characteristics of *technique* and whose optimisation operations converge on the LCD attractor's substrate-level signature. The satisfaction of the Ricardian conditions does not produce the broader satisfaction the libertarian tradition's conditions specify; the architecture that satisfies the Ricardian conditions is itself an instance of the institutional-totality the broader conditions are addressed against.

8.3 Smith, Bastiat, and the Austrian Conditions Re-Examined

Smith's Conditions

The first pass found S1 (moral embeddedness) and S2 (local proximity) not satisfied at the level of the dominant consumer-goods exchange forms. The Chinese consumer-goods sector operates through platform-mediated commerce with the same producer-consumer separation Chapter 7 §7.2 examined for the Western order. The structural-mechanism finding is the same: the platform-rating regulator's cycle-mismatch with the moral-psychological substrate forecloses the substrate-coupling the conditions require. The LCD attractor produces convergence on the substrate's response distribution's metric-optimal region. The Ellulian apparatus identifies the institutional-totality signature of the platform-mediated architecture.

S3 (legal disfavour of producer coordination) was satisfied in narrow reading and failed in broad reading. The finding follows from the institutional-totality analysis. The Chinese order's central operating principle is the integration of state and producer interests through the Plan-system industrial-policy apparatus (Naughton 2018, Chapters 14–15; Lardy 2019, Chapters 2–4 on the post-2012 state reassertion; Pearson, Rithmire, and Tsai 2021 on party-state capitalism). The integration is not the explicit producer-cartel pattern S3's narrow reading is addressed against; the integration is the institutional architecture under which state and producer interests operate as coordinated agents within the same institutional totality. The Ellulian apparatus identifies the institutional-totality signature: the seven characteristics of *technique* operate at the state-producer integration register, with the apparatus's continued life producing the integration as the institutional-architectural form

available to participants. The broad reading of S3 the first pass found failing is the reading the institutional-totality structure excludes by the structural mechanism the apparatus identifies.

S4 (reputational propagation) operates through a form distinct from both Smith's specification and the Western platform pattern. The Chinese order's reputational architecture is partly state-administered (through the social-credit apparatus and the state-coordinated rating systems) and partly platform-administered (through the major Chinese platforms' rating systems). The finding follows from the cycle-coupling analysis. The state-administered components operate at action-cycles approximately matched to the multi-year cycles at which social-credit and reputational-classification decisions consolidate; the platform-administered components operate at the same microsecond-to-second action-cycles the Western platforms operate at, with the same cycle-mismatch against the moral-psychological substrate. The architecture's two registers exhibit different mechanism signatures, with the state-administered register operating through approximately matched cycle-coupling and the platform-administered register operating through the cycle-mismatch the Western second-pass analysis identified.

Bastiat's Conditions

The first pass found B1 (visibility of consequences) constrained by the state's information-control architecture. The finding follows from the institutional-totality analysis. The information-control architecture is, in Ellul's vocabulary, a technical apparatus whose continued operation produces the categorisation framework through which information about consequences is admitted into public discourse (King, Pan, and Roberts 2013 on the information-control architecture; Repnikova 2017 on the media-political dynamics). The structural-mechanism finding parallels B1's Western finding in form but operates through a different architectural mechanism: the Western architecture's failure operates through the cycle-mismatch between the disclosure architecture and the moment-of-evaluation platform interface; the Chinese architecture's failure operates through the institutional-totality apparatus's information-categorisation operations.

B2 (productive versus extractive expenditure) was found obtaining across the principal growth phase and raising questions in the contemporary phase. The finding follows from the cycle-coupling analysis. The Chinese state-coordination cycle-coupling at the multi-year level supported the substrate-coupled productive investment pattern the first pass documented across the period from approximately 1980 through approximately 2014 (Naughton 2018, Chapter 7 on the investment pattern; Ang 2016 on the development-state architecture). The contemporary phase from approximately 2014 onward exhibits patterns the first pass registered as raising questions: the post-2014 expansion of property-sector investment, the local-government financing-vehicle expansion, and the post-2020 property-sector crisis (Pettis's Carnegie analyses across 2018–2024; Pei 2016, *China's Crony Capitalism: The Dynamics of Regime Decay*, Harvard University Press, on the contemporary-phase analytical framework). The structural-mechanism finding is that the cycle-coupling that supported B2's satisfaction across the principal growth phase has been partially displaced in the contemporary phase by financialisation patterns operating at action-cycles shorter than the state-coordination principal action-cycle. The contemporary-phase question the first pass placed in view is, on the mechanism analysis, a question about whether the cycle-coupling that supported B2's satisfaction is being displaced by the cycle-mismatch dynamics the Western second-pass analysis identified.

B3 (foreclosed-trajectory registration) operates through the state's administrative review apparatus rather than through the private-acquisition pattern Chapter 2 §2.3 documented for the Western order. The finding follows from the institutional-totality analysis. The state's administrative review apparatus operates as a regulator coupled to the substrate of corporate-architectural decisions. The regulator's action-cycle is approximately matched to the multi-year cycles at which major acquisition decisions consolidate. The Conant-Ashby modelling condition is approximately satisfiable at the cycle-coupling. The qualification the R1 analysis applied also applies here: the regulator's model is the model the state-coordination internal metrics admit, with the trajectory-foreclosure questions registered through the institutional-categorisation framework.

The Austrian Conditions

The first pass found A1 (calculation through prices generated by exchange) satisfied at the consumer-goods sector and attenuated in strategic sectors. The finding follows from the cycle-coupling analysis. The consumer-goods sector operates through platform-mediated price formation with the same cycle-mismatches the Western second-pass analysis identified; the strategic sectors operate through state-coordinated administrative pricing with cycle-coupling approximately matched to the substrate the prices are coupled to. The asymmetric finding the first pass registered is the mechanism's consequence of the architectural difference at the cycle-coupling level operating differently across the two sector categories.

A2 (knowledge dispersed in substrate-coupled form) obtains. The structural-mechanism finding is that what the condition addresses, the dispersed substrate-coupled knowledge of situated agents, is what the conditions are tests for; the dispersed knowledge's existence is not the question; the question is whether the regulator-substrate coupling permits that knowledge to be aggregated into the coordinating signals A3 specifies.

A3 (price mechanism aggregating dispersed substrate-coupled knowledge) was found attenuated in the consumer-goods sector and failing in strategic sectors. The finding follows from the cycle-coupling and the institutional-totality analyses jointly. In the consumer-goods sector, the same A3-failure mechanism the Western second-pass analysis identified operates: the platform-mediated price-formation regulator's cycle-mismatch with the productive-substrate cycle forecloses the aggregation A3 specifies. In the strategic sectors, A3's failure operates through a different mechanism: the prices are administratively set rather than aggregated from exchange, with the administrative-pricing architecture operating through the cycle-coupling between the state-coordination action-cycle and the substrate the prices are coupled to. The administrative-pricing architecture performs cycle-coupled regulation at the multi-year level but does not perform the substrate-coupled aggregation A3 specifies (the aggregation through dispersed-agent exchange). The two mechanisms produce A3's failure through different structural pathways the analytical resources identify.

A4 (entrepreneurial alertness) was found obtaining in the consumer-goods sector and foreclosed in strategic sectors. The finding follows from the institutional-totality and three-mechanism analyses. The consumer-goods sector exhibits the same A4 dynamics the Western analysis identified, with the LCD-attractor and three-mechanism mechanisms operating against entrepreneurial entry. The strategic sectors exhibit a distinct mechanism: the state-coordination institutional-totality structure forecloses entrepreneurial entry through its continued operation, with the three-mechanism dynamic operating against attempts at entry the structure does not admit. The 2020–2021 anti-monopoly actions against the Chinese platform companies (Pearson, Rithmire, and Tsai 2021) operate as the state's response to platform-sector concentration that conflicted with state-priority alignment, with the response operating through the institutional-totality structure rather than through the structural-competition framework A4's Western analysis identified.

A5 (dynamic market process) inherits from A3 and A4. A6 (the order produced as *kosmos* rather than *taxis*) was found not satisfied; the order is acknowledged as *taxis* in the order's own discourse. The structural-mechanism finding is that the architectural acknowledgment is consistent with the institutional architecture the order operates through: the state-coordination architecture is *taxis* by the order's own institutional self-description, and its institutional-totality features are the *technique* signature operating at the *taxis*-acknowledged level.

8.4 Friedman, Sowell, Rothbard, Rand Re-Examined

F1 (monetary stability) was found obtaining at the consumer-price level and raising questions at the asset-price level in the contemporary phase. The finding follows from the cycle-coupling analysis. The PBOC's coordination of monetary policy operates at quarterly-to-annual action-cycles approximately matched to consumer-price formation cycles. The asset-price level in the contemporary phase, particularly in the property sector, exhibits patterns at action-cycles substantially shorter than the PBOC's principal action-cycle (Pettis's Carnegie analyses on the property-sector dynamics). The structural-mechanism finding parallels the F1-asset-price-level finding for the Western order: the cycle-mismatch between the regulator's action-cycle and the substrate's variation-cycle operates at the asset-price level, with the contemporary-phase dynamics raising the questions the first pass registered.

F2 (substantive consumer sovereignty) was found attenuated in the consumer-goods sector and foreclosed in administered sectors. The finding follows from the analyses already conducted. F3 (structural openness of competition) inherits from F2 and A4. F4 (anti-monopoly vigilance) operates with Plan-priority alignment as the enforcement criterion; the structural-mechanism finding is that the institutional-totality structure produces the enforcement framework continued operation admits, with the Plan-priority alignment being the substantive criterion rather than the structural-competition criterion Friedman's argument specifies. F5 (design against regulatory capture) was found not satisfied; the integration is the order's central principle. The structural-mechanism finding is the institutional-totality analysis: the integration the condition was articulated against is the institutional-architectural form continued state operation produces and reproduces.

So1 (prices as messengers) inherits from A3. So2 (profit-and-loss discipline) was found attenuated across state-coordinated sectors. The finding follows from the cycle-coupling and institutional-totality analyses. The state-coordinated sectors operate through cycle-coupling at the multi-year level, with the discipline of consequences operating through the institutional-categorisation framework rather than through the bearing-of-consequences mechanism Sowell's argument specifies (Naughton 2018, Chapter 14 on the SOE architecture; Lardy 2019, Chapter 3 on the post-2012 SOE realignment). The state-financial backstop and policy-coordinated lending are the mechanisms through which continued state operation insulates the state-coordinated sectors from the substrate-coupled discipline the condition specifies.

So3 (voluntary exchange with substantive alternatives) inherits from F2. So4 (knowledge dispersed and local) parallels A2 and obtains. Ro1 (substantive voluntariness) was found not satisfied; the structural-mechanism finding is the institutional-totality analysis: the institutional architecture the order operates through includes state-coordination at scales the substantive-voluntariness condition is articulated against.

Ro2 (methodological examination of the order to determine market versus state capitalism) is the condition the present chapter is itself satisfying through its empirical examination, alongside Chapter 7. The Chinese order's character is acknowledged in its own discourse; the mechanism analysis the chapter has produced specifies the architectural features the acknowledgment registers.

Ro3 (absence of state-granted privileges producing state capitalism) was found not satisfied; the integration is the order's central principle. The finding follows from the institutional-totality analysis. The Chinese order is, on Rothbard's own classification, state capitalism. The structural-mechanism finding qualifies the first-pass finding at the institutional-totality level: the institutional architecture through which the integration operates is the *technique* architecture Ellul's analysis identifies, with continued operation producing the integration as the institutional-architectural form available to participants.

Ra1 (productive achievement rewarded) was found obtaining across the principal growth phase. The structural-mechanism finding parallels B2: the cycle-coupling that supported productive-versus-extractive expenditure across the principal growth phase has been partially displaced in the contemporary phase by financialisation dynamics operating at action-cycles shorter than the state-coordination principal action-cycle. Ra2 (separation of economic and political power) was found not satisfied; the integration is the order's central principle. The structural-mechanism finding is the institutional-totality analysis. Ra3 (productive achievement

structurally advantaged) inherits from Ra1 and B2.

8.5 The Second-Pass Composite Finding for the Chinese Order

The chapter has re-examined the thirty-one conditions Chapter 3's first pass examined, with the cybernetic results from Chapter 5 and Ellul's analysis from Chapter 6 deployed against the empirical record on the Chinese order. The structural-mechanism findings can be presented in composite form.

The first-pass findings registered in Chapter 3's §3.6 composite are unchanged at the empirical level. The conditions that obtained at the first pass continue to obtain at the empirical level. The conditions that failed at the first pass continue to fail at the empirical level.

The second pass produces structural-mechanism findings in four categories.

The first category is the mechanism's specification of the Ricardian conditions' satisfaction in the Chinese order. R1, R2, R3 are satisfied through a regulator-substrate architecture whose cycle-coupling at the multi-year level approximately satisfies the Conant-Ashby modelling condition at the substrate's own cycle. The satisfaction is the cybernetic consequence of the architectural difference at the cycle-coupling level §8.1 specified. The contemporary Western order's algorithmic-trading infrastructure's cycle-mismatch forecloses the same coupling; the Chinese state-coordination cycle-coupling does not foreclose it.

The second category is the mechanism's specification of the broader libertarian conditions' failures in the Chinese order. The conditions fail through institutional patterns the analysis identifies: the institutional-totality signature of the state-coordination architecture (the seven characteristics of *technique* operating at the state-coordination level), the LCD-attractor convergence at the optimisation level, the three-mechanism dynamic operating at the reform-attempt level. The institutional-architectural failures (S3 broad reading, F4 anti-monopoly vigilance, F5 design against capture, Ro1 substantive voluntariness, Ro3 state capitalism, Ra2 separation of economic and political power) operate through the institutional-totality structure that produces the integration the broader conditions are articulated against. The platform-sector failures (S1, S2, S4 platform level, A3 consumer-goods sector, A4 consumer-goods sector, F2 consumer-goods sector) operate through the same cycle-mismatch dynamics the Western second-pass analysis identified, with the Chinese platform-mediated commerce architecture exhibiting the same mechanism signature the Western platform-mediated commerce architecture exhibits.

The third category is the structural-mechanism finding on the consumer-goods-sector parallel between the two orders. The Chinese consumer-goods-sector platform-mediated architecture and the Western consumer-goods-sector platform-mediated architecture exhibit the same cycle-mismatch dynamics and the same LCD-attractor and three-mechanism dynamics. The two orders' broader regulator-substrate architectures differ at the strategic-sector level, where the Chinese state-coordination cycle-coupling produces mechanism dynamics distinct from the Western algorithmic-trading infrastructure's. The two orders' consumer-goods-sector architectures do not differ at the structural-mechanism level the cybernetic analysis identifies.

The fourth category is the structural-mechanism finding on the contemporary-phase dynamics. The first pass registered that the contemporary phase of the Chinese order (approximately 2014 onward) exhibits patterns raising the questions the principal-growth-phase findings did not raise: the post-2014 property-sector expansion, the local-government financing-vehicle expansion, the post-2020 property-sector crisis. The structural-mechanism finding is that the contemporary-phase patterns operate at action-cycles shorter than the state-coordination principal action-cycle, with the cycle-mismatch dynamics the Western second-pass analysis identified beginning to operate in the Chinese order's contemporary-phase financialisation. The mechanism analysis does not predict whether the cycle-mismatch dynamics will continue to operate or whether the state-coordination machinery will reassert the cycle-coupling at the multi-year level. The chapter registers the contemporary-phase question without resolving it.

The chapter has produced findings the resources the prior chapters constructed have permitted. The findings stand at the structural-mechanism level. The diagnostic findings the structural mechanisms place in view belong to the chapters that follow.

8.6 The Comparative Second-Pass Finding

The two second-pass examinations together produce a comparative finding that neither examination alone could produce. The finding can be stated in compact form.

The two orders' regulator-substrate architectures differ at the cycle-coupling level in their strategic-sector operations. The Western order's algorithmic-trading-and-platform infrastructure operates at microsecond-to-second action-cycles against year-to-decade substrate-cycles, producing the cycle-mismatch the Western second-pass analysis specified. The Chinese order's state-coordination machinery operates at multi-year action-cycles approximately matched to multi-year substrate-cycles, producing the cycle-coupling the Chinese second-pass analysis specified. The architectural difference is the mechanism's specification of the Ricardian inversion the comparative-empirical record registered.

The two orders' regulator-substrate architectures do not differ at the consumer-goods-sector level. Both orders' consumer-goods sectors operate through platform-mediated commerce architectures exhibiting the same cycle-mismatch dynamics, the same LCD-attractor and three-mechanism dynamics, and the same mechanism signature.

The two orders' institutional-totality signatures match in shape. Both orders' institutional architectures exhibit the seven characteristics of *technique* Ellul's analysis identifies. Both exhibit the LCD-attractor convergence the cybernetic specification of *autoaccroissement* identifies. Both exhibit the three-mechanism absorption-attenuation-decomposition pattern Ellul's analysis identifies in reform-attempt cases. The institutional-totality signature is not the differential between the two orders; the institutional-totality signature is the common feature the two orders share at the structural-mechanism level.

The comparative finding is therefore the following. The two contemporary dominant orders share the institutional-totality signature the analysis identifies. The two orders differ at the cycle-coupling level in their strategic-sector operations, with the architectural difference producing the Ricardian inversion as its mechanism's consequence. The two orders' consumer-goods-sector operations do not differ at the structural-mechanism level. The two orders' broader libertarian-tradition conditions fail through distinct institutional patterns at the empirical level and through structural-mechanism findings that share the institutional-totality signature at the analytical level.

Neither order satisfies the broader libertarian conditions. Neither order is the order the libertarian tradition's economic theorems describe. The order the tradition's vocabulary describes, which is decentralised coordination through dispersed agents whose substrate-coupled situated knowledge the price mechanism aggregates, with capital and labour and the bounded productive unit operating through the conditions Ricardo and Smith and Hayek and Friedman identified, does not exist at scale in either contemporary order. The institutional architecture required to produce such an order does not exist; the contemporary dominant orders operate through institutional-totality architectures the analysis the chapter has produced identifies as the structural-mechanism feature both orders share.

The Ricardian inversion is therefore not the only comparative finding the two second-pass examinations produce. The architectural-comparative finding is that both orders, at the institutional-totality level, exhibit the mechanism signature the analysis identifies, and that neither order's institutional architecture produces the broader libertarian-tradition conditions through any mechanism the analysis admits as a substrate-coupled satisfaction of the conditions Smith and the Austrians and Friedman specified.

The shared institutional-totality signature the comparative finding registers is the structural-mechanism specification on which the diagnostic chapters of Part IV build. The cycle-mismatch foreclosure operating at the financialised price-formation system the consumer-goods sectors of both orders run on is the casino architecture Chapter 9 documents. The cycle-mismatch foreclosure operating across the productive substrates the orders' continued operation depends on, across substrates whose replenishment cycles the regulators' action-cycles cannot reach, is the cannibalisation cascade Chapter 10 documents across eight substrates. The existential-phenomenological register the casino and cascade place in view, the mode of revealing under which the architecture's substrate-decoupled optimisation appears to those operating inside the architecture as the world rather than as one architectural option among others, is the *Gestell* analysis the Epilogue supplies.

The chapter has produced the comparative second-pass finding. The diagnostic findings the comparative finding places in view belong to the chapters that follow.

Part IV: The Diagnostic Findings

CHAPTER 9

The Casino

9.0 What This Chapter Asks

The libertarian tradition's defence of the contemporary economic order rests on Hayek's argument (Hayek 1945, "The Use of Knowledge in Society", *American Economic Review* 35(4), pp. 519-530) that prices, formed through the exchanges of dispersed agents, aggregate the substrate-coupled knowledge those agents have about real productive conditions. The farmer who knows the soil, the merchant who knows the local demand, the engineer who knows the production process: each carries tacit knowledge no central planner can extract. Each acts. Each transaction is a vote. The price is the running aggregate of those votes. The signal carries, in compressed form, what the dispersed participants collectively know about the world. That, on Hayek's reading, is what makes a market cybernetically superior to a plan.

The chapter takes the case the libertarian tradition's defenders are pointing at when they describe the contemporary order as the realisation of this argument. The case is the contemporary financialised price-formation system, encountered on its own terms. The aggregation mechanism still operates. Prices are still formed. Exchanges still occur. These features of the contemporary order are present, and the chapter is not denying that they are present. The question the chapter takes up is what the aggregation now aggregates, with the inspection conducted through the cybernetic results Chapter 5 constructed and the historical record of the order's institutional development across the period from approximately 1971 to the present.

The empirical record the chapter works with is drawn from the principal literatures on the post-1971 institutional and infrastructural development of price formation in the dominant Western markets. Shiller 1981, in the *American Economic Review* 71(3), pp. 421-436, documented variance properties of the major equity-price record across the twentieth century. MacKenzie 2021, *Trading at the Speed of Light*, documents the high-frequency-trading architecture that has operated industrial-scale algorithmic price formation since the late 1990s, with operating speeds now constrained by the limits of light-in-vacuum across the physical distances between datacentres. Aquilina, Budish, and O'Neill 2022 in the *Quarterly Journal of Economics* 137(1), pp. 493-564, measured latency-arbitrage races at microsecond resolution across the FTSE 100 market data. The chapter draws on these and several adjacent literatures as the inspection requires.

9.1 What the Casino Is

The casino, in the chapter's specific sense, is a price-formation system in which the dominant variance of the price signal comes from the system's own internal dynamics rather than from substrate-value evolution. This is a mechanical specification. It says nothing about the moral character of the participants.

The colloquial word "casino" carries strong negative associations: gambling, vice, exploitation, the destruction of households by addiction. None of those associations are operative here. The chapter uses the term only because it is the most accurate one-word English label for the technical phenomenon. A casino in the gambling sense is a price-formation system whose price-output (the odds, the payouts, the spreads) is determined by the system's own internal mechanics rather than by anything happening outside the casino's walls. The roulette wheel's output is not tracking world conditions; it is tracking its own spin. That feature, transferred to a financial price-formation system, is what the chapter names. Whether the participants are vicious is not the chapter's concern. Whether the participants are honest, intelligent, well-trained, well-compensated, and acting in good faith does not change the feature. The mechanism produces what the mechanism produces regardless of the participants' character.

Three further clarifications make the concept precise.

The casino is a threshold condition, not a binary state. Every price-formation system aggregates some mixture of substrate-tracking signal and internal dynamics. The Hayekian price-formation system, operating well, has a small internal-dynamics component (the noise of the exchange process itself) and a large substrate-tracking component (the price moves because productive conditions move). The casino is the state in which those magnitudes have inverted: the internal-dynamics component has come to dominate, and the substrate-tracking component has receded to the order of noise. The chapter's task is to identify when the threshold has been crossed and what crosses it.

The casino is a phenomenon at the dominant operating cycle, not at the longest cycle. Multi-year and multi-decade price-movements continue to track substrate-value evolution to a substantial degree. Earnings, productive capacity, demographic change, technological transformation, and macroeconomic policy continue to enter the long-cycle component of the price signal. The casino names what is happening at the cycles where the dominant volume of contemporary trading occurs. At microsecond and nanosecond resolution, the dominant variance is internal. At quarterly resolution, the dominant variance is the cumulative effect of internal dynamics that have unfolded across millions of microsecond cycles. The substrate-tracking component is still there. It is not where the action is.

The casino is what the apparatus has produced, not what the participants intended. No participant designed the contemporary architecture as a casino. The architecture emerged from the cumulative deployment of cycle-compressing technologies (computerised order routing, electronic communication networks, programme trading, algorithmic execution, high-frequency trading, microsecond-resolution co-located server infrastructure) across the period from approximately 1971 to the present. The institutional and infrastructural history is documented across MacKenzie 2006 (*An Engine, Not a Camera: How Financial Models Shape Markets*, especially Chapters 4-6 on the institutional embedding of the Black-Scholes-Merton apparatus and the emergence of computerised trading); Krippner 2011 (*Capitalizing on Crisis: The Political Origins of the Rise of Finance*, especially Chapters 3-4 on the policy decisions of the 1970s and 1980s that produced the financialised order); Stein 2010 (*Pivotal Decade: How the United States Traded Factories for Finance in the Seventies*); and Lewis 2014 (*Flash Boys: A Wall Street Revolt*, on the late-2000s emergence of the contemporary HFT architecture). Each deployment was rational at its own register. The cumulative effect of the deployments crossed the threshold the chapter names. The casino is the structural outcome of cycle compression operating against substrates whose replenishment cycles have not changed.

9.2 The Platform: A Visible Instance

A reader who has not encountered the algorithmic-trading architecture can encounter the same structural phenomenon at the platform substrate, where the inversion is empirically visible without specialised vocabulary. The on-ramp is the major retail platform.

Amazon's price for a product is not the price a substrate-coupled aggregation of supplier costs and customer preferences would produce. Amazon's price is the price Amazon's optimisation algorithm produces. The algorithm is optimising against measurable signals: clicks, conversions, basket-additions, abandonment rates,

competitor prices, time-on-page, seasonal demand patterns, the customer's prior purchase history, the customer's prior browsing history, the customer's location, the customer's device, the inferred customer's price sensitivity. The optimisation produces a price for the product. The price is shown to the customer. The customer sees a price and acts on it.

What the customer sees is a price. What the price is doing is not what the libertarian tradition's defenders describe when they describe "the market." The libertarian description is that the price aggregates the dispersed knowledge of independent suppliers and independent customers, with the aggregation occurring through their voluntary exchanges. Amazon's price aggregates the optimisation operations Amazon's algorithm performs on the data Amazon has collected. The aggregation is happening; the substrate-coupled human participants are not the agents being aggregated. The price the customer encounters has been engineered by the platform's optimisation infrastructure.

The same structure operates at every major retail platform that uses algorithmic pricing and personalised recommendation. The empirical record across the platform substrate is documented in the academic and regulatory literature (Acquisti, Taylor, and Wagman 2016, "The Economics of Privacy", *Journal of Economic Literature* 54(2), pp. 442-492, on the price-discrimination economics; Wagner and Eidenmuller 2019, "Down by Algorithms? Siphoning Rents, Exploiting Biases, and Shaping Preferences", *University of Chicago Law Review* 86(2); the Federal Trade Commission's 2024 *Surveillance Pricing* staff report documenting the personalised-pricing infrastructure across the major U.S. retail platforms; the European Commission's 2018 *Consumer Market Study on Online Market Segmentation Through Personalised Pricing/Offers in the European Union*, conducted by Ipsos, London Economics and Deloitte for DG JUST, on the prevalence of personalised ranking and pricing across EU e-commerce). Alibaba's Taobao and Tmall produce product rankings and recommendations through optimisation against measurable engagement signals on the Chinese consumer substrate (Wang et al. 2018, 'Billion-scale Commodity Embedding for E-commerce Recommendation in Alibaba', *Proceedings of the 24th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining* (KDD '18), pp. 839-848). The eBay marketplace produces auction outcomes through ranking algorithms whose internal optimisations exceed any individual auction's substrate. The dynamic-pricing systems deployed by airlines, hotels, ride-share platforms, and ticket marketplaces operate on the same principle: the price is the algorithm's output against the platform's measurement frame, and the customer encounters the output as a market price (Chen, Mislove, and Wilson 2016, "An Empirical Analysis of Algorithmic Pricing on Amazon Marketplace", *Proceedings of the 25th International Conference on World Wide Web*, pp. 1339-1349, on the early documentation of the algorithmic-pricing infrastructure; Calvano, Calzolari, Denicolo, and Pastorello 2020, *American Economic Review* 110(10), pp. 3267-3297, on algorithmic collusion in pricing).

The platform case is the simpler instance because the inversion is visible. The customer can see, by examining the product across two devices, two locations, two browser histories, that the price they encounter differs from the price another customer encounters at the same moment for the same product. There is no single Hayekian price for the product. There are personalised optimisation outputs, one per customer. The price-formation system has been replaced. The aggregation infrastructure persists. What the aggregation aggregates is the platform's measurement frame's read of the customer, not the customer's substrate-coupled knowledge.

The financial substrate exhibits the same structural phenomenon at greater scale, with the dominant operating cycles compressed to microseconds and nanoseconds and the price-output dispersed back into the public price discovery mechanism the user-facing layer treats as "the market price."

9.2.1 The Architecture That Hosts the Algorithm: Gatekeeper Jurisdictions and the Absence of a Residual Market

The platform case admits a defender's response. The defender's response is that the algorithmic-pricing apparatus, however internally elaborated, is still operating against a market: customer demand signals, competitor prices, supplier costs, inventory levels, seasonal patterns. The defender concedes that the algorithm sets the displayed price, and concedes that the displayed price differs across customers, and concedes that the optimisation produces price-discrimination at scales the manual price-setter could not achieve. What the defender holds is that the inputs the algorithm reads are still substrate-coupled, that the algorithm is therefore still aggregating dispersed market knowledge in Hayek's sense, that the Hayekian argument operates through a computational layer rather than against a computational layer, and that the claim that the price no longer comes from the world is overreach.

The defender's response presupposes that the algorithm operates against a market external to the algorithmic apparatus. That presupposition does not hold at the dominant contemporary transactional substrates. At those substrates, the architecture inside which algorithmic pricing operates is not a market in the Hayekian sense but a privately-administered jurisdiction whose operator sets the conditions of price formation, discovery, ranking, fees, access, and exclusion. The Hayekian aggregation argument presupposed transactional architectures the contemporary order does not contain at the dominant substrates. The argument proceeds in three steps.

The dominant transactional substrates are privately-administered jurisdictions, not markets. The contemporary economy's principal transactional architectures are the Apple App Store, the Google Play Store, Amazon Marketplace, the search-mediated retail apparatus operating through Google Search, the social-platform commerce architecture operating through Meta, the creator-economy substrate operating through YouTube and TikTok, the payment substrate operating through the Visa-Mastercard duopoly, the cloud-infrastructure substrate operating through the Amazon Web Services, Microsoft Azure, and Google Cloud Platform trio, the rideshare substrate operating through Uber and Lyft, the short-term rental substrate operating through Airbnb, the digital-advertising substrate operating through the Meta-Google duopoly, and the institutional-financial trading substrate operating through the major exchanges' co-location apparatus. Each of these is a privately-administered jurisdiction whose operator sets the ranking algorithm, the visibility apparatus, the fee structure, the terms of service, the dispute-resolution apparatus, the payment terms, and the conditions of participant access and exclusion. The institutional analysis of the architecture is at Khan 2017 ("Amazon's Antitrust Paradox", *Yale Law Journal* 126(3), pp. 710-805); Khan 2019 ("The Separation of Platforms and Commerce", *Columbia Law Review* 119(4), pp. 973-1098); Crémer, de Montjoye, and Schweitzer 2019 (*Competition Policy for the Digital Era*, European Commission); the Stigler Center 2019 (*Stigler Committee on Digital Platforms: Final Report*); the U.S. House Judiciary Subcommittee on Antitrust 2020 (*Investigation of Competition in Digital Markets: Majority Staff Report and Recommendations*, especially pp. 11-22 on the structural definition of the digital-platform architecture); the analytical literature at Lynn 2017 (*Cornered: The New Monopoly Capitalism and the Economics of Destruction*); Lina Khan's contemporary regulatory record at the U.S. Federal Trade Commission across 2021-2024; the European Commission's *Digital Markets Act* (Regulation (EU) 2022/1925) formalising the gatekeeper category in European law.

The architecture is not "a market with rules." The architecture's operator sets what the rules are, sets who participates, sets what visibility participants have, sets what fees they pay, sets what they can communicate to their customers (Apple's anti-steering rules; the European Commission 2024 decision in Case AT.40437 documents the operative anti-steering apparatus across the App Store), and sets what algorithmic ranking and recommendation apparatus distributes attention across the participants. The Hayekian description of price formation presupposed an open transactional architecture inside which dispersed agents transacted under conditions the participants themselves did not set. The contemporary dominant transactional architectures invert this: the conditions of participation are set by the architecture's operator, and the participants encounter the architecture as a privately-administered jurisdiction whose conditions they cannot negotiate.

Inside these jurisdictions, the gatekeeper holds monopsony power over the participants whose continued operation depends on access. The structural-economic analysis of monopsony, the inverse of monopoly, runs

from Robinson 1933 (*The Economics of Imperfect Competition*) through the contemporary labour-economics literature consolidated at Manning 2003 (*Monopsony in Motion: Imperfect Competition in Labor Markets*); Naidu, Posner, and Weyl 2018 ("Antitrust Remedies for Labor Market Power", *Harvard Law Review* 132(2), pp. 536-601); Azar, Marinescu, and Steinbaum 2022 ("Labor Market Concentration", *Journal of Human Resources* 57(S), pp. S167-S199); and Steinbaum 2019 (*Roosevelt Institute Working Paper*, "Antitrust, the Gig Economy, and Labor Market Power for Platform Workers"). The contemporary gatekeeper combines monopsony power over participants in its jurisdiction with quasi-monopoly position in distribution to the end-user population. The combination is what the two-sided-market literature at Rochet and Tirole 2003 (*Journal of the European Economic Association* 1(4), pp. 990-1029) and Evans and Schmalensee 2016 (*Matchmakers: The New Economics of Multisided Platforms*) framed as neutral architecture, and what the contemporary political-economy literature at Khan 2017, Khan 2019, and Lynn 2017 reads as the feature the contemporary order's principal transactional architectures exhibit. Three pathologies follow from the gatekeeper's monopsony position, documented at the principal cases.

The first pathology is rent extraction at the gatekeeper's set rate. Apple's 30 percent commission on App Store sales; Google's analogous Play Store commission; Amazon's marketplace fees, fulfilment fees, and the advertising fees the platform's ranking algorithm effectively requires for product visibility, with the cumulative take-rate exceeding 50 percent on many product categories (Mitchell 2021, *Amazon's Toll Road: How the Tech Giant Funds Its Monopoly Empire by Exploiting Small Businesses*, Institute for Local Self-Reliance); YouTube's revenue share of approximately 45 percent on the YouTube Partner Program; Uber's driver take-rate documented at Rosenblat 2018 (*Uberland: How Algorithms Are Rewriting the Rules of Work*); Visa and Mastercard's interchange fees documented at the regulatory record (U.S. Department of Justice, *United States v. American Express Co.*, 838 F.3d 179 (2d Cir. 2016)). The defender's reading of this pathology alone is that the gatekeeper is functioning as a landlord, taxing commerce that still occurs inside the jurisdiction. That landlord reading, taken on its own, does describe what the first pathology amounts to: the first pathology by itself does not foreclose the Hayekian aggregation. What forecloses the aggregation is the combination of this pathology with the second and third.

The second pathology is the gatekeeper's participation in the jurisdiction it administers, using informational and structural positions no other participant can have. Amazon's documented use of non-public third-party seller data to launch private-label competitors against successful third-party products is the canonical case (Mattioli 2020, *Wall Street Journal*, "Amazon Scooped Up Data From Its Own Sellers to Launch Competing Products", April 23, 2020, with the documentary record of twenty-plus former Amazon employees; the Reuters October 13, 2021 investigation of Amazon's India operations, with the internal documents showing the intentional use of non-public third-party seller data to create copycat products and the manipulation of search rankings to disadvantage the original sellers; The Markup October 2021, "Amazon Puts Its Own 'Brands' First Above Better-Rated Products", with the empirical documentation that Amazon's house brands are placed ahead of third-party competitors with higher customer ratings and more sales; the U.S. House Judiciary Subcommittee on Antitrust 2020 report, pp. 247-318, on the structural conflict-of-interest in Amazon's dual role; Bezos's congressional testimony of July 2020 acknowledging that he could not guarantee Amazon's policy against using seller-specific data had not been violated; the U.S. Securities and Exchange Commission's 2022 investigation into Amazon's handling of third-party seller data; the European Commission's antitrust case against Amazon concluded in December 2022, AT.40462, on the same data-usage and self-preferencing conduct). The Apple case operates through the practice the developer community has named sherlocking: Apple's absorption of third-party application functionality into iOS through native-feature releases that compete with and disadvantage the original third-party developer (the U.S. Senate Judiciary Committee 2021 antitrust subcommittee hearing record, with Senator Blumenthal's documentation of the sherlocking pattern across Konfabulator, iPodderX, Sandvox, Growl, F.lux, Duet, Luna, and the screen-time-management application category; *Epic Games, Inc. v. Apple Inc.*, 559 F. Supp. 3d 898 (N.D. Cal. 2021), affirmed in relevant part 67 F.4th 946 (9th Cir. 2023)). Apple's further structural pathology is the asymmetric API access that disadvantages third-party applications competing against Apple's own native applications: third-party email applications cannot perform operations the native Mail application performs because Apple sets the API permissions; third-party music applications operate under restrictions the

native Music application does not face; third-party browser engines were structurally foreclosed on iOS until the European Commission's *Digital Markets Act* enforcement action in 2024 required the change.

The feature is that the gatekeeper's informational and rule-setting positions give it action-options no other participant in the jurisdiction can have. The participant's price, ranking, and visibility are the gatekeeper's algorithmic outputs; the gatekeeper's price, ranking, and visibility for its competing products are the gatekeeper's algorithmic inputs. The asymmetry follows from the gatekeeper's position in the architecture, not from the gatekeeper's individual conduct. The Hayekian aggregation argument presupposed participants who encountered the price-formation system on identical terms. The gatekeeper architecture violates this presupposition by construction.

The third pathology is unilateral rule-setting with no bilateral negotiation. The participants in the gatekeeper's jurisdiction operate under terms the gatekeeper sets, modifies, and enforces without participant consent or recourse. YouTube's policy modifications across the period from 2017 to the present have repeatedly restructured the demonetisation criteria, the algorithmic-distribution apparatus, and the partner-program eligibility thresholds, with creators whose businesses operate inside the jurisdiction encountering the modifications retroactively (Caplan and Gillespie 2020, "Tiered Governance and Demonetization: The Shifting Terms of Labor and Compensation in the Platform Economy", *Social Media + Society* 6(2); Gillespie 2018, *Custodians of the Internet: Platforms, Content Moderation, and the Hidden Decisions That Shape Social Media*; Cohen 2019, *Between Truth and Power: The Legal Constructions of Informational Capitalism*; Suzor 2019, *Lawless: The Secret Rules That Govern Our Digital Lives*). The tiered-governance apparatus Caplan and Gillespie document specifies that only creators with above-threshold scale can request human review of monetisation decisions; the smaller participants are subject to algorithmic enforcement without recourse. Apple's anti-steering rules operate at the same structural level: developers operating in the App Store cannot inform their users about alternative payment options or alternative subscription channels, on penalty of removal from the jurisdiction (the European Commission 2024 decision in Case AT.40437 documents the operative anti-steering apparatus and imposes the €1.84 billion fine; the *Epic Games v. Apple* ruling requires Apple to permit alternative payment links). The Uber driver, the DoorDash worker, the Airbnb host, the Etsy seller, the eBay merchant all operate under terms the gatekeeper sets unilaterally; the participant's only available action against the unilateral terms is exit from the jurisdiction, and exit from the jurisdiction means loss of access to the customer base the jurisdiction has aggregated. The high switching cost is what makes the unilateral rule-setting operative; the participant who has built a business inside the jurisdiction cannot port the business to a competing jurisdiction because the customer base is not the participant's to port. The Hayekian aggregation argument presupposed bilateral exchange in which both parties had the option to walk away. The gatekeeper architecture violates this presupposition through the monopsony-with-high-switching-costs structure the literature documents.

The residual "market outside the jurisdictions" does not exist as a Hayekian market either. A defender confronted with the three pathologies above may retreat to a final position: that there is a Hayekian market outside the gatekeeper jurisdictions, that small businesses operate outside Amazon, that independent media operates outside YouTube, that independent retail operates outside the platform substrate, and that the residual market preserves the Hayekian aggregation at scale even if the platform substrates do not. The retreat does not hold either. The residual "market outside the jurisdictions" is itself constituted by stacked transactional substrates that are themselves privately-administered jurisdictions. The small bookshop that operates outside Amazon nonetheless finds its customers through Google Search (a privately-administered jurisdiction with its own ranking algorithm and sponsored-slot apparatus), processes its payments through Visa-Mastercard (a privately-administered duopoly with its own fee structure and dispute-resolution apparatus), runs its website on Amazon Web Services or Microsoft Azure or Google Cloud Platform (a privately-administered oligopoly with its own pricing terms and access conditions), advertises on Meta or Google (the privately-administered ad-tech duopoly), and ships its products through the logistics oligopoly (UPS, FedEx, USPS in the United States; the analogous oligopolies in other jurisdictions). Every transactional architecture in the alleged "residual market" is itself a privately-administered jurisdiction with its own ranking, pricing, fees, terms, and exclusion apparatus. The contemporary independent business does not operate in a Hayekian market that exists outside the gatekeeper

architecture; the contemporary independent business operates inside a stack of gatekeeper architectures, each of which extracts rent, sets terms unilaterally, and (in the cases where the gatekeeper has a competing offering) participates in the jurisdiction it administers.

The cumulative finding is that the Hayekian "market" the defender's response presupposed does not exist as a transactional substrate the algorithm reads. The dominant transactional substrates of the contemporary economy are privately-administered jurisdictions. The algorithmic-pricing apparatus the platform case introduced is the gatekeeper's internal optimisation apparatus operating inside the gatekeeper's jurisdiction. The "market" the algorithm reads is the gatekeeper's privately-administered jurisdiction, and the gatekeeper's privately-administered jurisdiction is the gatekeeper's construction. The Hayekian aggregation argument presupposed transactional architectures the contemporary order does not contain at the dominant substrates. The defender's response that the algorithm reads a market is therefore not a response to the chapter's claim; it is a restatement of the presupposition the chapter's claim has identified as inoperative.

The moral-individualist reading of this finding, which holds that the gatekeeper pathologies are the product of bad actors at particular firms that antitrust enforcement could correct, was foreclosed at the mechanism analysis Chapter 7 conducts on the dominant-platform pattern. The operators inside Amazon, Apple, YouTube, Meta, Google, and the other gatekeeper-architecture operators are operating inside institutional positions whose available actions are specified by the gatekeeper architecture and by the competitive position of the alternative gatekeepers operating with the same available actions. Breaking up any particular gatekeeper produces successor entities operating at the same scale with the same available actions; the architecture reproduces the pattern across firm-identities. The structural finding stands at the architectural level, not at the firm level.

The chapter has now specified the architecture inside which the algorithmic-pricing apparatus operates. The cybernetic analysis at §9.3 proceeds against this architecture.

9.3 The Cybernetic Analysis

The cybernetic results from Chapter 5 supply the analytical instrument the section requires. Three results, applied to the contemporary financialised price-formation system, produce the chapter's principal finding.

The Conant-Ashby theorem (Conant and Ashby 1970, *International Journal of Systems Science* 1(2), pp. 89–97) establishes that every good regulator of a system must be a model of that system. A regulator without a model of the system it is regulating cannot stabilise the system except by accident. The contemporary financialised price-formation system can be analysed as a regulator. The system stabilises certain magnitudes (asset prices, bid-ask spreads, market depth) through its continuous operation across action-cycles (the empirical record on contemporary market microstructure is at Hendershott, Jones, and Menkveld 2011, "Does Algorithmic Trading Improve Liquidity?", *Journal of Finance* 66(1), pp. 1-33; Brogaard, Hendershott, and Riordan 2014, "High-Frequency Trading and Price Discovery", *Review of Financial Studies* 27(8), pp. 2267-2306; Hasbrouck and Saar 2013, "Low-Latency Trading", *Journal of Financial Markets* 16(4), pp. 646-679; the cumulative literature on the microstructure consolidated in Menkveld 2016, *Annual Review of Financial Economics* 8, pp. 1-24). The theorem applied to this regulator yields the question: what does the regulator have a model of? At microsecond resolution, the high-frequency-trading apparatus does not have a model of the underlying productive economy. It has a model of the order book, the recent price history, the positions and likely behaviours of other algorithmic agents, and the latency characteristics of the network paths to other exchanges. The architecture is documented empirically across Lewis 2014 (*Flash Boys*, especially Chapters 4-6 on the co-location apparatus and the spread-arbitrage operation); Patterson 2012 (*Dark Pools: The Rise of the Machine Traders and the Rigging of the U.S. Stock Market*); Budish, Cramton, and Shim 2015 ("The High-Frequency Trading Arms Race: Frequent Batch Auctions as a Market Design Response", *Quarterly Journal of Economics* 130(4), pp. 1547-1621); and the cumulative analytical scholarship at Aldridge 2013 (*High-Frequency Trading: A Practical Guide to Algorithmic Strategies and Trading Systems*, second edition, especially Part II on the strategy taxonomy). The regulator's model is of itself, not of the substrate. By the theorem, the regulator cannot stabilise the substrate.

It can stabilise only what its model registers.

Ashby's Law of Requisite Variety (Ashby 1956, *An Introduction to Cybernetics*, especially Chapters 11–12) establishes that the variety of disturbances a regulator must absorb requires variety in the regulator equal to or exceeding the disturbance variety. A regulator with insufficient variety cannot stabilise the system. Applied to the price-formation system: the underlying productive economy generates substrate-state disturbances at multiple cycles (decade-scale shifts in engineering capability, multi-year shifts in supplier ecosystems, generational shifts in workforce composition, century-scale shifts in ecological capacity). The contemporary price-formation regulator operates at microsecond cycles. The variety of substrate-state disturbances at the multi-decade and century scales is, at the microsecond cycle, infinite; the variety is unmeasurable at the resolution available. By the Law, the regulator cannot absorb the disturbance variety, and the substrate-state at those cycles cannot be stabilised by the price-formation system's operation.

The horizon-mismatch theorem derived at Chapter 5 §5.6 establishes the formal-mathematical consequence: a regulator operating at action-cycles shorter than the substrate's replenishment-cycle by orders of magnitude cannot, by construction, model the substrate at the substrate's own cycles. Substrate-depletion proceeds as the necessary signature of cycle-mismatched regulation. The contemporary action-cycle is the nanosecond cycle of co-located high-frequency-trading servers. The relevant substrate-cycles span the multi-year capital-stock replenishment cycle (~20 years), the multi-decade engineering-culture replenishment cycle (~30 years), the generational human-capital replenishment cycle (~25 years), the multi-decade research-and-development replenishment cycle (~30 years), and the century-to-millennial ecological replenishment cycle. The mismatch ratios between the action-cycle and the substrate-cycles are extreme by any measure the cybernetic literature treats as significant. The action-cycle against the engineering-culture cycle is approximately 10^17. The action-cycle against the ecological cycle is approximately 10^21. By the theorem, the regulator cannot, by construction, stabilise these substrates. Substrate-depletion at those cycles is what the regulator's operation produces.

Each step of the analysis just conducted carries a citation in the cybernetic literature, and each step carries a name the literature has given the structural feature it identifies. What the steps together produce, when their findings are composed, is a mechanical result. The contemporary financialised price-formation system is a regulator with a model of itself, insufficient variety against the substrate, and cycles mismatched against the substrates by orders of magnitude. The cybernetic results deliver a unanimous verdict: this regulator cannot, by construction, stabilise the substrates the libertarian tradition's defenders treat it as stabilising.

9.4 The Variance Decomposition

The cybernetic verdict admits empirical confirmation through a partition of the price-signal's variance. The partition was developed by Robert Shiller in 1981 and has been extended across the subsequent four decades.

The variance decomposition literature has, across the four decades since Shiller's original result, become one of the most substantial empirical anchors in the analytical study of financial markets (the broader literature includes LeRoy and Porter 1981, "The Present-Value Relation: Tests Based on Implied Variance Bounds", *Econometrica* 49(3), pp. 555-574, on the contemporaneous independent derivation; Campbell and Shiller 1988, "The Dividend-Price Ratio and Expectations of Future Dividends and Discount Factors", *Review of Financial Studies* 1(3), pp. 195-228, on the dividend-yield decomposition; Cochrane 2011, "Presidential Address: Discount Rates", *Journal of Finance* 66(4), pp. 1047-1108, on the contemporary state of the variance-decomposition literature). Shiller's question was simple. Is the variance of stock prices what the substrate-coupled value of those stocks would predict? He compared the historical variance of actual stock prices against the variance of the present-value of subsequent dividends, the magnitude the prices would have to track if the prices were aggregating substrate-coupled value through Hayek's mechanism. The two variances should be of comparable magnitude if the Hayekian mechanism was operating. Shiller found, empirically, that the variance of actual stock prices substantially exceeded the variance of substrate-coupled value. The price was moving more than the underlying value (Shiller 1981, *American Economic Review* 71(3), pp. 421–436, with the variance ratios reported across pp.

432–435; the result extended in Shiller 2003, *Journal of Economic Perspectives* 17(1), pp. 83–104; and Shiller 2014, *American Economic Review* 104(6), pp. 1486–1517).

The variance decomposition partitions the variance of the price signal P into three components:

$$\mathrm{Var}(P) = \mathrm{Var}(V) + \mathrm{Var}(R) + \mathrm{Var}(N)$$

Where Var(V) is the variance attributable to substrate-value evolution (the fundamentals the Hayekian mechanism would aggregate), Var(R) is the variance attributable to the internal dynamics of the price-formation system itself (reflexive content), and Var(N) is residual noise.

The Hayekian price-formation system, operating as Hayek described, has Var(V) dominant over Var(R). The price moves because substrate-value moves. Reflexive content (traders reading other traders, momentum effects, technical-pattern trading) is present but secondary.

Shiller's empirical result is that Var(R) is large relative to Var(V) across the contemporary order's major equity markets and across multi-decade timeframes. The variance ratios are in the literature. Excess volatility, in the contemporary period, is the norm rather than the anomaly.

The casino, in the chapter's technical specification, is what the empirical record describes: a price-formation system in which Var(R) has come to dominate Var(V). The threshold is the inversion of the magnitudes. Hayek's mechanism requires Var(V) > Var(R). The contemporary record shows Var(R) > Var(V). The mechanism is operating in the regime its founder identified as the failure case.

What produces the inversion is the architecture the cybernetic analysis specified. Computational regulators with models of each other rather than of the substrate, operating at action-cycles compressed by orders of magnitude relative to substrate cycles, generate internal dynamics whose variance grows with the regulators' interactions. The high-frequency-trading architecture is not a small enhancement to the Hayekian price-formation system. It generates the dominant component of the price signal's variance, with the substrate-tracking component reduced to a smaller modulation atop the larger internal-dynamics motion.

The infrastructure that conducts this can be specified. The contemporary financialised order has built, across the period since approximately 1971, a cybernetic-computational architecture whose scale exceeds anything Hayek's 1945 argument could have anticipated. Data centres aggregate trillions of transactions per second. Machine-learning models identify patterns in user behaviour at scales no prior aggregation mechanism could have approached. Algorithmic-trading systems operate at nanosecond cycles, with co-located server infrastructure positioned within metres of exchange matching engines to minimise light-speed latency. Predictive analytics model the state of other algorithmic instances with precision exceeding what Hayek's 1945 clerks-and-adding-machines bureaucracy could have approached by many orders of magnitude. The cybernetic-computational infrastructure available to private financial actors in the contemporary order vastly exceeds the cybernetic-computational infrastructure available to any historical centralised planning bureaucracy, including the Soviet planning apparatus at its peak. The price aggregates the operations of this architecture, not the dispersed substrate-coupled knowledge of human participants.

9.5 The Action-Cycle Contraction

The cycle compression that produced the inversion can be traced historically across the period from 1971 to the present, with the principal stages documented (MacKenzie 2021, *Trading at the Speed of Light*, especially Chapters 2–4; Aquilina, Budish, and O'Neill 2022, *Quarterly Journal of Economics* 137(1), pp. 493–564).

The 1970s and early 1980s saw the introduction of computerised order routing and the compression of settlement times from five days to three (the historical record across the SEC's institutional documentation and at Stoll 2014, *Annual Review of Financial Economics* 6, pp. 1-22, on the contemporary settlement-cycle history). The 1990s saw the introduction of electronic communication networks and the expansion of derivative markets whose cycles operated at minute-to-hour scales. Programme trading deployed action-cycles measured in seconds. The 2000s saw the deployment of algorithmic trading at action-cycles measured in milliseconds, with the

high-frequency-trading apparatus that emerged across the late 2000s operating at microsecond scales (Hendershott, Jones, and Menkveld 2011 documents the institutional transition; the 2010 Flash Crash provided the institutional discontinuity at which the regulatory apparatus began its retrospective accommodation, documented in the SEC and CFTC 2010 joint report *Findings Regarding the Market Events of May 6, 2010*). The 2010s and 2020s have seen further compression to nanosecond cycles in the major exchanges' co-location facilities, where the speed of light in optical fibre is the relevant constraint on action-cycle compression. The Chicago-to-New York microwave-route material in MacKenzie's Chapter 4 documents the nanosecond regime empirically.

The substrate-cycles relevant to the productive economy have not changed across the same period. A skilled engineer still takes a generation to form. A supplier ecosystem still takes a decade or more to build. A research-and-development pipeline still operates on multi-decade horizons. An ecological substrate still replenishes on century-to-millennial timescales. The action-cycle has contracted from approximately ten thousand seconds (the daily-cycle horizon at the start of the period) to approximately ten-to-the-minus-nine seconds (the nanosecond cycle of co-located servers). The substrate-cycles have remained at their natural scales.

The mismatch ratio is the action-cycle divided by the substrate-cycle. The ratio in 1971 was, against the engineering-culture substrate's thirty-year replenishment-cycle, approximately 10^4. The ratio in the contemporary order is approximately 10^17. The compression has produced a thirteen-order-of-magnitude increase in the mismatch ratio across the period.

The horizon-mismatch theorem at §5.6 specifies the consequence. Where the mismatch ratio exceeds a small constant, the regulator cannot model the substrate at the substrate's cycles, and substrate-depletion proceeds by construction. The contemporary ratio is not a small constant. It is the largest mismatch ratio any economic regulator has ever operated under. The substrate-depletion produced by the operation is the empirical signature that follows from the cycle-mismatch the section has specified.

9.6 The Empirical Case: GameStop and the Coupled Apparatus

A particular empirical case demonstrates the casino architecture's operation at the limit. The case is the GameStop episode of late January 2021.

GameStop Corporation was a brick-and-mortar video-game retailer in structural decline. Its productive position was the position of a chain-store retailer whose business model had been disrupted by the shift to digital-download distribution. By the end of 2020 the firm was operating at quarterly losses, closing stores, and reducing headcount. Its substrate-coupled productive position warranted a price in the low single-digits per share.

In late January 2021, the firm's stock price moved from approximately seventeen dollars to approximately four hundred eighty-three dollars across a period of approximately three weeks. The empirical record across the episode is documented in the Securities and Exchange Commission's official report (SEC 2021, *Staff Report on Equity and Options Market Structure Conditions in Early 2021*, U.S. Securities and Exchange Commission, October 2021); the U.S. House Financial Services Committee 2021 hearings *Game Stopped? Who Wins and Loses When Short Sellers, Social Media, and Retail Investors Collide*; and the subsequent academic literature including Eaton, Green, Roseman, and Wu 2022 (*Journal of Financial Economics* 146(2), pp. 502-528, "Retail Trader Sophistication and Stock Market Quality"); Pedersen 2022 (*Journal of Financial Economics* 146(3), pp. 1097-1119, on the meme-stock dynamics); and Anand and Pathak 2022, 'The Role of Reddit in the GameStop Short Squeeze', *Economics Letters* 211 on the longitudinal documentation across the post-episode period. The price subsequently retraced. The movement was not produced by any change in the firm's substrate-coupled productive position. The firm's stores continued to operate. The firm's quarterly results continued to deteriorate. The firm's debt position continued to weigh on its operations. Nothing the price-mechanism's substrate-coupling would track had changed.

What had changed was the coordination signal at a particular social-media platform, principally the Reddit subforum r/WallStreetBets, where retail traders coordinated buying activity against the short positions of major

hedge funds. The coordination produced concentrated buying. The buying drove the price up. The price increase forced short-position holders to cover their positions by buying further, which produced further upward pressure (the "short squeeze" mechanism). The cycle iterated. The price reached approximately twenty-eight times its pre-episode level before retracing.

Two apparatuses were operating in coupled form. The first apparatus was the engagement-optimisation apparatus of the social-media platform, operating on the cognitive-emotional substrate of its users. The platform's recommendation system amplified financial-market content (price movements, options trades, retail-trader positioning) because that content produced high engagement at the platform's measurement frame's resolution. The second apparatus was the algorithmic-trading apparatus of the financial substrate, operating on the price-formation system documented across §§9.3–9.5. The two apparatuses were coupled through the platform's amplification of the financial-market content. The engagement-optimisation cycle amplified content that produced high engagement. The amplified content produced coordination signals among the platform's users. The coordination signals translated into financial-market positioning. The positioning produced price movements. The price movements produced further amplifiable content. The cycle iterated and the price moved.

What the price registered was the social-media coordination signal. What the price did not register was the firm's substrate-coupled productive position. The signal had inverted its source: the price was reading the platform's engagement-optimisation output, not the firm's productive operations.

The GameStop case is not an aberration. The same mechanism produces tweet-driven price-movements in major-capitalisation equities. A single tweet by a major principal has, on documented occasions, produced double-digit single-day price movements in his own firms, in cryptocurrencies, in companies he has named, and in companies whose tickers happen to resemble references in his posts. The empirical record across the Twitter-X period is documented in the regulatory record (Securities and Exchange Commission v. Elon Musk, Case No. 18-CV-8865, settlement of October 2018 and the subsequent enforcement record across 2018-2024); the academic literature on social-media-driven price movements (Bartov, Faurel, and Mohanram 2018, "Can Twitter Help Predict Firm-Level Earnings and Stock Returns?", *The Accounting Review* 93(3), pp. 25-57; Sprenger, Tumasjan, Sandner, and Welpe 2014, *European Financial Management* 20(5), pp. 926-957, on Twitter's price-movement effects); and the cumulative documentation at Ante 2023, 'How Elon Musk's Twitter Activity Moves Cryptocurrency Markets', *Technological Forecasting and Social Change* 186, article 122112, with the empirical analysis documenting the price-movement signatures. The mechanism is the same. The platform's amplification operates on the cognitive substrate; the amplified content produces coordination; the coordination translates into financial positioning; the positioning produces the price. What the price tracks is the coordination signal, not the substrate.

The casino architecture, at its limit case, is a price-formation system whose dominant variance at the relevant moment comes from a coupled engagement-financial apparatus operating on two substrates the apparatus is itself depleting. The cognitive-emotional substrate of the platform's users is depleted by the engagement-optimisation cycle. The financial substrate's connection to productive reality is dissolved by the algorithmic-trading cycle. The price movement is the empirical signature of the coupling.

9.7 The Operation at the Architecture's Level

The architecture is run by people whose participation in it is not vicious in the colloquial sense the word "casino" risks pushing the reader toward. The chapter must record this directly because the colloquial associations of "casino" risk pushing the reader toward a moral reading the chapter does not intend.

The high-frequency-trading firms employ engineers and traders of exceptional technical capability. The platform engineers who design the engagement-optimisation algorithms are working competently against well-defined objective functions. The compliance officers at the regulated entities are conducting their roles correctly under the regulations that apply to them. The regulators are operating within the legislative and procedural authorities they have been granted. No one in the chain has decided to dissolve the substrate-coupling

of the contemporary price-mechanism. Each agent in the chain is doing the work the agent's role specifies.

The chapter's analysis applies to the architecture, not to the people inside it. The cybernetic verdict says nothing about the participants' character. The libertarian tradition's contemporary defenders, when they identify the chapter's diagnosis as an attack on financial professionals, on entrepreneurs, on traders, on the people who work inside the architecture, are misreading the analysis. The analysis is about what the architecture does. It is about what cannot, by the architecture's construction, be otherwise. The substrate the optimisation operates against is not in the optimiser's measurement frame as substrate; the substrate is in the measurement frame as engagement signal, share price, quarterly return, spread-capture. The condition under which this substrate-foreclosure operates at the perceptual layer of the operators occupying the architecture's positions is a question the present chapter has identified the empirical signature of without conducting its analysis at the level the question requires; the standalone Epilogue takes up the question at the existential-phenomenological register the empirical signature places in view.

9.8 The Inversion Stated Plainly

The signal direction has reversed. This is the chapter's principal finding, stated in its plainest form.

Hayekian aggregation runs from substrate to price. Dispersed agents with substrate-coupled tacit knowledge act on what they know. The price-formation system registers the action. The signal propagates back to participants. The participants adjust their positions. Substrate-coupled coordination occurs. The price emerges as the cumulative trace of the participants' substrate-coupled decisions. The arrow runs: substrate → action → price → coordination.

Contemporary algorithmic aggregation runs in the opposite direction. The price-formation system, operating at action-cycles incompatible with substrate-information acquisition, produces signals. Computational agents react to the signals at the cycles the signals are produced at. Position-changes drive price-movements. Price-movements drive corporate-strategy decisions, capital-allocation decisions, and operational decisions. Those decisions drive substrate-state changes (firms cut R&D to make quarterly numbers; supplier relationships are terminated to optimise procurement cost; engineering culture is hollowed to satisfy share-buyback budgets; ecological capacity is degraded to meet quarterly revenue targets). The price did not register the substrate-state changes because the price was not reading the substrate. The arrow runs: price → corporate decision → substrate change → (eventually, after long lag) further price-formation that the price has produced rather than received.

The cleanest formulation: the free market has become the user interface; the algorithmic-data system has become the operating system. What the user experiences as voluntary choice within a market is choice within a field that has already been engineered by the operating-system layer. The contemporary order's price-formation system has been technically arranged by the apparatus whose continued operation depends on the result the arrangement produces. The consumer really clicks; the trader really buys; the investor really sells. The field in which these actions appear has been technically arranged by the system that profits from the result. The libertarian vocabulary of voluntary exchange describes the surface event; it does not describe the architecture producing the option-space, timing, salience, and incentives under which the exchange occurs.

The plain-language formulation consolidates what §§9.3–9.6 demonstrated and what §5.4 established at the cybernetic level. Hayek's price was a consensus referendum among substrate-coupled agents. The contemporary price is a consensus referendum among reflexively-coupled algorithms. The referendum still happens. The aggregation mechanism still functions. The price is still produced through participants' choices and the price-formation system still aggregates the choices into a signal. What has been replaced is the object of the aggregation. The original participants were substrate-coupled humans whose dispersed local knowledge about real productive conditions constituted the price. The contemporary dominant participants are reflexively-coupled algorithms whose models contain no substrate-knowledge. Their models contain the history of the price-formation system itself, the positions of other algorithms, the order-book structure at millisecond resolution, the statistical distribution of price-movements in the immediate past nanoseconds. The mechanism

functions identically; the population of agents whose choices it aggregates has been replaced; the object of the aggregation has been replaced as a result. The structural form Hayek's 1945 argument identified as the failure case of centralised planning, the form against which his argument was constructed, has been reproduced inside the contemporary order at the coordinating layer by a small number of private computational nodes whose aggregation capacity exceeds, by orders of magnitude, what any historical centralised planner could have approached (§5.4 documents the empirical reading: Amazon's pricing infrastructure, BlackRock's Aladdin platform, Citadel Securities' market-making infrastructure, the high-frequency trading networks at the major exchanges).

9.8.1 The Optimisation Without the Substrate: Growth as the Goal Detached From What It Was For

The inversion stated at §9.8 has a structural consequence the chapter must register at this stage of the chapter's argument. The consequence is that the optimisation the contemporary architecture conducts has detached from the substrate the optimisation was supposed to serve, and the optimisation-metric has become the goal in its own right. The feature is the operative form Ellul's *autoaccroissement* takes at the contemporary financialised order's price-mechanism.

Ellul (1954/1964, *The Technological Society*, John Wilkinson translation) introduced *autoaccroissement* as one of the three features of *la technique*: the self-augmentation through which the technical apparatus produces its own continued expansion, with each technical solution generating the conditions for the next technical solution and the apparatus's continuation operating without reference to any external purpose the apparatus is supposed to serve (Ellul 1954/1964, especially the closing chapters on the autonomy of technique). Ellul's earlier formulation left open whether *autoaccroissement* operates against an external constraint the apparatus is for: whether the apparatus's continued expansion remains coupled, even loosely, to the substrate the apparatus was supposed to serve. The contemporary financialised order's price-mechanism, at the substrate the chapter has documented, exhibits the operative form of *autoaccroissement* in which the constraint has been removed. The optimisation operates against itself. The substrate the optimisation was for is not present in the optimiser's measurement frame.

The feature is visible at the substrate the chapter has documented. The financial substrate's quarterly-cycle measurement frame optimises against quarterly-cycle measurables: share price, earnings per share, return on equity, the buyback's accretive effect on per-share metrics. The substrate the optimisation was supposed to serve was the productive economy the financialised order was institutionally constructed to coordinate. The productive substrate is not in the optimiser's measurement frame. The optimisation continues to operate against the quarterly-cycle measurables; the productive substrate (engineering culture, supplier ecosystems, the human-capital base, the research-and-development pipeline, the infrastructure, the ecological capacity) absorbs the cost of the continued operation. The metric continues to grow. The substrate the metric was supposed to track is not what the metric is tracking. The optimisation has detached from what it was for.

The same feature operates at the platform substrate the chapter introduced at §9.2. Amazon's optimisation against gross merchandise value, Apple's optimisation against services revenue, YouTube's optimisation against watch time, Meta's optimisation against engagement, Google's optimisation against advertising revenue, Uber's optimisation against gross bookings, Airbnb's optimisation against booking volume. Each gatekeeper's measurement frame contains the optimisation metric; each gatekeeper's measurement frame does not contain the substrate the metric was supposed to track. The substrate at Amazon was the population of independent producers and consumers whose voluntary exchanges the marketplace was supposed to aggregate; the substrate has been progressively displaced by the gatekeeper's private-label apparatus, the engagement-optimised ranking algorithm, and the search-result apparatus that orders product visibility against the gatekeeper's revenue metrics rather than against the participants' substrate-coupled preferences. The substrate at YouTube was the population of creators and audiences whose preferences for creative production and attentional engagement the platform was

supposed to coordinate; the substrate has been progressively replaced by the engagement-signal optimisation operating at the cognitive-emotional substrate the literature on attention-capture documents (Haidt 2024, *The Anxious Generation*; Zuboff 2019, *The Age of Surveillance Capitalism*; Wu 2016, *The Attention Merchants*). The optimisation-metric grows; the substrate the metric was supposed to track is absent from the measurement frame.

The cultural articulation of this feature has appeared in the public discourse without the analytical framework the chapter has constructed. McKay 2021 (*Don't Look Up*, Netflix; the screenplay published as McKay and Sirota 2021, *Don't Look Up: The Original Screenplay*, Hyperion Avenue) dramatised the feature at the architecture's response to a planetary-substrate threat: the political class, the media institutions, and the financial-corporate establishment each operating against their own measurement frames, with the planetary threat absent from any of their available actions. The order continues to optimise against its measurables (political polling, media engagement, market capitalisation) with the substrate the optimisations were supposed to serve (the planet's continued habitability) absent from the available actions. The film's analytical force operates at the level the present section specifies: the optimisation continues; the substrate is not in the optimiser's frame; the metric is the goal. The film operates as a cultural articulation of the feature the contemporary financialised order's price-mechanism exhibits at the productive substrate and the gatekeeper architectures exhibit at the platform substrates. The feature is the same across the cases. The substrate differs. The optimisation operates the same.

The substrate-decoupling the section has identified operates at the perceptual level the operators occupying the architecture's positions encounter the architecture through. The substrate the optimisation was supposed to serve is not in the optimiser's measurement frame as substrate; the measurement frame admits the metric the optimiser optimises against. The substrate's depletion is not in the order's discourse as a depletion; the substrate's depletion is in the order's discourse as an externality, as a regulatory question, as a corporate-social-responsibility report, as a sustainability-disclosure form. The substrate's depletion is not a candidate object the optimiser optimises against; the optimisation operates as if the substrate were not depleting. The existential-phenomenological diagnosis of this perceptual-architectural condition belongs to the standalone Epilogue.

The feature is what makes the optimisation autonomously operative across the operators occupying the architecture's positions. Each operator optimises against the measurement frame the operator's institutional position specifies. The measurement frame contains the metric the operator's performance is evaluated against. The measurement frame does not contain the substrate the metric was supposed to track. The operator's perceptual capacity to register the substrate's depletion does not, by itself, alter the measurement frame; the measurement frame is set by the architecture, not by the operator. The structural-mechanism finding on the operators' available actions holds at the optimisation register. The operator optimises against the metric because the metric is what the operator's position is evaluated against. The metric grows. The substrate depletes. The architecture's continued operation produces both.

The chapter has now specified what the inversion is, what architecture hosts it, and what feature its operation exhibits. The question why the libertarian tradition's defenders do not recognise the inversion is the question §9.9 takes up.

9.9 Why the Tradition Cannot Recognise the Inversion

The libertarian tradition's contemporary defenders, on my reading, are defending an architecture whose features Hayek's argument identifies as the failure case. The defence is conducted in Hayek's vocabulary. The architecture's features are the features Hayek's own analysis specifies as the failure mode. The defence is therefore a defence Hayek's argument's specification cannot legitimate.

This is not a rhetorical claim about the contemporary order's character but a mechanical finding about the order's structure, derivable from the four features the chapter has documented. The features of the contemporary financialised regulator the chapter has documented are: the regulator's model is of itself rather than of its substrate (Conant-Ashby applied at Chapter 9 §9.3); the signal flows from regulator to substrate rather than from substrate

to regulator (the signal-direction inversion specified at §9.8); the regulator's action-cycle is decoupled from any substrate-cycle the regulator nominally addresses (the cycle-mismatch specified at Chapter 5 §5.6 and applied at §9.5); the regulator's variance is dominated by reflexive content rather than by substrate-tracking content (the variance decomposition specified at §9.4). The four features together specify the form Hayek's argument identified as the failure mode the price-mechanism's distributed aggregation was constructed to oppose.

The proposition that the contemporary architecture is what Hayek's argument identified as the failure mode is, at the analytical level, foreclosed against the libertarian tradition's contemporary discourse. The defenders cannot recognise the foreclosure because the order's discourse pre-formats the contemporary architecture as the realisation of Hayek's argument, with the pre-formatting operating at the perceptual layer rather than at the level of explicit claim. What the defenders see when they look at the contemporary financialised order is what Hayek's argument said markets are. What the apparatus is doing at the operational layer the order's discourse cannot reach is not what the defenders see. The discourse forecloses access to the operational layer, and the defenders' description of the order remains the description of the user-facing layer the discourse admits.

The proposition that the libertarian tradition is defending the order's failure mode is, the chapter is aware, provocative. The chapter's claim is not provocation. The claim is that Hayek's own analytical apparatus, applied to the contemporary architecture, produces this finding. The libertarian tradition's contemporary defenders are not analytically equipped to deny the finding without rejecting Hayek's own apparatus. The finding stands on Hayek's analysis. The defenders' continued defence operates inside the framing that pre-empts recognition of the analysis's verdict.

9.10 The Soviet Comparison and the Casino's Diagnostic

The identification has a historical irony the chapter must register without exploiting.

The Soviet planning apparatus across the period from 1928 to 1991 operated through the features Hayek's argument identified as the failure case (the historical record across Kornai 1992, *The Socialist System: The Political Economy of Communism*, Princeton University Press, especially Chapters 7-9 on the planning apparatus's institutional architecture; Allen 2003, *Farm to Factory: A Reinterpretation of the Soviet Industrial Revolution*, Princeton University Press; Gregory and Stuart 2014, *The Global Economy and Its Economic Systems*, on the comparative-economic-systems literature; Easterly and Fischer 1995, 'The Soviet Economic Decline', *World Bank Economic Review* 9(3), pp. 341-371, on the Soviet productivity-growth pattern and its eventual collapse). The Soviet apparatus was a regulator whose model was of itself rather than of its substrate. The Soviet apparatus's signal flowed from the regulator to the substrate, with planning targets dictating production rather than substrate-state dictating planning. The Soviet apparatus's action-cycle was decoupled from the substrate-cycles the regulator nominally addressed, with five-year plans operating against substrate-cycles ranging from annual harvests to multi-decade industrial transformations. The Soviet apparatus's measurement frame registered plan-fulfilment metrics that were dominated by the apparatus's own internal dynamics rather than by substrate-state evolution.

Hayek's 1945 argument, "The Use of Knowledge in Society" (Hayek 1945, *American Economic Review* 35(4), pp. 519–530), was constructed against precisely this apparatus. Hayek's claim was that centralised planning could not, by construction, perform the aggregation of dispersed substrate-coupled knowledge the price-mechanism performed through decentralised exchange. The Soviet apparatus's failures across its operational period were the failures Hayek's argument predicted any centralised aggregation apparatus would produce when its features satisfied the conditions Hayek's argument specified.

The contemporary financialised order's features satisfy the same conditions. The order's defenders, deploying Hayek's vocabulary, are defending an apparatus whose form is the form Hayek's argument identified as the failure case. The architecture has been constructed by private actors operating with computational capacity vastly exceeding any historical centralised planning bureaucracy's. The architecture is decentralised in its institutional form (no single firm or agency controls the aggregate operation) and centralised in its operational form (the

dominant aggregation cycles are conducted by a small number of algorithmic operators with concentrated computational infrastructure). The architecture produces the substrate-depletion Hayek's argument said centralised planning would produce. The vocabulary deployed in its defence is the vocabulary Hayek developed against centralised planning.

The casino, in the chapter's specific sense, is the formal-cybernetic specification of this architecture. It is the price-formation system that has crossed the threshold at which the dominant variance comes from its own internal dynamics rather than from substrate-value evolution. The threshold has been crossed empirically. The threshold's crossing is what the chapter has demonstrated through the cybernetic results from Chapter 5, the variance decomposition documented across the empirical literature, the historical record of action-cycle compression across the period from 1971 to the present, and the empirical cases of GameStop and the tweet-driven price-movement record.

The chapter's diagnostic finding can be stated at the consolidation level §9.9 prepared. The contemporary financialised order's price-formation system is a casino architecture in the strict sense the chapter developed at §9.1: a price-formation system whose feedback loop has become self-enclosed, whose dominant variance derives from internal dynamics rather than from substrate-value evolution, and whose participants are no longer the substrate-coupled agents Hayek's argument depended on. The order's features satisfy the conditions Hayek's argument identified as the failure case the argument was constructed to oppose. The libertarian tradition's contemporary defenders are defending an order the tradition's own analysis identifies as the failure case, with the defence operating through the framing's foreclosure of access to other modes of revealing under which the failure case could be recognised as the failure case.

The chapter has operated on the financial substrate alone. The diagnosis the chapter has produced stands as the analytical reading of the casino architecture and its operative consequences at the financial substrate.

The Casino, Read as a Nested Loop

Extension passage for the economy volume (CIH), casino chapter

Draft: v0_1 (prompt S5) Register: economic-cybernetic diagnostic Status: new material to slot into the existing chapter; extends, does not restate; register battery to run before deposit

The chapter has shown the house edge as the pure case of an instrument that drains a substrate: a mechanism that returns, over enough plays, a fixed fraction of everything that passes through it, indifferent to any individual outcome, visible to the operator as a rate and to the player as a run of luck. The edge is where the series' economy volume grounds its account of extraction booked as performance, and the reader who has followed it will not need the mechanism restated. What the reader now has, which the chapter's first pass did not yet deploy, is the nested loop the organisation volume closed: money selects the target, the target selects the operators, the operators spend the substrate, the spending shows as growth, and the growth attracts more money. The casino runs that loop as cleanly as it runs the edge, and running it here, once, shows the loop where the reader already sees the edge.

Capital enters the floor with an objective, and the objective is not the edge; the edge is arithmetic, given. The objective is throughput: hold per unit of floor per unit of time, the quantity capital can compare across venues and reallocate toward. Throughput is the target the money selects, and the target then selects the operators. The floor is staffed, cycle by cycle, by those who move the throughput number: the host who reads which player to comp and which to let cool, the designer who tunes the machine's reinforcement schedule, the manager who reads the floor's rhythm and adjusts the mix. These operators are advanced for their calibration to throughput, and their calibration is real skill; the loop does not require them to be cynical, only to be selected, and they are selected by exactly the reading of the instrument that the second volume described.

What the operators spend, to move the number, is a substrate the number cannot hold. It is the player's capacity to stop: the slack of judgement, the outside relationships, the sense of the hour, the reserves of self-command that a life outside the floor replenishes and the floor is engineered to draw down. Every design choice that lifts throughput, the absent clock, the reinforcement schedule tuned to the threshold of chasing, the comp that arrives exactly as the reserve of judgement thins, spends that capacity, and spends it in the register the series has named: the drawing-down releases what the instrument can see, the play continues, the hold rises, and the depletion of the player's capacity to stop appears on no dashboard as a stock going down, because it was never

an entry. It surfaces, if it surfaces, as a threshold event, a ruin, a self-exclusion, a family's account, attributed by the record to the player who crossed it and not to the loop that set the threshold.

And the rising hold attracts more capital, which sets a higher throughput target, which selects operators calibrated to the higher target, who spend the substrate faster. The loop has closed, and it has closed at the scale the economy volume cares about, because the casino is not the anomaly here; it is the visible limit case of the configuration the whole volume diagnoses. The chapter used the edge to show extraction as a rate. The nested loop shows why the rate is not self-correcting: the profit it produces is not a signal that damps the process but the fuel that accelerates it, routed back through capital allocation into a higher target, a harder-calibrated operator, and a deeper draw on the one stock the instrument was built not to see. What the reader watched as arithmetic on the first pass is, on this one, a machine that eats a renewable human capacity by treating it as a mine, and books the mining, quarter by quarter, as the strongest performance on the floor.

CHAPTER 10

The Cannibalisation Cascade

10.0 What This Chapter Asks

A productive economy rests on substrates that take a long time to build and a long time to replace. An engineer capable of certifying an aircraft takes a generation to form. A supplier ecosystem takes decades to mature. A research-and-development pipeline that produces new pharmaceutical molecules operates on multi-decade horizons. A power grid takes a generation to build. An ecological system replenishes on century-to-millennial scales. The order's productive operation depends on these substrates. The order's continued production requires that the substrates continue to replenish.

The contemporary economic order coordinates on a quarterly clock. The quarterly clock cannot see what happens on a decadal clock or a generational clock or a millennial clock. The Chapter 9 finding was that the price no longer comes from the world. When the price stops coming from the world, the price cannot tell the order what the world is doing. The order then optimises against the price. The price moves the order. The order moves the substrates the order's productive operation depends on.

Each individual decision inside the order is rational at its own action-cycle. The senior executive cutting research-and-development to make the quarterly buyback number is being measured against the quarterly buyback number. The procurement officer consolidating the supplier base is being measured against the procurement-cost target. The corporate-strategy team optimising the engineering organisation around the merger's cost-reduction commitments is being measured against the merger's cost-reduction commitments. The local mayor approving the gas-plant exemption from weatherisation requirements is being measured against the local rate-payer cost. Each decision is correct at the resolution at which it is being measured. The chapter takes up what the cumulative effect of those decisions, across the substrates the order's production depends on, produces over decades.

The evidentiary base is drawn from the literature on substrate-depletion across multiple sectors, with the analytical reading anchored in Daly 1996, *Beyond Growth: The Economics of Sustainable Development*, on ecological-economic substrate analysis; Lazonick and O'Sullivan 2000, "Maximizing Shareholder Value: A New Ideology for Corporate Governance," *Economy and Society* 29(1), pp. 13-35, on the financial-shareholder-value reorientation; Foster, Clark, and York 2010, *The Ecological Rift: Capitalism's War on the Earth*; and Mazzucato 2018, *The Value of Everything*, on the value-extraction-versus-value-creation distinction. The cybernetic instrument applied is the Conant-Ashby theorem and the horizon-mismatch theorem constructed at Chapter 5 §§5.2 and 5.6. The substrates the chapter examines, the order in which they are taken up, and the categorical distinction drawn at the close are introduced as the examination requires.

10.1 What Cannibalisation Names

The chapter's central object requires explicit definition before the cascade analyses begin. The colloquial English deployment of the verb "cannibalise" in business contexts ordinarily refers to a firm's product line eating into another product line's sales. The cannibalisation the chapter documents operates at a different level from the colloquial deployment.

Cannibalisation in the chapter's sense is the substrate-depletion the cybernetic results from Chapter 5 specified as the necessary signature of cycle-mismatched regulation. The substrates the cannibalisation operates against (engineering culture, supplier ecosystems, human capital, research and development, infrastructure, ecological capacity, cognitive-emotional integrity) are the substrates the order's continued production depends on. The depletion is the formal-mathematical consequence of the regulator's operation at action-cycles shorter than these replenishment-cycles. The depletion is necessary by construction; it is not a contingent failure that further regulation might remedy.

The form the chapter's apparatus identifies under the heading of cannibalisation is metabolic in the precise sense that the order consumes what produces its outputs, with the consumption operating at action-cycles that exceed the substrates' capacity to replenish themselves. The substrate-cycle/action-cycle mismatch is the form Chapter 5 §5.6's horizon-mismatch theorem identifies as foreclosing substrate-coupled regulation by construction. The order's measurement frame registers the continued production as the order's continued operation; the depletion of engineering culture, supplier ecosystems, human capital, research pipelines, infrastructure, ecological capacity, and cognitive-emotional integrity is registered at each substrate's own resolution, which the action-cycle's measurement frame cannot reach. The order's continued operation appears as productivity at its own measurement frame. The substrates' depletion is the price extracted to sustain the appearance.

Three clarifications make the concept precise.

The cannibalisation is what the order does, not what its participants intend. No participant designed the contemporary architecture to deplete the substrates the architecture's continued operation depends on. The depletion is the cumulative effect of decisions each of which is rational at the decision-maker's action-cycle. The chief executive setting the buyback budget is being measured against the share price. The buyback raises the share price. The procurement officer consolidating the supplier base is being measured against the procurement cost. The consolidation reduces the cost. The engineering manager retiring the senior staff is being measured against the labour cost. The retirement reduces the cost. Each decision is correct at the measurement frame at which the decision-maker operates. The cumulative effect registers nowhere within the order, because the measurement frame the cumulative effect would register at is the substrate's measurement frame, and the substrate's measurement frame is operating on cycles the action-cycle cannot reach.

The cannibalisation cannot be corrected by adjustment at the level of individual firms or particular policies. The order's defenders, encountering the chapter's empirical record, sometimes reply that the depletion the chapter documents is a contingent feature of particular firms, particular sectors, or particular regulatory regimes; that the depletion can be corrected by appropriate institutional reform; that further deregulation, or further regulation, or different management practices, or different corporate-governance structures, would produce different outcomes. The chapter's reply is the analysis the cybernetic chapter constructed. The depletion is necessary by construction wherever a regulator operates at action-cycles shorter than the substrate's replenishment-cycle. Whether the regulator is a private firm or a state agency, whether the regulator's institutional form is a corporation or a regulator's office, whether the regulator's discourse is market-liberal or social-democratic, the cycle-mismatch produces the depletion. The depletion is what the formal analysis identifies as the signature of cycle-mismatched regulation; the chapter's empirical record documents that the signature appears, across the contemporary Western order, at seven substrates simultaneously.

The cannibalisation operates across substrates of different cycle-lengths in different ways. The engineering-culture substrate, with a replenishment-cycle of approximately thirty years, depletes through the

retirement of senior practitioners whose accumulated tacit knowledge is not transmitted to junior practitioners because the firm's hiring and training practices have been reorganised around cost-reduction. The supplier-ecosystem substrate, with a replenishment-cycle of approximately one to two decades, depletes through procurement consolidation that reduces the number of suppliers below the threshold at which the ecosystem's redundancy and competitive structure are sustained. The ecological substrate, with a replenishment-cycle of centuries to millennia, depletes through the accumulation of substrate-state changes (atmospheric concentrations, ocean acidification, ecosystem reorganisation) that the action-cycle's measurement frame registers, when it registers at all, only as small modulations of the quarterly-reported variables the regulator nominally addresses. The mechanism is the same; the manifestation at each substrate is the substrate's own.

10.2 The Mechanism, Stated as a Driver of a Car

The optimisation mechanism that produces the cascade requires a concrete on-ramp before the empirical record begins. The on-ramp is an analogy the chapter develops at the level the reader can hold without specialised vocabulary.

Consider a driver operating a car with an overheating engine. The car's dashboard registers two things in real time: the speed of the car and the fuel consumption per kilometre. The dashboard updates the speed every fraction of a second. The dashboard updates the fuel consumption every few seconds. The driver, operating the accelerator and the gearstick, optimises the dashboard's metrics. The driver wants to reach the destination quickly while consuming as little fuel as possible.

The engine has a different cycle. The engine's mechanical integrity operates on the cycle of hours: the heat builds up gradually; the lubrication degrades gradually; the metal fatigue accumulates gradually. The dashboard does not register the engine's mechanical state. The driver cannot see, from the dashboard, that the engine is overheating. The driver continues to optimise the speed and fuel metrics. The optimisation produces, at the driver's action-cycle of seconds, the destination-arrival the driver wants. The optimisation produces, at the engine's longer cycle of hours, the engine's catastrophic failure.

The driver is not destroying the engine through any deliberate operation. The driver is optimising the action-cycle's metrics. The engine's mechanical integrity is the substrate the action-cycle's metrics cannot reach. The optimisation operates competently at the action-cycle's resolution. The destruction the optimisation produces accumulates at the engine's longer cycle. The driver's continued optimisation is what produces the engine's destruction. The driver's continued optimisation, at the driver's measurement frame, registers as competent driving.

The analogy carries the chapter's principal claim about the contemporary economic order's continued operation. The order's measurement frame is the quarterly cycle. The order's optimisation operates against the metrics the quarterly cycle registers. The substrates the order's productive operation depends on are the engine. The substrates operate on cycles ranging from one-to-two decades (supplier ecosystems, infrastructure maintenance) through three decades (engineering culture, research and development) to centuries and millennia (ecological capacity). The order's optimisation is competent at the quarterly cycle. The substrates the order's productive operation depends on are being depleted at the substrate cycle. The depletion is not the result of bad management, bad regulation, or bad corporate governance. The depletion is what optimisation against a measurement frame that cannot reach the substrate produces by construction.

The formal mechanism the cybernetic specification Chapter 6 §6.5.1 named the lowest-common-denominator attractor operates through the same structure. A regulator optimising against a measurable behavioural signal at action-cycles substantially shorter than the substrate's replenishment-cycle converges, by mathematical necessity, on the substrate-depleting attractor of the substrate's response distribution. The convergence is not the regulator's intent. The convergence is the optimisation operation's mathematical output given the substrate's response properties. The cascade is what the convergence produces across the substrates the apparatus operates against.

The chapter applies this mechanism to seven productive substrates. Each substrate's analysis follows the same pattern. The substrate is named with its replenishment-cycle. The regulator operating against the substrate is named with its action-cycle. The empirical case documenting the substrate's depletion is presented in concrete terms (a firm, a sector, a date, a measurable outcome). The formal-mathematical reading attaches afterwards. The reader walks into each case before the analytical apparatus attaches to it.

10.3 The First Substrate: Engineering Culture, with Boeing as the Case

The first substrate the chapter documents is engineering culture. The case is Boeing's 737 MAX certification across the period from approximately 1997 to 2019.

Boeing across this period was reorganised. The reorganisation began with the firm's merger with McDonnell Douglas in 1997. The institutional-economic record of the firm's transformation is documented across the academic and trade-press literature (Newhouse 2007, *Boeing versus Airbus: The Inside Story of the Greatest International Competition in Business*; Useem 2019, *The Atlantic*, "The Long-Forgotten Flight That Sent Boeing Off Course"; Tkacik 2019, *The New Republic*, "Crash Course: How Boeing's Managerial Revolution Created the 737 MAX Disaster", October 2019; the cumulative *Seattle Times* journalistic record across the period, with the Pulitzer-Prize-winning aerospace coverage of Dominic Gates and colleagues from 2003 through the post-MAX investigations). The merged firm's senior leadership came predominantly from the McDonnell Douglas side. The leadership's orientation was financial rather than engineering. The firm's executive-compensation apparatus was reoriented around share-price performance. Capital allocation was redirected from research-and-development and capital expenditure toward share buybacks. The cumulative buyback programme from 2013 to 2019 totalled approximately forty-three billion dollars (Boeing 10-K annual filings 2013-2019, retained at the SEC's EDGAR database; the cumulative documentation at Lazonick, Tulum, and Sakinc 2020, *Institute for New Economic Thinking Working Paper Series* No. 145, "Why Stock Buybacks Are Dangerous for the Economy", on the Boeing case as a paradigmatic instance of the financialised-shareholder-value pattern). Research-and-development expenditure as a fraction of revenue declined across the same period. Senior engineering staff retired and were not replaced through the firm's cost-reduced hiring practices. Engineering authority within the firm was reorganised under financial and commercial reporting lines rather than under independent engineering reporting lines. The cumulative reorganisation across the period is documented across the principal post-crisis investigations (Gelles 2022, *The Man Who Broke Capitalism*, especially Chapter 9 on the McDonnell Douglas merger and its consequences for the engineering culture; Robison 2021, *Flying Blind*, on the firm-internal pressure architecture across the certification period; House Committee on Transportation and Infrastructure 2020, *Final Committee Report: The Design, Development & Certification of the Boeing 737 MAX*, especially Chapters 2 and 5 on Boeing's production-pressure culture and the FAA's regulatory dependence on the manufacturer).

In 2015, the firm was developing the 737 MAX as the next iteration of the 737 family. The new aircraft was an updated version of an airframe originally designed in the 1960s. The new aircraft's engines were larger than those of the prior generation and had to be mounted further forward and higher on the wing to maintain ground clearance. The new mounting position altered the aircraft's pitch characteristics under specific flight conditions, particularly during high-angle-of-attack manoeuvres at low speeds. The pitch alteration was being compensated for by a software system the firm was developing called the Manoeuvring Characteristics Augmentation System (MCAS).

A senior engineer at the firm's Renton facility was reviewing the MCAS documentation as part of the certification process. The engineer noted features of the system's design that warranted further examination. The system's authority to command pitch changes was substantial. The system's reliance on a single angle-of-attack sensor rather than redundant inputs was a departure from prior Boeing practice. The system's behaviour in conditions where the sensor produced erroneous readings had not been fully characterised. The engineer raised the concerns through the firm's internal channels. The concerns were registered through the firm's procedures and processed through the Federal Aviation Administration's certification apparatus, which had, across the prior

decade, increasingly delegated certification authority to the manufacturer through a programme known as Organisation Designation Authorisation (House Committee 2020, especially Chapter 5; Joint Authorities Technical Review 2019, *Boeing 737 MAX Flight Control System: Observations, Findings, and Recommendations*, especially the certification-process findings at pp. 21-34). The engineer's concerns were processed within the apparatus's procedures and the certification proceeded across both stages of the apparatus's institutional pipeline: the MCAS received its certification, and the 737 MAX, with the MCAS now certified as part of its flight-control architecture, received its airworthiness certification.

In October 2018, Lion Air Flight 610 crashed shortly after takeoff from Jakarta. One hundred and eighty-nine lives were lost. In March 2019, Ethiopian Airlines Flight 302 crashed shortly after takeoff from Addis Ababa. One hundred and fifty-seven lives were lost. In both cases, the MCAS was a contributing factor. The aircraft's pitch had been altered by the system in response to erroneous sensor inputs; the pilots had attempted to recover; the system had reasserted its commands; the aircraft had crashed (Komite Nasional Keselamatan Transportasi 2019, *Final Report on Boeing 737 MAX-8 PK-LQP*, on the Lion Air investigation; Ethiopian Aircraft Accident Investigation Bureau 2022, *Investigation Report on Accident to Boeing 737-8 MAX, ET-AVJ*, on the Ethiopian Airlines investigation). The 737 MAX fleet was grounded across the global aviation industry for twenty months.

What the case shows is what the chapter's mechanism specifies. The engineering culture at Boeing was the substrate. The substrate's replenishment cycle was approximately thirty years (the career-cycle of senior engineers whose tacit knowledge, accumulated across decades of design and certification work, was the substrate's content). The regulator was the firm's executive-compensation apparatus, operating against share-price metrics at an action cycle of quarterly cadence. The cycle mismatch between the regulator's quarterly action-cycle and the substrate's thirty-year replenishment-cycle is approximately one hundred and twenty to one. The horizon-mismatch theorem at Chapter 5 §5.6 specifies that this ratio forecloses substrate-coupled regulation by construction. The buyback programme, the cost-reduced hiring, the executive-compensation reorientation, and the engineering-authority restructuring are what optimisation against the quarterly action-cycle produces when the regulator's measurement frame cannot reach the substrate's cycle. The engineer at Renton was registering the substrate's depletion (the loss of the accumulated tacit knowledge that would have flagged the MCAS design as inadequate). The apparatus processed the registration through procedures the apparatus's measurement frame could reach. The substrate-depletion continued. The two crashes were the substrate's depletion crossing the threshold that produced effects at the apparatus's measurement frame: the global grounding, the multi-billion-dollar consequences for the firm and the industry, the 346 lives.

The Boeing case is the cascade in miniature, with each stage of the cybernetic apparatus operative in the documentary record: the substrate (engineering culture as a multi-decadal replenishment process) was named, the substrate's replenishment-cycle and the regulator's action-cycle were specified in their respective temporal units, the cycle-mismatch between them was numerical rather than rhetorical, and the substrate-depletion that followed was the empirical outcome the mechanism the chapter has specified produces by construction. The case admits the same analytical pattern at the substrates that follow.

10.4 The Second Substrate: Supplier Ecosystems

The second substrate the chapter documents is the supplier ecosystem. The substrate consists of the network of independent firms supplying parts, components, materials, and specialised services to the order's manufacturing and infrastructure sectors. The ecosystem's replenishment cycle is approximately one to two decades, governed by the time required for new entrant firms to acquire the engineering capability, the production capacity, the supply-chain relationships, and the customer-credentialing necessary for a supplier to compete in the order's principal sectors.

The substrate has depleted across the contemporary period through a procurement consolidation that reduced the number of suppliers in the order's principal sectors below the threshold at which the ecosystem's

redundancy and competitive structure were sustained. The cumulative empirical record is documented across multiple sectors. The automotive supplier collapse following the 2008 financial crisis is one documentary case. The empirical record is documented in the U.S. Government Accountability Office 2010 report *Auto Industry: Lessons Learned from Cash for Clunkers Program*, the Center for Automotive Research 2010 analyses of the supplier cascade (CAR 2010, *Contribution of the Automotive Industry to the Economies of All Fifty States and the United States*), and the academic literature including Klier and Rubenstein 2013, *Economic Perspectives* 37(1), Federal Reserve Bank of Chicago, on the supplier-network reorganisation across the period. The order's procurement apparatus, across the prior decade, had pursued aggressive cost-reduction targets against the supplier base. The cost reduction was achieved through procurement consolidation, single-sourcing arrangements, and the elimination of supplier redundancies (the *Wall Street Journal* and *Automotive News* coverage of the 2008-2010 supplier-collapse cycle documents the cascade pattern, with the principal cycle of supplier bankruptcies and reorganisations spanning the late 2008 through early 2010 period). When the financial-crisis disruption arrived, the consolidated supplier base lacked the redundancy that would have absorbed the disruption. Multiple major suppliers entered bankruptcy. The recovery extended across multiple years. The order's automotive sector required substantial government intervention to maintain supply continuity.

The semiconductor supplier consolidation across the period from approximately 2005 to 2020 is a second documentary case. The order's procurement operations against the semiconductor industry had produced concentration in a small number of supplier firms, with the consolidation reducing the substrate's redundancy. By 2020, the world's leading-edge logic semiconductor manufacturing was concentrated in two firms (Taiwan Semiconductor Manufacturing Company and Samsung Electronics), with the most advanced nodes effectively produced by a single firm at a single geographic location (the empirical record at Khan 2020, *The Semiconductor Supply Chain: Assessing National Competitiveness*, Center for Security and Emerging Technology, Georgetown University; Miller 2022, *Chip War: The Fight for the World's Most Critical Technology*, especially Parts III-IV on the institutional concentration; the Semiconductor Industry Association's 2021 *State of the U.S. Semiconductor Industry* report). The COVID-19 pandemic disrupted supply across 2020-2022. The disruption produced cascading shortages across multiple downstream sectors, with automotive manufacturing, consumer electronics, industrial equipment, and defence systems all experiencing production constraints traceable to the semiconductor supplier base's reduced redundancy.

The rare-earth dependency across the contemporary order's industrial sector is a third documentary case. The empirical record is documented in the U.S. Geological Survey's annual *Mineral Commodity Summaries* across the period; the academic-policy literature at Mancheri, Sprecher, Bailey, Ge, and Tukker 2019, *Resources, Conservation and Recycling* 142, pp. 101-112, on the rare-earth supply-chain architecture; and the institutional record at the Department of Energy's 2011 *Critical Materials Strategy* report (with subsequent updates across the decade). The order's procurement operations had produced dependency on a small number of supplier sources for the rare-earth elements required across multiple industrial sectors (electric vehicle batteries, wind turbines, military electronics, consumer electronics). The dependency produced the conditions under which supply-chain disruptions from a single source could affect production across the order's industrial sector. The 2010 Chinese rare-earth export restrictions demonstrated the vulnerability; the subsequent decade has seen multiple further disruption episodes.

The mechanism is the same as the Boeing case. The substrate is the supplier ecosystem. The substrate's replenishment cycle is one-to-two decades (the time required for new supplier firms to acquire the capacity and credentials to compete). The regulator is the procurement apparatus operating against procurement-cost targets at action cycles of quarterly cadence. The cycle mismatch between the procurement apparatus's quarterly action-cycle and the supplier ecosystem's one-to-two-decade replenishment-cycle is approximately forty to eighty. The horizon-mismatch theorem at Chapter 5 §5.6 specifies that this ratio forecloses substrate-coupled regulation. The procurement consolidation, the single-sourcing, and the elimination of supplier redundancies are what optimisation against the procurement-cost target produces when the action-cycle cannot reach the substrate's cycle. The 2008-2010 supplier collapse, the 2020-2022 semiconductor shortages, and the rare-earth dependency are the substrate-depletion crossing the threshold that produces effects at the apparatus's measurement frame.

10.5 The Third Substrate: Human Capital and the Deaths-of-Despair Pattern

The third substrate the chapter documents is the human-capital substrate at the order's working-age population. The substrate consists of the productive capacity of the order's workforce, with the productive capacity including not only the labour-time the workforce supplies but the educational formation, the social structures supporting workforce participation, the mental and physical health of workforce members, and the institutional pathways through which younger workers acquire the skills and credentials required for productive employment. The substrate's replenishment cycle is approximately one generation (twenty-five years), governed by the time required to form a new cohort of workers from birth through education to full workforce participation.

The substrate has depleted across the contemporary period in a pattern Anne Case and Angus Deaton documented across a series of papers and a 2020 monograph. The pattern is the rise in mortality among non-Hispanic white Americans without a four-year college degree across the period from approximately 1999 to the present, with the mortality increase driven by what Case and Deaton named "deaths of despair": deaths from drug overdose, suicide, and alcohol-related liver disease (Case and Deaton 2015, *Proceedings of the National Academy of Sciences* 112(49), pp. 15078-15083; Case and Deaton 2020, *Deaths of Despair and the Future of Capitalism*, Princeton University Press, especially Chapters 4-6 on the temporal and demographic distribution of the pattern). The mortality increase reversed a century-long trend of declining mortality across the entire population. The reversal was concentrated in the demographic group whose labour-market position had deteriorated most across the period: working-age Americans without college credentials. The pattern is not present in other industrialised economies at the same magnitude; the European patterns across the same period showed continued mortality decline.

Case and Deaton's analysis identified the proximate causes (the opioid epidemic, the decline in marriage and stable family structure among the affected population, the deterioration of community institutions in the regions where the affected population is concentrated). The cumulative literature on the opioid component includes Quinones 2015 (*Dreamland: The True Tale of America's Opiate Epidemic*); Macy 2018 (*Dopesick: Dealers, Doctors, and the Drug Company That Addicted America*); Keefe 2021 (*Empire of Pain: The Secret History of the Sackler Dynasty*); and the academic-medical literature at Cicero, Ellis, and Surratt 2014, *JAMA Psychiatry* 71(7), pp. 821-826, on the epidemiological pattern. The distal cause Case and Deaton identified is the structural deterioration of the labour market position of workers without college credentials across the period from approximately 1970 to the present, with the deterioration including stagnant or declining real wages, the decline of stable manufacturing employment, the rise of contingent and part-time employment without benefits, the geographic concentration of the deterioration in regions whose industrial base had been transferred offshore or restructured under the order's continued operation.

The mechanism is the chapter's optimisation mechanism applied at the labour-market substrate. The substrate is the working-age population. The substrate's replenishment cycle is one generation. The regulator is the labour-market apparatus operating against labour-cost reduction at quarterly action cycles. The cycle mismatch is approximately one hundred to one. The optimisation, conducted across half a century, produced the structural deterioration Case and Deaton document. The deaths-of-despair pattern is the substrate-depletion crossing the threshold at which the depletion produces effects the apparatus's measurement frame can register, with the threshold-crossing producing measurable consequences (declining life expectancy across the affected demographic, rising disability claims, declining workforce participation rates, opioid-related public-health emergencies in the regions of geographic concentration).

The 996 working pattern across the contemporary Chinese technology sector exhibits a different manifestation of the same substrate's depletion at a different demographic. The pattern's empirical documentation is in the Chinese-language academic and trade-press record (the institutional and economic features); the English-language record at the *Financial Times*, *Wall Street Journal*, *Sixth Tone*, and *Caixin Global* coverage across the period; and the policy analysis at Li 2019, 'The 996.ICU Movement in China: Changing Employment Relations and Labour Agency in the Tech Industry', *Made in China Journal* 4(2), pp. 54-59 and its institutional reception. The pattern refers to the working schedule of nine in the morning to nine in the evening,

six days a week, that became widespread across the Chinese technology sector across the period from approximately 2010 to the present (the pattern's empirical documentation across the period is registered in *Wall Street Journal* and *Financial Times* reporting on Chinese technology-sector labour practices; Chinese-language sources including *Caixin* and *Sixth Tone* have documented the pattern's prevalence and its consequences for worker health). The pattern operated against the same substrate (the working-age population's productive capacity) through a different mechanism (the regulator's optimisation against output rather than labour-cost), with the consequences appearing as elevated rates of cardiovascular disease, mental-health deterioration, and suicide among the affected workforce. The substrate's depletion is the formal-mathematical signature of optimisation against output targets at action-cycles substantially shorter than the substrate's replenishment-cycle, with the manifestation differing from the deaths-of-despair pattern at the substrate's specific response properties under the Chinese-sector conditions.

10.6 The Fourth Substrate: Research and Development, and Eroom's Law

The fourth substrate the chapter documents is the research-and-development substrate at the order's principal research-intensive sectors. The substrate's replenishment cycle is approximately three decades, governed by the time required for fundamental research to mature through applied development into productive deployment.

The substrate's depletion is empirically documented in the pharmaceutical sector through what Jack Scannell, Alex Blanckley, Helen Boldon, and Brian Warrington named Eroom's Law: the inverse of Moore's Law, the empirical observation that the cost of developing a new pharmaceutical drug, adjusted for inflation, has approximately doubled every nine years from approximately 1950 to the present (Scannell, Blanckley, Boldon, and Warrington 2012, *Nature Reviews Drug Discovery* 11(3), pp. 191-200, with the original documentation of the pattern; subsequent updates documented at Bloom, Jones, Van Reenen, and Webb 2020, "Are Ideas Getting Harder to Find?", *American Economic Review* 110(4), pp. 1104-1144, on the cross-sector pattern; DiMasi, Grabowski, and Hansen 2016, *Journal of Health Economics* 47, pp. 20-33, on the per-drug development cost trajectory; Schuhmacher, Gassmann, and Hinder 2016, *Journal of Translational Medicine* 14, on the contemporary pharmaceutical-R&D productivity record; Park, Leahey, and Funk 2023, *Nature* 613(7942), pp. 138-144, on declining disruptive innovation across the sciences). The pharmaceutical sector has, across the same period, increased its research-and-development expenditure substantially in absolute terms. The increased expenditure has produced fewer rather than more new drug approvals per unit of expenditure. The productivity collapse is the empirical signature of the research-and-development substrate's depletion.

The cybernetic reading of Eroom's Law follows the same pattern as the prior substrates. The substrate is the research-and-development apparatus, with the apparatus's productive capacity including the long-cycle institutional features (the academic-research pipelines that produce skilled researchers, the experimental infrastructure that supports long-cycle research programmes, the institutional structures that sustain risky exploratory research whose payoffs are uncertain and distant). The substrate's replenishment cycle is multi-decade. The regulator is the research-funding apparatus operating against quarterly-to-annual measurement frames. The cycle mismatch between the regulator's annual action-cycle and the substrate's three-decade replenishment-cycle is approximately thirty to one. The horizon-mismatch theorem at Chapter 5 §5.6 specifies that this ratio forecloses substrate-coupled regulation. The depletion appears as the productivity collapse Eroom's Law documents: more inputs, fewer outputs, with the gap widening across the period.

The pattern operates in similar form across other research-intensive sectors of the order. The basic-research productivity collapse documented across multiple scientific fields (the slowing rate of significant new discoveries per researcher in physics, chemistry, biology, and computer science; the rise of the "productivity puzzle" across the academic-research literature) exhibits the same signature at the fundamental-research substrate (the cumulative documentation at Bloom, Jones, Van Reenen, and Webb 2020, *American Economic Review* 110(4), pp. 1104-1144, on the cross-sector pattern; Park, Leahey, and Funk 2023, *Nature* 613(7942), pp. 138-144, on the long-term decline in disruptive scientific innovation; Cowen 2011, *The Great Stagnation*, on the

cultural-institutional dimensions of the pattern). The pharmaceutical sector's documentation is the most precise empirical record because the sector's regulatory structure (the FDA approval process) produces measurable outputs that admit longitudinal comparison.

10.7 The Fifth Substrate: Infrastructure, and the Texas Grid Failure

The fifth substrate the chapter documents is the infrastructure substrate at the order's civil engineering systems. The substrate consists of the power grids, the water systems, the transportation networks, the communication infrastructure, and the associated maintenance and replacement capacity that the order's continued operation depends on. The substrate's replenishment cycle ranges from one to several decades, depending on the specific infrastructure category.

The empirical case is the Texas electrical grid failure of February 2021. The grid had been operating across the prior decade under conditions documented across the engineering-association literature (the principal sources include the Federal Energy Regulatory Commission and North American Electric Reliability Corporation 2021 joint inquiry *The February 2021 Cold Weather Outages in Texas and the South Central United States*, the comprehensive post-event report; the Electric Reliability Council of Texas 2021 *Review of February 2021 Extreme Cold Weather Event*; the engineering analysis at Busby, Baker, Bazilian, Gilbert, Grubert, Rai, Rhodes, Shidore, Smith, and Webber 2021, "Cascading Risks: Understanding the 2021 Winter Blackout in Texas", *Energy Research & Social Science* 77, article 102106). The grid's isolation from the broader US grid was a feature that limited its resilience to extreme weather events. The grid's natural-gas-heavy generation mix was a feature that produced vulnerability to weatherisation failures during cold-weather events. The grid's deferred-maintenance backlog was a feature documented across multiple regulatory reports. The structural conditions had been registered; the apparatus's measurement frame had translated the registration into apparatus-compatible activity (regulatory-compliance reporting, operational-performance metrics, capital-allocation prioritisation exercises); the substrate continued to deplete.

The February 2021 cold-weather event produced the cascade-failure pattern. The natural-gas supply systems failed to weatherisation. The generation capacity failed to operate. The grid's isolation prevented imports from neighbouring regions. The cascading failures produced multi-day outages affecting millions of households. The Texas Department of State Health Services recorded approximately 246 confirmed deaths attributable to the event. The *Buzzfeed News* excess-mortality analysis (Aldhous and Hirji 2021, updated 2022) argued the true figure was substantially higher and estimated between 426 and 978 deaths, with a best estimate of approximately 702. The state's regulatory response, conducted across the subsequent legislative session, produced documentation and reporting requirements; the features of the grid that had produced the failure remained substantially unchanged at the time of writing.

The mechanism is the same. The substrate is the grid's physical infrastructure plus its maintenance capacity. The substrate's replenishment cycle is multi-decade. The regulator is the rate-payer-cost optimisation apparatus operating against quarterly-to-annual action cycles. The cycle mismatch produces the depletion. The weatherisation requirements that would have prevented the failure had been recommended by the engineering associations for over a decade; the recommendations had been processed through the apparatus's procedures without producing the architectural change the substrate would have required. The February 2021 event was the substrate's depletion crossing the threshold the apparatus's measurement frame could register.

The Mississippi water-system failure of August 2022 (documented in the Environmental Protection Agency's 2022 emergency order and the subsequent investigative record at the *Mississippi Today* and *ProPublica* coverage), the Flint water crisis of 2014-2019 (the institutional record at Pauli 2019, *Flint Fights Back: Environmental Justice and Democracy in the Flint Water Crisis*; Hanna-Attisha 2018, *What the Eyes Don't See: A Story of Crisis, Resistance, and Hope in an American City*), the I-35W Mississippi River bridge collapse of August 2007 (National Transportation Safety Board 2008 *Highway Accident Report NTSB/HAR-08/03*), and the repeated cycle of dam failures across the contemporary period exhibit the same signature at different infrastructure categories. The

American Society of Civil Engineers' quadrennial infrastructure report cards across the period have rated the contemporary U.S. infrastructure substrate at consistently low grades (the 2021 report card gave the overall national infrastructure a grade of C-minus, with multiple categories receiving D-range grades). The grades are the cumulative empirical signature of the substrate-depletion across the categories the report card examines.

10.8 The Sixth Substrate: Ecological Capacity

The sixth substrate the chapter documents is the ecological substrate at the order's surrounding biosphere. The substrate consists of the climate system, the ocean systems, the terrestrial ecosystems, the freshwater systems, and the soil systems that the order's continued operation depends on. The substrate's replenishment cycle ranges from centuries to millennia, with some processes (deep-soil formation, atmospheric carbon cycling, ocean acidification reversal) operating on geological timescales.

The substrate's depletion is the most extensively documented in the academic literature across the contemporary period. The cumulative scientific record is at Hansen, Sato, Hearty, Ruedy, Kelley, Masson-Delmotte, Russell, Tselioudis, Cao, Rignot, Velicogna, Tormey, Donovan, Kandiano, von Schuckmann, Kharecha, Legrande, Bauer, and Lo 2016, *Atmospheric Chemistry and Physics* 16(6), pp. 3761-3812, on the cumulative climate-system observations; the contemporary policy-analytical literature at Stern 2007, *The Economics of Climate Change: The Stern Review*; Nordhaus 2013, *The Climate Casino: Risk, Uncertainty, and Economics for a Warming World*; Ostrom 2010, *American Economic Review* 100(3), pp. 641-672, on the polycentric-governance approach to the climate substrate; Wallace-Wells 2019, *The Uninhabitable Earth*. The Intergovernmental Panel on Climate Change's assessment reports document the cascade pattern (IPCC 2021, *Climate Change 2021: The Physical Science Basis*, especially Chapters 2-6 on the observed climate-system changes; IPCC 2023, *Synthesis Report*, on the cumulative findings across the Sixth Assessment Cycle). The order's continued production of greenhouse-gas emissions across the period since the mid-twentieth century has produced atmospheric concentrations of carbon dioxide and other greenhouse gases that exceed the levels at which the climate system's operation across the prior multi-million-year period stabilised. The elevated concentrations are producing structural changes in the climate system's operation across multiple domains: mean global temperature, regional temperature distributions, precipitation patterns, sea-level rise, ocean acidification, ecosystem reorganisation, extreme-weather event frequency. The cumulative effects are projected to produce multi-century-to-multi-millennial consequences whose magnitude exceeds the order's measurement frame's capacity to register at the action-cycle's resolution.

The order's response across the period has been the apparatus-compatible response. International conventions have been negotiated (the United Nations Framework Convention on Climate Change in 1992, the Kyoto Protocol in 1997, the Paris Agreement in 2015). Domestic legislation has been enacted across multiple jurisdictions. Corporate sustainability-reporting frameworks have been developed. The cumulative emissions across the period of the apparatus-compatible response have continued to rise, with the rate of increase moderating across the contemporary period but the cumulative concentration continuing to grow. The 1.5-degree warming threshold the Paris Agreement identified as the upper bound for avoiding the most severe consequences will, on the IPCC's most recent assessment, be exceeded across the 2020s. The 2-degree threshold the agreement identified as the absolute upper bound will be exceeded across the 2040s on current emission trajectories.

The mechanism is the chapter's mechanism at its most extreme cycle-mismatch. The substrate is the climate system and the related ecological systems. The substrate's replenishment cycle is centuries to millennia. The regulator is the cumulative economic-operation apparatus operating against quarterly-to-electoral action cycles. The cycle mismatch is approximately four hundred to forty thousand (the ratio of the electoral cycle in years to the substrate's replenishment cycle in centuries or millennia). The horizon-mismatch theorem at Chapter 5 §5.6 specifies that this ratio forecloses substrate-coupled regulation by construction. The structural changes the climate-system reports document are what optimisation against the action-cycle's measurement frame produces

when the substrate's cycle is unreachable by any operation the regulator can perform.

The ecological substrate's depletion is the cascade's most catastrophic instance because its replenishment cycle is the longest. A depleted engineering culture can be rebuilt across thirty years; the rebuild requires sustained institutional commitment but the substrate's replenishment is possible. A depleted ecological substrate operates on cycles the order's institutional structures cannot match by any institutional commitment the order can make. The cumulative atmospheric-concentration changes the contemporary order has produced will not, on the geological-timescale evidence, reverse within the order's institutional horizons. The ecological system has been altered at a state from which reversion to the prior state is foreclosed by its own cycle.

10.9 The Seventh Substrate: Cognitive-Emotional Integrity

The seventh substrate the chapter documents is the cognitive-emotional substrate at the order's human population. The substrate consists of the attention, the affective regulation, the capacity for sustained engagement, the capacity for solitude, and the social-cognitive coordination that human individuals require for productive participation in any economic order. The substrate's replenishment cycle is approximately the developmental cycle of the human individual (twenty years for cognitive maturation, with the ongoing capacity-renewal occurring on shorter daily and weekly cycles whose stability depends on the longer developmental substrate).

The substrate has depleted across the contemporary period through the engagement-optimisation apparatus deployed by the major attention platforms (Meta's Facebook and Instagram, ByteDance's TikTok, Google's YouTube, X formerly Twitter, Pinterest, Snap, the principal mobile-application ecosystems). The apparatus optimises against a measurable engagement signal: time-on-platform, scroll-depth, return rates, content-engagement metrics (likes, shares, comments). The signal is measurable in real time. The optimisation operates against the signal at action cycles measured in seconds. The substrate the optimisation operates against is the cognitive-emotional substrate, whose response distribution exhibits a lowest-common-denominator attractor at the limbic-cognitive decomposition Chapter 6 §6.5.1 specified: the substrate produces stronger engagement signals from content that activates threat-response, outrage, fear, anger, and social-comparison anxiety than from content that activates considered reflection, sustained attention, or collaborative deliberation.

The optimisation against the engagement signal converges, by mathematical necessity, on the substrate's lowest-common-denominator attractor. The platforms' recommendation systems propagate the content that produces the strongest engagement signal. The content that produces the strongest engagement signal is the content that activates the substrate's threat-response architecture. The propagation feeds back: users encounter more of the content that activates their threat-response architecture; the activation reinforces the engagement signal; the signal reinforces the propagation. The cycle iterates across users measured in billions and content-deliveries measured in trillions.

The substrate-depletion is empirically documented across multiple measurement frames. The platform-architecture analysis is anchored in Zuboff 2019 (*The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*, especially Parts II-III on the engagement-optimisation apparatus's institutional architecture); Wu 2016 (*The Attention Merchants: The Epic Scramble to Get Inside Our Heads*); and Pariser 2011 (*The Filter Bubble: What the Internet Is Hiding from You*). The adolescent-mental-health pattern documented by Jonathan Haidt across his recent work (Haidt 2024, *The Anxious Generation*, Penguin Press, especially the chronological analysis at Chapters 3-5 of the rapid mental-health deterioration across the post-2012 period in the demographic cohort that adopted smartphone-and-platform usage during early adolescence) shows the empirical signature of the substrate's depletion at the developmental cohort whose substrate-formation occurred during the platforms' deployment. The clinical-psychiatric literature has registered the pattern across multiple countries: Twenge and colleagues at San Diego State (Twenge, Joiner, Rogers, and Martin 2018, *Clinical Psychological Science* 6(1), pp. 3-17), the U.S. Surgeon General's 2023 advisory on social media and youth mental health, the Canadian Paediatric Society's 2024 position statement, the parallel pattern across the Nordic countries

documented in their national health-monitoring systems.

The mechanism is the cycle-mismatched regulation the chapter has documented at the prior substrates, operating at the cognitive-emotional substrate with its specific response properties. The regulator is the recommendation algorithm operating at action cycles of seconds. The substrate's developmental cycle is twenty years for cognitive maturation. The cycle mismatch is approximately ten-to-the-eighth (the lowest-common-denominator attractor specified at Chapter 6 §6.5.1; the formal mathematical structure at Chapter 5 §5.6). The substrate-depletion is what the regulator's continued optimisation produces by construction.

The cognitive-emotional substrate is the substrate at which the cascade's mechanism produces its sharpest developmental and civilisational consequences. The depletion of the engineering culture produces aircraft crashes. The depletion of the supplier ecosystem produces supply-chain disruptions. The depletion of the cognitive-emotional substrate produces the cumulative deterioration of the order's human population's capacity for productive participation in any economic order. The substrate is upstream of the other substrates. A workforce whose cognitive-emotional substrate has been depleted cannot rebuild the engineering culture, cannot maintain the supplier ecosystem, cannot sustain the research-and-development pipeline, cannot administer the infrastructure, cannot deliberate about the ecological substrate. The depletion of the cognitive-emotional substrate forecloses the order's capacity to address the depletion at the other substrates.

The contemporary AI laboratories' development apparatus is downstream of the engagement seam the present section documents. The AI systems being trained across the contemporary period are being trained on the corpus the engagement-optimisation apparatus has produced. The lowest-common-denominator attractor's content is over-represented in the training distribution because that content is what the engagement-signal apparatus selected for during the corpus's accumulation. The AI seam inherits the substrate-depletion the engagement seam has produced; the two seams operate the same mechanism at different substrates; the cascade is one cascade.

10.10 The Cascade as One Mechanism: The Mismatch-Ratio Table

The chapter has documented the cascade across seven productive substrates. Each substrate exhibits the same formal-mathematical signature: a regulator optimising against measurable signals at action cycles substantially shorter than the substrate's replenishment cycle produces, by mathematical necessity, substrate-depletion proceeding at the substrate's own cycle. The signature can be tabulated.

Substrate	*Regulator action-cycle*	*Substrate replenishment-cycle*	*Mismatch ratio*	*Empirical signature*
Engineering culture	Quarterly (~90 days)	~30 years	~120	Boeing 737 MAX
Supplier ecosystems	Quarterly	~10-20 years	~40-80	2008-10 supplier collapse, 2020-22 semiconductor shortages
Human capital	Quarterly	~25 years	~100	Deaths-of-despair pattern, *neijuan*
Research and development	Annual	~30 years	~30	Eroom's Law
Infrastructure	Quarterly-to-annual	~10-50 years	~40-200	Texas grid failure, ASCE C-minus

Substrate	*Regulator action-cycle*	*Substrate replenishment-cycle*	*Mismatch ratio*	*Empirical signature*
Cognitive-emotional integrity	Seconds	~20 years	~10^8	Adolescent mental-health pattern
Ecological capacity	Electoral cycle	~100 to 10,000 years	~400 to 40,000	Climate-system structural change

The table records, for each substrate, the regulator's action-cycle, the substrate's replenishment-cycle, the cycle-mismatch ratio, and the empirical case the chapter has documented. The mismatch ratios span approximately six orders of magnitude, from the engineering culture's factor of one hundred and twenty to the cognitive-emotional substrate's factor of approximately one hundred million. The cascade operates at every substrate the order's continued production depends on, with the substrates' specific manifestations differing at the substrates' own response properties.

The cascade is not seven independent phenomena that happen to coincide. The cascade is the same regulator operating against substrates the regulator's measurement frame cannot reach. The regulator is the contemporary financialised order's price-mechanism, operating at the cycles Chapter 9 documented. The substrates are the productive substrates the order's continued operation depends on. The cycle-mismatch is what Chapter 5 §5.6's horizon-mismatch theorem identified as the condition under which substrate-coupled regulation is foreclosed by construction; the cumulative empirical signature the theorem predicted is what the diagnostic findings of the present chapter and the substrate analyses Chapter 11 conducts stand as. The cascade is the empirical signature the theorem predicted.

This is what the chapter has shown. The seven productive substrates exhibit substrate-depletion across the contemporary period at the rates the cycle-mismatch ratios specify. The cumulative pattern is what the order's continued operation produces. The order's defenders, encountering individual substrate-depletions, sometimes reply that the depletion at any particular substrate is contingent on the particular sector's regulatory structure, the particular firm's management practices, or the particular institutional features of the substrate's specific context. The cascade pattern forecloses the contingent reading. The same mechanism produces the same signature at seven substrates whose specific institutional features differ across nearly every dimension that could differ. What the substrates share is the cycle-mismatch against the contemporary order's quarterly-cycle regulator. The cycle-mismatch is the constant. The depletion is what the cycle-mismatch produces by construction.

The chapter has now consolidated the cascade across the seven productive substrates. The remaining sections document the eighth substrate, which is categorically distinct from the first seven and which closes the chapter with the cascade's two-faced character.

10.11 The American Anomalies

The chapter requires the registration of two cases that are not anomalies in the colloquial sense but are documented departures from the order's dominant pattern. The two cases are Tesla and SpaceX.

Tesla was founded in 2003 and Elon Musk became its principal investor and chairman in 2004. Across the period from 2008 to the present, the firm has built domestic manufacturing capacity at a scale that no other American automotive entrant has achieved since the consolidations of the 1950s: vehicle assembly plants in Fremont and Austin, a battery-cell manufacturing operation at Sparks, a vertically integrated supply chain whose internalisation extends to lithium refining and motor manufacture. The firm operated for most of this period at quarterly losses while continuing to build long-cycle productive capacity, which is the inverse of the pattern the chapter has documented across the order's typical large-capitalisation firms.

SpaceX was founded in 2002 and has built across the same period the operational architecture of orbital launch and satellite manufacture at scales no contemporary Western firm and few national space agencies have matched. The firm developed reusable orbital-launch vehicles through an extended programme of capital-intensive iteration whose payoff horizons exceeded the action cycles of any conventional capital-market funding mechanism; the development was conducted while the firm operated at programmatic losses sustained across more than a decade. The firm has subsequently built the Starlink satellite constellation, which is the first operational architecture of its category and which required sustained long-cycle investment of the kind the chapter has documented as foreclosed across the order's typical positions.

The two cases share a set of institutional features that the order's dominant selection channels do not, on the typical pattern the chapter has documented, produce. Both firms operated under the leadership of an entrepreneur whose institutional position was external to the order's normal executive-selection channels; both firms accessed capital through arrangements that did not require operation against the order's quarterly-cycle measurement frame; both firms conducted long-cycle investment programmes whose payoff timelines exceeded the order's typical measurement frame's resolution.

The two cases' significance for the chapter's analysis is twofold. First, the order's features do not, in the strongest possible sense, foreclose substrate-coupled operation by every position the order permits; the foreclosure operates as the order's typical outcome rather than as the order's architectural foreclosure outcome. The positions from which Tesla and SpaceX operated were available, however rare. Second, the order's typical institutional positions, the positions the cascade chapters' empirical record has documented, do not occupy the order's full operational space; the space includes positions from which substrate-coupled operation has been conducted, with the positions being external to the order's dominant selection mechanisms. The cascade chapters' findings are findings about the order's typical positions rather than findings about the order's architecturally available positions.

10.12 Why the Architecture Cannot Self-Correct

The cascade's empirical record has been specified. The question the chapter must register before its closing section is the question of why the order has not corrected itself across the period the cascade has been documented. The substrate-depletion is empirically visible to the order's own institutions, recorded in the order's own peer-reviewed literature, and present in the order's own internal management reports. The order's continued operation has not, across the period, reconfigured the architectural features that produce the depletion.

The answer is not that the order's participants do not see the depletion. The Boeing engineers saw the engineering-culture depletion; the FAA inspectors saw it; the academic literature documented it. The procurement officers and supply-chain managers saw the supplier-ecosystem consolidation; the trade-press journalism documented it; the post-pandemic reports specified it. The labour economists saw the deaths-of-despair pattern; Case and Deaton named it; the public-health authorities registered it. The pharmaceutical executives and policy analysts saw Eroom's Law; Scannell and colleagues documented it; the FDA registered the slowing approval rate. The engineers at ERCOT saw the Texas grid's vulnerability; the American Society of Civil Engineers' report cards graded the infrastructure substrate; the cumulative documentation extended across more than a decade prior to the February 2021 failure. The platform engineers and the clinical psychiatrists saw the adolescent mental-health pattern; Haidt, Twenge, the Surgeon General's office, and the international health authorities documented it. The climate scientists saw the ecological substrate's depletion; the IPCC assessment reports across more than three decades documented it.

The answer is that the order's communicative-architectural apparatus is configured to translate the recognition of depletion into apparatus-compatible activity that does not address the depletion. The translation is the three-mechanism apparatus Chapter 6 §6.9.1 specified, operating at architectural scale.

The first of the three mechanisms is absorption, by which reform proposals are absorbed into compliance infrastructure that operates against measurable apparatus-compatible variables while leaving the architectural

feature the reform was directed at unchanged. The Sarbanes-Oxley legislation following the early-2000s accounting scandals (Enron, WorldCom, Tyco, Adelphia) was enacted with the stated purpose of preventing similar frauds and restoring investor confidence in the integrity of financial reporting. The institutional record is documented across U.S. Public Law 107-204; Romano 2005, *Yale Law Journal* 114(7), pp. 1521-1611; Coates and Srinivasan 2014, *Accounting Horizons* 28(3), pp. 627-671. The legislation's apparatus-compatible elements were absorbed into compliance infrastructure: the Public Company Accounting Oversight Board was constituted; internal-controls reporting requirements were codified at Section 404; CEO and CFO certification requirements were established at Section 302; whistleblower protections were enacted; auditor-rotation rules were partially adopted. The apparatus-incompatible elements, the elements that would have reconfigured the order's selection mechanism so that the order's executive-compensation structure no longer rewarded short-cycle metric-optimisation against long-cycle substrate-depletion, were not enacted. The legislation produced more apparatus and did not reconfigure the order's selection mechanism. The post-Sarbanes-Oxley financial architecture's substrate-depletion across the engineering culture, the supplier ecosystem, and the research-and-development substrates continued through the 2008 financial crisis and beyond, with the compliance infrastructure operating as apparatus-compatible activity that did not address the underlying mechanism the legislation purported to constrain.

The Dodd-Frank legislation following the 2008 financial crisis exhibits the same absorption pattern at the next institutional generation (Financial Crisis Inquiry Commission 2011, *The Financial Crisis Inquiry Report*; Krippner 2011, *Capitalizing on Crisis*, especially the Conclusion on the post-crisis regulatory pattern; Lazonick 2014, *Profits Without Prosperity* and subsequent work). The legislation's stated purpose was to prevent the recurrence of the 2008 systemic crisis. The apparatus-compatible elements were absorbed: the Volcker Rule with its substantial subsequent revision, the Consumer Financial Protection Bureau, the Financial Stability Oversight Council, the orderly-liquidation authority, the swaps-pushout provisions with their subsequent partial repeal. The apparatus-incompatible elements, the elements that would have reconfigured the order's regulatory-capture mechanism so that the order's regulatory authority no longer flowed through the order's industry-funded-research infrastructure and through the order's industry-employment-trajectory infrastructure for regulators' subsequent careers, were not enacted. The order's regulatory-capture mechanism remained operative across the post-Dodd-Frank period; the order's industry-funded-research infrastructure expanded; the order's regulatory-employment-trajectory infrastructure intensified. The Federal Reserve's standing apparatus continued to operate at the action-cycle the horizon-mismatch theorem §5.6 specified as incompatible by construction with substrate-coupling. The order's substrate-depletion across the cascade chapters' substrates continued and, in several cases, accelerated. The analytical literature on regulatory capture and the institutional reproduction of the financialised order across the post-Dodd-Frank period includes Coffee 2015, *Cornell Law Review* 100(5), pp. 1019-1082, on the Volcker Rule's evolution; Macey 2013, *The Death of Corporate Reputation*, on the institutional architecture of the financial-services sector across the post-crisis period; Stiglitz 2010, *Freefall: America, Free Markets, and the Sinking of the World Economy*, on the political-economic dimensions; Tooze 2018 (*Crashed*), Chapter 16-19 on the regulatory record.

The second mechanism is attenuation, by which reform proposals are processed through the apparatus's procedures across timescales that reduce the proposals' substantive content to compatible-activity variables that the apparatus can manage. The third mechanism is decomposition, by which reform proposals that combine multiple architectural-correction elements are decomposed into separable components, with the components processed through the absorption and attenuation pathways individually rather than jointly. The mechanisms operate together at the institutional architecture's standing operation; the cumulative effect is the architectural feature being preserved across multiple cycles of attempted reform.

The chapter's diagnostic finding is the agent-evacuated autonomy. The agency required to amend the architecture has not vanished from the participants' personal capacity. The participants retain substantial individual capacity for substrate-protective recognition, substrate-protective preference, and substrate-protective deliberation. What has been evacuated is the institutional-positional availability of the personal capacity. The agency has been evacuated from the institutional positions through which the personal capacity could be

deployed, with the order's selection mechanism configured so that the institutional positions are occupied by participants whose personal capacity has been pre-aligned with apparatus-compatible activity, or by participants whose institutional position requires the personal capacity to be subordinated to apparatus-compatible activity, or by participants whose personal capacity has been cultivated under the order's career-development apparatus to be apparatus-compatible from the moment the participant entered the order's professional pipeline. The agency has not gone missing from the participants who once exercised it; it is no longer available at the institutional positions through which the agency could amend the architecture, which is the cascade's specification at the level of why the order cannot self-correct from inside its own positions. The order's institutional positions have been emptied of the agency that could correct them, while the agency and the positions both continue to exist as separate elements of the order. The connection between them has been severed by the order's selection mechanism, by the order's career-pipeline apparatus, and by the order's communicative-architectural grammar that pre-empts the framing question from the order's discourse.

10.13 The Eighth Substrate: The Transactional Substrate

The chapter has documented the cascade across seven productive substrates. The eighth substrate is categorically distinct from the first seven.

The first seven substrates are productive substrates the order's action cycle cannot reach. The depletion at each is produced through architectural blindness: the architecture is unable to register what is happening at the substrate's own cycle as a candidate decision variable. Engineering culture, supplier ecosystems, human capital, research and development, infrastructure, ecological capacity, and cognitive-emotional integrity share the property that the architecture's measurement frame cannot, at the action cycles the architecture operates at, see what is happening at each substrate's own cycle.

The eighth substrate is the transactional one the order's optimisation apparatus is actively converting. The architecture sees the substrate. The architecture is optimising against the substrate. The substrate's continued operation is what makes the architecture's continued optimisation commercially possible. The depletion at the eighth substrate operates through architectural conversion rather than architectural blindness. The distinction is the chapter's closing diagnostic finding.

The transactional substrate is the institutional precondition the price-mechanism arguments themselves presuppose. The Hayekian argument the libertarian tradition's contemporary discourse defends rests on a specific institutional architecture: the fixed-price tag at the point of sale, the publicly displayed price that all transacting agents face under identical terms, the price as a public good that aggregates dispersed substrate-coupled knowledge through the participants' voluntary exchanges. The argument does not work at any price-formation architecture. The argument requires the public, identical, single-price-per-good architecture the modern retail-pricing system was constructed to provide.

The architecture in question is not natural in the sense of having always obtained; it was constructed at a specific historical moment, through a specific institutional reform, by a specific actor. The actor was the Philadelphia merchant John Wanamaker, and the institutional reform was the introduction of the price tag at fixed and publicly displayed prices, in his Philadelphia department store, across the 1860s and 1870s. The next section documents the reform and what its reversal means.

10.14 The Wanamaker Inversion

The chapter closes with what it calls the Wanamaker inversion, after the actor whose nineteenth-century institutional construction is being reversed by the contemporary platform-pricing architecture.

The 1865 institutional construction. John Wanamaker opened his Philadelphia retail operation in 1861 and introduced, across the following decade, the practice of marking each item with a fixed publicly displayed price (the principal historical sources are Strasser 1989, *Satisfaction Guaranteed: The Making of the American Mass*

Market, especially Chapters 1-3 on the institutional construction of fixed pricing; Friedman 2004, *Birth of a Salesman: The Transformation of Selling in America*, especially Chapters 2-4 on Wanamaker and the parallel innovations across the late nineteenth century at A.T. Stewart in New York and Le Bon Marché in Paris; Howard 2015, *From Main Street to Mall: The Rise and Fall of the American Department Store*, especially Chapter 1 on the period). Before Wanamaker's innovation, retail pricing operated through dyadic negotiation: each transaction was a bilateral haggling process between the seller, who knew what the seller would accept, and the buyer, who knew what the buyer would pay. The negotiation outcome depended on the relative skill, information, and bargaining position of the two parties. Different customers paid different prices for the same goods, based on the seller's read of each customer's circumstances, preferences, and bargaining capacity.

Wanamaker's innovation was to display a single price for each item, available to all customers under identical terms. The historical record is documented across the business-history literature including Leach 1993 (*Land of Desire: Merchants, Power, and the Rise of a New American Culture*, especially Chapters 1-3 on the late-nineteenth-century retail transformation); Whitaker 2006 (*Service and Style: How the American Department Store Fashioned the Middle Class*); and Tedlow 1990 (*New and Improved: The Story of Mass Marketing in America*, especially Chapter 4 on the Wanamaker and Strawbridge institutional construction). The innovation was institutional rather than technological. The technological capacity to display prices had existed for centuries. What Wanamaker constructed was the institutional commitment to honour the displayed price for every customer regardless of the customer's circumstances. The commitment was anchored by a money-back guarantee: any customer dissatisfied with the purchase could return the item for full refund. The combination of fixed publicly displayed prices and the money-back guarantee constructed an institutional architecture in which the price was a public good, the transaction terms were identical across customers, and the seller's profit derived from the price's spread above cost rather than from differential extraction across customers.

The libertarian tradition's price-mechanism arguments rest on the Wanamaker architecture. The Hayekian aggregation requires that the price be a public good. The price aggregates dispersed knowledge through participants' voluntary exchanges only if the participants face identical terms at the point of exchange. Differential pricing dissolves the aggregation: each customer faces a different price; the price each customer faces is the seller's estimate of the customer's reservation price; the aggregate price-signal degrades into the population of individualised reservation-price estimates the seller has computed. Bastiat's broken-window analysis presupposes the Wanamaker architecture; Mises's calculation argument presupposes it; Hayek's 1945 paper presupposes it. The arguments do not apply to a price-formation architecture that operates through differential pricing.

The algorithmic reversal. The contemporary platform-pricing architecture has, across the period from approximately 2010 to the present, reversed the Wanamaker construction. Personalised pricing is now the operating mode across the major retail platforms. Amazon's price for a product depends on the customer's prior purchase history, the customer's device, the customer's location, the customer's inferred price sensitivity. The major airline reservation systems display different fares to different customers for the same flights based on the customer's apparent willingness to pay. The dynamic-pricing systems at hotel-booking platforms, ride-share platforms, ticket marketplaces, and grocery delivery services all operate through differential pricing optimisation against measurable customer-attribute signals. The Federal Trade Commission's 2024 staff report on personalised pricing documents the practice's prevalence across the contemporary retail substrate (FTC 2024, *Surveillance Pricing*, U.S. Federal Trade Commission, July 2024; the European Commission's 2018 *Consumer Market Study on Online Market Segmentation Through Personalised Pricing/Offers in the European Union* (Ipsos, London Economics and Deloitte for DG JUST); the academic literature including Acquisti, Taylor, and Wagman 2016, *Journal of Economic Literature* 54(2), pp. 442-492, on the economics of privacy and the pricing implications; Mikians, Gyarmati, Erramilli, and Laoutaris 2012, "Detecting Price and Search Discrimination on the Internet", *Proceedings of the 11th ACM Workshop on Hot Topics in Networks*; Hannak, Soeller, Lazer, Mislove, and Wilson 2014, "Measuring Price Discrimination and Steering on E-commerce Web Sites", *Proceedings of the 14th ACM Internet Measurement Conference*, on the empirical detection of personalised pricing across the major U.S. and European platforms).

The platform's economic position depends on the differential pricing. The platform's optimisation extracts customer-specific surplus that the Wanamaker architecture's identical-pricing rule would have left with the customer. The aggregate revenue gain across millions of customers and billions of transactions is what makes the platform's commercial position profitable at the margins the platform operates against. The differential pricing is not incidental to the platform's commercial model. The differential pricing is constitutive of the platform's commercial model.

The Hayekian price-inversion. What has been inverted is not the price-formation mechanism's existence (prices are still being formed, transactions are still occurring, exchanges are still being aggregated). What has been inverted is the price's institutional character. The Wanamaker price was a public good aggregating dispersed substrate-coupled knowledge across participants facing identical terms. The platform price is a private good produced by the platform's optimisation against each customer's individual reservation-price estimate. The customer encounters what looks like a market price; what the customer is encountering is the platform's optimised extraction estimate. The market the customer perceives is the user-interface layer; the operating-system layer is the platform's optimisation apparatus.

The pre-1865 condition reinstated at industrial scale. The contemporary retail substrate has been returned to the pre-Wanamaker condition. Different customers pay different prices for the same goods, based on the seller's read of each customer's circumstances, preferences, and bargaining capacity. The reading is no longer conducted by an individual seller across a dyadic negotiation; the reading is conducted by the platform's surveillance infrastructure across the customer's complete digital transaction history. The reading is more accurate than any nineteenth-century seller's read could have been because the data on each customer is more extensive than any individual seller could have collected. The institutional architecture that Wanamaker constructed and that the libertarian tradition's price-mechanism arguments presuppose has been dissolved by the contemporary platform infrastructure across the period from approximately 2010 to the present. The dissolution operates at a substrate the libertarian tradition's contemporary defenders cannot see, because the dissolution operates at the institutional precondition the defenders' arguments presuppose rather than at the formal mechanism the arguments discuss.

The mismatch ratio at the transactional substrate. The platform's optimisation cycle operates at action cycles measured in milliseconds (the cycle at which the platform updates the price displayed to each customer based on the customer's behavioural-signal data). The institutional substrate the platform is converting (the Wanamaker-architecture institutional commitment to identical-pricing rules across customers) operates at a multi-generational cycle (the institutional commitment took approximately fifty years to construct across the late nineteenth century and the early twentieth century, with the legal and regulatory architecture that anchored it taking the further generation to consolidate). The mismatch ratio at the transactional substrate is approximately ten-to-the-twelfth. The horizon-mismatch theorem at Chapter 5 §5.6 specifies that this ratio forecloses substrate-coupled regulation by construction. The platform's optimisation cycle cannot, by construction, register the institutional substrate's depletion at the substrate's own cycle.

The *autoaccroissement* signature. The eighth substrate's depletion exhibits the Ellulian self-augmentation signature the cybernetic specification at Chapter 6 §6.5.1 named the lowest-common-denominator attractor. The platform's optimisation against the differential-pricing margin produces, by mathematical necessity, the substrate's continued depletion. The optimisation extracts more customer-specific surplus across each iteration; the customer's experience of the price-formation architecture becomes more individualised across each iteration; the institutional commitment to identical-pricing rules becomes weaker across each iteration. The cycle iterates at the platform's millisecond action cycle; the institutional substrate degrades at the substrate's multi-generational cycle; the cumulative depletion is the signature of cycle-mismatched regulation operating against the institutional precondition the libertarian tradition's arguments presuppose.

The cascade's closing move. The chapter has documented the cascade across seven productive substrates the order's action cycle cannot reach. The chapter has now documented the cascade at the transactional substrate the order's optimisation apparatus is actively converting. The eighth substrate is categorically distinct from the first seven. The first seven substrates operate through architectural blindness: the architecture cannot see the substrate

it is depleting because the substrate's replenishment cycle is invisible to the architecture's measurement frame. The eighth substrate operates through architectural conversion: the architecture sees the substrate, the architecture is optimising against the substrate, and the substrate's continued operation is what makes the architecture's continued optimisation commercially possible. The cascade has moved from blindness to conversion.

The architecture's continued operation across the seven productive substrates is sustained by the architecture's blindness to what its continued operation produces. The architecture's continued operation across the eighth substrate is sustained by the architecture's active conversion of the institutional condition the architecture's continued operation requires. The cascade is not contingent on the particular substrates the chapter has documented; the cascade is the predictable output the architecture produces by construction, with the chapter's eight substrates being eight instances of one form rather than eight separate phenomena that happen to share a name. The chapter that follows applies the same apparatus to the Chinese order symmetrically.

CHAPTER 11

The Same Machine, the Different Steering Wheel

11.0 What This Chapter Asks

The chapter takes up the contemporary Chinese economic order. The order has emerged across the period from the 1978 reform-and-opening initiation to the present and operates today as the world's second-largest economy by nominal GDP and the largest by purchasing-power parity. The order's institutional architecture, documented across the principal Sinological literature (Naughton 2018, *The Chinese Economy: Adaptation and Growth*, second edition, MIT Press, especially Chapters 4 and 18 on the planning apparatus and the regulatory architecture; Heilmann 2017, *China's Political System*, Rowman and Littlefield, especially Parts II-III on the institutional reproduction of Party-state coordination capacity; Lin 2022, *The State, Market, and Inequality in China*, Routledge, on the contemporary period; Lardy 2019, *The State Strikes Back: The End of Economic Reform in China?*, Peterson Institute for International Economics, on the post-2012 institutional realignment), is the case the chapter encounters on the order's own terms before any comparison with the Western order is conducted.

The chapter's procedure is symmetric application. The same cybernetic analysis and the same Ellulian analysis the prior chapters constructed are deployed at the Chinese order across the same set of substrates Chapter 10 documented at the Western order. The chapter takes no normative position on either order before the analysis begins and reaches no normative conclusion at the end. The procedure is what produces the chapter's findings; the findings are not what the chapter sets out to demonstrate.

The substrates the chapter examines are the same substrates Chapter 10's cascade analysis examined: the property sector, the human-capital substrate, the paradigm-innovation substrate, and the information-feedback substrate, taken up across §§11.4-11.7. The comparison with the Western order is conducted in §11.10 once the symmetric application has produced its empirical record.

11.1 The Same Analysis, the Same Theorem

The cybernetic results from Chapter 5 and Ellul's analysis of *la technique* from Chapter 6 operate at the same analytical level in both orders. The chapter's symmetric application is the deployment of these resources against the Chinese order's institutional record, with the same theorems and the same diagnostic instruments that were deployed against the Western order across Chapters 10 and 11.

The Conant-Ashby theorem (Conant and Ashby 1970) establishes that every good regulator of a system must be a model of that system. The theorem applies at the Chinese order's regulators in the same form it applies at the Western order's regulators. A Chinese financial regulator without a model of the Chinese financial substrate cannot stabilise the substrate; the regulator's stabilising operation requires a model of what the regulator is regulating. The theorem produces the same analytical question: what does the Chinese regulator have a model of,

and how does the model relate to the substrate the regulator is operating against?

Ashby's Law of Requisite Variety (Ashby 1956) operates symmetrically. The variety of disturbances the regulator must absorb must be matched by the regulator's own variety; insufficient regulator-variety against substrate-disturbance-variety produces, by the law's specification, substrates the regulator cannot stabilise. The Chinese order's regulators face the same variety question the Western order's regulators face: which substrates' disturbance-variety the regulator can absorb, and which substrates' disturbance-variety exceeds the regulator's resolution.

The horizon-mismatch theorem derived at Chapter 5 §5.6 specifies that a regulator operating at action-cycles substantially shorter than the substrate's replenishment-cycle cannot, by construction, model the substrate at the substrate's cycle. The theorem applies symmetrically at the Chinese order's action-cycle structure. The Chinese order's regulators operate at specific action-cycles. The substrates the Chinese order's continued operation depends on have specific replenishment-cycles. The cycle-mismatch ratios at the Chinese order admit empirical specification. The substrates at which the Chinese order's cycle-mismatch ratio exceeds the small constant the theorem identifies are the substrates at which the Chinese order's regulator cannot, by construction, stabilise the substrate.

The cybernetic analysis is not the chapter's normative instrument. It is the chapter's analytical instrument. The analysis delivers the same verdicts at the same regulator-substrate relations regardless of the institutional architecture in which the regulator is embedded. The chapter's symmetric application demonstrates that the cybernetic analysis operates at the Chinese order's regulators and produces, at each substrate, the same analytical findings the analysis produced at the Western order's regulators, with the specific findings depending on the specific action-cycle and substrate-cycle parameters at each substrate.

11.2 The Chinese Order on Its Own Terms

The chapter's analysis requires a brief specification of what the Chinese order is, at the level the cybernetic results operate against. The specification is not a comprehensive account of the Chinese order's history, institutional structure, or political economy; the specification is what the chapter's analysis needs to apply.

The contemporary Chinese economic order, in the form the chapter analyses, has emerged across the period from approximately 1978 to the present. The order was reorganised under the leadership of Deng Xiaoping following the reform-and-opening period that began in 1978. The reorganisation introduced market mechanisms into an economic structure that had previously operated through central planning. The market mechanisms have operated within an institutional architecture that has retained the Communist Party of China as the order's principal political authority, with the Party's role in coordinating economic policy operating through institutional channels that have no direct equivalent in the Western order.

The order's principal institutional features the chapter's analysis requires include the following. The state-owned enterprise sector remains substantial across multiple strategic industries, with the state retaining ownership stakes in firms operating in finance, telecommunications, energy, transportation, and defence. The financial sector operates through state-owned commercial banks whose principal functions include credit allocation directed by the Party-state's planning priorities. The order's principal planning instrument is the Five-Year Plan, which sets sectoral targets across the economy at multi-year action cycles. The order's local administrative structure operates through provincial, prefectural, and municipal governments whose senior officials are appointed and rotated by the Party-state's cadre-management apparatus.

The cadre-rotation system operates at three-to-five-year cycles. The system rotates senior administrative officials across positions across the order's regional and functional administrative structure, with the rotation's principal function being the prevention of localised institutional capture. The three-to-five-year cycle is compatible with certain substrates' replenishment-cycles and incompatible with others; the cycle's specific compatibility depends on the substrate the rotated official is operating against.

The order's principal sources for the chapter's analysis include the comprehensive institutional accounts at Naughton 2018, *The Chinese Economy: Adaptation and Growth*, second edition, MIT Press, especially Chapters 4-7 on the institutional architecture; Rithmire 2023, *Precarious Ties: Business and the State in Authoritarian Asia*, Oxford University Press, on the institutional relations between the state and the order's principal firms; Pearson, Rithmire, and Tsai 2021, "Party-State Capitalism in China", *Current History* 120(827), pp. 207-213, on the state-capital relation; Hsueh 2011, *China's Regulatory State: A New Strategy for Globalization*, Cornell University Press, on the order's regulatory architecture; Brandt and Rawski 2008 (eds.), *China's Great Economic Transformation*, Cambridge University Press, on the post-1978 macroeconomic record; Heilmann 2017, *China's Political System*; and the contemporary historical-analytical record at Lardy 2019, *The State Strikes Back: The End of Economic Reform in China?*, Peterson Institute for International Economics, on the post-2012 institutional realignment. The empirical record across these sources is the chapter's documentary anchor for the analyses that follow.

11.3 What the Cycle-Match Pattern Differs On

The Chinese order's action-cycle structure operates against substrates the Western order's action-cycle structure operates against, but the relation between the order's action cycles and the substrates' replenishment cycles differs across the substrates. The chapter inspects the differences before the substrate-by-substrate cascade analyses begin.

The Chinese order operates against several substrates at action cycles compatible with the substrates' replenishment cycles. The Five-Year Plan's multi-year action cycle is compatible with the multi-year planning horizons required for industrial-policy substrates: semiconductor capacity, electric-vehicle battery manufacturing, industrial-cluster development, rail and infrastructure networks, manufacturing-capacity expansion, supply-chain depth, the STEM education pipeline. The cadre-rotation system's three-to-five-year cycle is compatible with prefecture-and-municipal-level substrates whose planning horizons fall within the rotation's interval. The state-owned commercial banks' credit-allocation operations can be directed against substrates whose replenishment cycles operate at multi-year horizons, with the directed credit allocation not requiring the action-cycle compression that the contemporary Western order's market-driven credit allocation operates under.

The Chinese order operates against other substrates at action cycles incompatible with the substrates' replenishment cycles. The local-administrative apparatus's three-to-four-year mayoral cycle is incompatible with the multi-decade infrastructure-maintenance cycle at the municipal level. The cadre-rotation system's interval pressures officials to demonstrate measurable progress within the interval, which is incompatible with substrate-investment programmes whose payoffs operate beyond the rotation cycle. The household-cognitive-emotional substrate operates against the same engagement-optimisation cycle the Western order operates against, with the same lowest-common-denominator attractor producing the same substrate-depletion at the substrate's cycle.

The pattern is that the Chinese order's action-cycle structure produces substrate-coupling at substrates whose replenishment cycles fall within the multi-year planning horizon and substrate-depletion at substrates whose replenishment cycles fall outside it. The Western order's action-cycle structure produces substrate-depletion across the seven substrates Chapter 10 documented because the Western order's principal action cycle (the quarterly cycle of the financialised order's measurement frame) is incompatible with all seven substrates' replenishment cycles by orders of magnitude. The Chinese order's action cycle is also short relative to many substrates' replenishment cycles, but the Chinese order operates against several substrates through a parallel longer-cycle planning apparatus that the Western order does not have. The result is a different cycle-match-and-mismatch pattern at the level the apparatus identifies as the source of substrate-depletion.

The next four sections document four substrates at which the Chinese order exhibits cascade patterns. The substrates are property, human capital under *neijuan*, lateral innovation, and information feedback. Each substrate's analysis follows the same pattern Chapter 10 used: the substrate is named with its replenishment cycle, the regulator operating against it is named with its action cycle, the empirical case is documented in concrete

terms, and the analytical reading attaches afterwards.

11.4 The Property Sector and the Evergrande Default

The first substrate at which the Chinese order exhibits a cascade pattern is the property sector. The Chinese property sector across the period from approximately 2000 to the present has expanded at scales that exceed any comparable property-sector expansion in modern economic history. The expansion has operated through institutional arrangements whose cycle-mismatch features are the chapter's analytical subject.

The local-administrative apparatus's revenue structure is the principal feature the cascade pattern operates through. The local-mayoral apparatus across the order's prefecture-and-municipal administrative structure is dependent on land-sale revenue for substantial fractions of its operating budget. The dependency operates at the local-mayoral cycle of three-to-four years and the property-sector cycle of one-to-three years. The land-sale revenue, the property-development-driven local infrastructure investment, and the property-construction-driven local-employment outcomes are the metrics the cadre-management apparatus uses to evaluate local officials' performance across the rotation interval. The metrics the cadre-management apparatus tracks are measurable at the apparatus's own resolution, and the local officials whose career advancement the apparatus determines optimise against them. The optimisation produces the property-sector expansion the order has documented.

The cycle-mismatch produces the cascade pattern. The property substrate's productive cycle (the cycle at which property development can be sustainably matched to actual housing demand) operates at multi-decade horizons. The local-administrative action cycle operates at the three-to-four-year rotation interval. The cycle-mismatch ratio is approximately ten. The horizon-mismatch theorem at Chapter 5 §5.6 specifies that this ratio forecloses substrate-coupled regulation. The local officials optimising against the rotation-interval metrics produce property development at scales that exceed the substrate's productive cycle's capacity to match to housing demand. The cumulative pattern is the property-sector overbuild that the contemporary record documents (the empirical analysis at Glaeser, Huang, Ma, and Shleifer 2017, *Journal of Economic Perspectives* 31(1), pp. 93-116, "A Real Estate Boom with Chinese Characteristics"; Rogoff and Yang 2021, "Has China's Housing Production Peaked?", *China & World Economy* 29(1), pp. 1-31; Liu and Xiong 2020, "China's Real Estate Market", in *The Handbook of China's Financial System*, edited by Amstad, Sun, and Xiong, Princeton University Press, Chapter 10).

The empirical signature is the Evergrande default of 2021. The Evergrande Group, one of the order's largest property-development firms, defaulted on its debt obligations in late 2021. The institutional-financial record across the cascade is documented in the academic-policy literature: Rogoff and Yang 2024, "A Tale of Tier 3 Cities", *Journal of International Economics* 152, on the property-sector cascade dynamics; Chen, He, and Liu 2020, 'The Financing of Local Government in China: Stimulus Loan Wanes and Shadow Banking Waxes', *Journal of Financial Economics* 137(1), pp. 42-71, on the property sector's institutional features prior to the cascade; Pettis 2013–2024, *China Financial Markets* analyses across the period; the IMF's *Article IV Consultation* reports for China across 2021-2024; the *People's Bank of China Financial Stability Report* across the period; and the empirical-archival reporting at the *Financial Times* and *Wall Street Journal* across the 2021-2024 cascade. The default produced cascading effects across the order's property sector, with multiple major property-development firms entering default or near-default conditions across the subsequent period (the principal sources include the *Financial Times* and *Wall Street Journal* coverage across 2021-2024; Pettis 2013–2024, *China Financial Markets*, on the structural dimensions of the property sector's reorganisation; the IMF's Article IV Consultation reports across the period document the macroeconomic dimensions). The cascade's features were registered through the order's regulatory-apparatus's response: the order's institutional structures registered the property-sector substrate's depletion and produced regulatory interventions across the period.

The cascade's analytical reading follows the chapter's mechanism. The local-administrative apparatus is the regulator. Its action cycle is the rotation interval. The property sector is the substrate; its productive cycle is

multi-decade. The cycle-mismatch produces the depletion. The depletion crosses the threshold the apparatus's measurement frame can register when the cascade arrives at scales that affect the broader financial sector and the household-savings substrate. The Evergrande default is the threshold-crossing's empirical signature.

11.5 The Human-Capital Substrate and *Neijuan*

The second substrate at which the Chinese order exhibits a cascade pattern is human capital, at the order's professional-managerial-and-knowledge-worker sectors. The cascade pattern at this substrate has acquired a Chinese-language designation across the contemporary period: *neijuan* (), often translated as "involution", names the pattern of intensifying competition that produces increasing input without producing proportionate output.

The *neijuan* pattern's features are documented across the order's professional-managerial sectors. The order's tertiary-educated workforce across the period has expanded substantially through the human-capital pipeline §11.2 documented. The expansion has produced competition for positions in the order's professional-managerial sectors at scales that exceed the positions' expansion rate. The competition has produced the *neijuan* dynamics: extending working hours (the so-called 996 working pattern, with employees working from 9 AM to 9 PM six days a week becoming widespread across the order's technology sector across the period from approximately 2010 to the present; the institutional record at China Labour Bulletin 2019-2024 annual reports on the 996.icu protest movement; Wang 2021, *Made in China Journal*, on the labour-organisational dimensions; the legal-institutional record at the People's Supreme Court of China's 2021 *Notice on Top Ten Cases of Overtime Work Disputes*, which formally identified 996 working schedules as unlawful under PRC Labor Law); accumulating credentials beyond the positions' actual requirements; accumulating training certifications and supplementary qualifications; the broader pattern of human-capital substrate-depletion the order's clinical-psychiatric literature has registered across the period.

The empirical record across the *neijuan* pattern's manifestations is documented across the Chinese-language and English-language record: Xiang 2020, *Made in China Journal* 5(2), on the early-period documentation of *neijuan* as analytical category; the *neijuan* pattern's institutional and economic features; Pun 2005 (*Made in China: Women Factory Workers in a Global Workplace*) and Pun and Lu 2010 (*Modern China* 36(5), pp. 493-519) on the earlier-period working-class manifestations the contemporary *neijuan* pattern has extended into the professional-managerial sector; the *Caixin*, *Sixth Tone*, and *China Labour Bulletin* coverage of the 996.icu protest movement across 2019-2024. The 2022 youth-unemployment statistics the order's National Bureau of Statistics published indicated urban youth unemployment rates exceeding twenty percent across the post-pandemic period before the agency suspended the reporting of the metric.

The cybernetic reading of the *neijuan* pattern: the substrate is the working-age population's productive capacity, with a replenishment cycle of one generation. The regulator is the labour-market apparatus operating against quarterly-to-annual measurement frames, through institutional features (the human-capital formation pipeline, the credential-evaluation apparatus, the labour-market matching infrastructure) at action cycles substantially shorter than that generational replenishment cycle. The cycle-mismatch produces the depletion the *neijuan* pattern documents. The depletion is structurally homologous with the deaths-of-despair pattern Chapter 10 §10.5 documented at the Western order's human-capital substrate, with the manifestation differing at the working-age population's specific response properties under Chinese-sector conditions. The mechanism is the formal-mathematical signature Chapter 5 §5.6's horizon-mismatch theorem specifies.

The *neijuan* pattern is one instance at which the chapter's symmetric application produces the same diagnostic finding the Western order's analysis produced. The substrate-depletion at the Chinese order's human-capital substrate is what cycle-mismatched regulation produces by construction. The institutional architecture differs from the Western order's; the cycle-mismatch pattern is the same; the depletion is the same.

11.6 Lateral Innovation and the Substrate of Paradigm Change

The third substrate at which the Chinese order exhibits a cascade pattern is lateral innovation. The substrate consists of the institutional capacity for paradigm-changing innovation, with paradigm-changing distinguished from incremental innovation by the substrate's replenishment cycle and by the institutional conditions under which the substrate produces its outputs.

Incremental innovation operates against existing technological paradigms, improving performance metrics, reducing costs, and extending applications within the paradigms' existing architecture. The Chinese order has demonstrated substantial capacity for incremental innovation across multiple sectors: the order's solar-cell manufacturing has reduced the cost of photovoltaic energy substantially across the contemporary period; the order's electric-vehicle battery manufacturing has produced sustained cost reductions across the period; the order's high-speed rail network is the world's largest at scale.

Paradigm-changing innovation operates by producing new technological paradigms that incremental innovation cannot reach. The analytical literature on the institutional preconditions of paradigm-changing innovation includes Kuhn 1962 (*The Structure of Scientific Revolutions*) on the paradigm-change concept; Dosi 1982, *Research Policy* 11(3), pp. 147-162, on the institutional dimensions of technological paradigms; Mokyr 1990, *The Lever of Riches: Technological Creativity and Economic Progress*, on the historical-institutional features that have produced paradigm-changing innovation in different economic orders; and Nelson and Winter 1982 (*An Evolutionary Theory of Economic Change*), on the institutional-evolutionary apparatus. The substrate the paradigm-changing innovation operates through has specific institutional features: the long-cycle research-funding structures that sustain risky exploratory research whose payoffs are uncertain and distant; the academic-research culture that admits paradigm-questioning as a legitimate research activity; the cross-institutional networks that permit researchers to develop ideas outside their formal institutional affiliations; the tolerance for failure that permits research programmes to continue across the long iteration cycles paradigm change requires. The substrate's replenishment cycle is multi-decade.

The Chinese order's institutional structures have not produced this substrate at the same scales as the order's incremental-innovation substrate. The empirical record across the contemporary period documents substantial incremental-innovation outputs across the order's principal sectors and limited paradigm-changing outputs across the same period. The order's principal Nobel-Prize-level scientific outputs across the contemporary period have been concentrated in fields where the institutional architecture admits the long-cycle exploratory research the paradigm-changing substrate requires (Tu Youyou's artemisinin work, with the underlying research conducted across the 1960s-70s under specific institutional arrangements documented at Tu 2011, *Nature Medicine* 17(10), pp. 1217-1220, and Tu 2015 Nobel Prize lecture); the order's principal contemporary scientific outputs operate at the incremental-innovation register across the sectors where the institutional architecture admits incremental but not paradigm-changing research. The institutional-economic analysis of the Chinese R&D apparatus is at Wei, Xie, and Zhang 2017, *Journal of Economic Perspectives* 31(1), pp. 49-70, "From 'Made in China' to 'Innovated in China'"; Sun and Cao 2021, 'Planning for science: China's grand experiment and global implications', *Humanities and Social Sciences Communications* 8(1), article 215, on the institutional-incentive features of contemporary Chinese science, on the comparative-institutional reading of Chinese versus Western scientific architectures.

My reading is that the substrate's depletion is not the depletion the prior cascade chapters' apparatus documented at the Western order's substrates. The substrate's depletion is the inadequacy of the Chinese order's institutional structures at the specific substrate the lateral-innovation capacity operates through. The Chinese order's institutional architecture has been optimised against incremental-innovation metrics; the optimisation has produced the substantial incremental-innovation outputs the order has documented; the optimisation has not produced the institutional conditions the paradigm-changing substrate requires.

The diagnostic finding is symmetric with the Western order's finding at the research-and-development substrate documented at Chapter 10 §10.6 (Eroom's Law and the cumulative basic-research productivity collapse). Both orders exhibit cycle-mismatched regulation against the long-cycle innovation substrate. The Western order's mismatch operates through the financialised order's quarterly cycle against the multi-decade

research-and-development cycle; the Chinese order's mismatch operates through the Party-state's planning cycle against the same multi-decade research-and-development cycle. The specific institutional manifestation differs at the two orders; the cybernetic finding is the same.

11.7 Information Feedback and the Order's Communicative Architecture

The fourth substrate at which the Chinese order exhibits a cascade pattern is information feedback, at the order's communicative architecture. The substrate consists of the order's capacity to register substrate-state changes at the substrate's own resolution and to admit the changes as legitimate objects of architectural action.

The cybernetic reading of the information-feedback substrate is that the substrate operates through the order's communicative architecture, with the architecture's features determining which substrate-states the order's institutional structures register as legitimate objects of architectural action. The Chinese order's communicative architecture differs from the Western order's communicative architecture; the substrates the Chinese order's communicative architecture admits as legitimate objects of architectural action differ from the substrates the Western order's communicative architecture admits.

The Chinese order's communicative architecture admits certain substrates as legitimate objects of architectural action that the Western order's communicative architecture does not admit. The Chinese state's capacity to issue directives that override the price-formation system, the industrial-organisation apparatus, and the market-structure apparatus is a feature of the Chinese order's communicative architecture rather than a feature of the order's executive power per se. The capacity is conditioned on the directives being articulable inside the order's planning grammar; substrates the planning grammar admits as legitimate objects of state action can be addressed through directives; substrates the planning grammar does not admit cannot be addressed through directives at the same operational register.

The Chinese order's communicative architecture does not admit certain other substrates as legitimate objects of architectural action. The order's principal substrates that fall outside the planning grammar's admitted objects include the substrates the prior three sections documented: the property-sector substrate where the cadre-rotation incentive structure produces the cascade pattern; the human-capital substrate where the *neijuan* pattern operates; the lateral-innovation substrate where the order's institutional architecture has not produced the conditions paradigm-changing innovation requires. The information-feedback substrate's cascade pattern is the empirical signature of the order's communicative-architectural features at the specific substrates the order's institutional structures have not admitted.

The Chinese order's communicative architecture's specific features the chapter's analysis requires include the following. The order's principal information-feedback mechanism is the Party-state's internal reporting system, which channels substrate-state information through the cadre-management apparatus to the order's central planning authorities (the institutional documentation at Heilmann 2017, Chapter 9 on the cadre-management apparatus; Manion 2014, *China Quarterly* 218, pp. 311-338, on the institutional architecture of accountability within the Party-state; King, Pan, and Roberts 2013, *American Political Science Review* 107(2), pp. 326-343, on the information-feedback features the system permits and forecloses). The system operates at multi-month action cycles for routine reporting and at shorter cycles for crisis-response reporting. The system's coverage is uneven across substrates: substrates the planning grammar admits as legitimate objects of state action are extensively monitored; substrates outside the planning grammar's admitted objects are less extensively monitored. The asymmetric coverage produces the information-feedback substrate's cascade pattern at the substrates the planning grammar does not admit.

The reading is symmetric with the Western order's analysis. The Western order's communicative architecture admits market-driven coordination at substrates the planning grammar of the Chinese order admits state-directed coordination at; the Western order's communicative architecture does not admit state-directed coordination at the substrates the Chinese order's planning grammar admits. The specific substrates the two orders' communicative architectures admit as legitimate objects of architectural action are different; the formal structure

(architecture-admitted substrates are coupled, architecture-unadmitted substrates exhibit cascade patterns) is the same.

11.8 The Steering-Wheel Asymmetry

The symmetric application of the analysis to the Chinese order has produced four substrate-by-substrate analyses at §§11.4 through 11.7. Each substrate exhibits the cascade pattern Chapter 10 documented at the Western order, operating through the cycle-mismatched-regulation mechanism the analysis specifies. The mechanism is the same as the Western order's mechanism. The substrates at which the mechanism operates differ between the two orders. The two orders' communicative architectures admit different substrates as legitimate objects of state-directed coordination.

The asymmetry the symmetric application produces is at the level of the order's communicative grammar. The two orders' discourses differ on a single feature the chapter must name precisely. The Western order's discourse has reached a closure I call the discourse-level closure of the order's constructedness: the order's discourse no longer admits the order as a constructed thing the order's authority could override; the operational sentence "we are turning the order off" or "we are reconfiguring the architecture's selection mechanism" is inarticulable inside the order's communicative grammar. The Chinese order's discourse has not reached this closure: the order's discourse admits the order as a constructed thing the order's authority can override; the operational sentence "we are halting securities lending" or "we are reconfiguring the property-sector regulatory apparatus" is articulable inside the order's communicative grammar and has been operationalised through the order's regulatory-apparatus's continued operation. The existential-phenomenological diagnosis of the closure-condition itself belongs to the standalone Epilogue.

The asymmetry has a specific empirical signature the chapter requires the reader to register at the comparative level. The Western order's regulatory apparatus across the period from 1971 to the present has operated through the post-crisis legislative-regulatory pattern Chapter 10 §10.12 documented: the apparatus-compatible elements of every reform proposal absorbed into compliance infrastructure, the apparatus-incompatible elements attenuated, the hybrid elements decomposed; the apparatus's features unchanged. The Chinese order's regulatory apparatus across the same period has operated through the override-capacity that the apparatus's institutional position and communicative grammar admit: the order's regulatory authority has, on multiple occasions documented at §11.9, issued directives that override the order's price-formation system, the order's industrial-organisation apparatus, and the order's market-structure apparatus, with the directives operating at the architectural-correction level rather than at the marginal-adjustment level the Western order's regulatory apparatus operates at.

The asymmetry can be illustrated through a cybernetic-mechanical analogy. The Chinese order's architecture is, in the analogy, a vehicle with a steering column the driver can grasp. The vehicle's steering is operative: when the driver turns the wheel, the wheels respond. The Western order's architecture is, in the analogy, a vehicle with a steering wheel the operator can turn but that is not connected to the wheels. The order's regulators can issue directives, can write legislation, can enact reforms, can deploy compliance infrastructure, can issue regulatory findings. The directives, legislation, reforms, compliance infrastructure, and findings do not produce the architectural correction the order's substrates require, because the order's communicative architecture has reached the discourse-level closure of the order's constructedness and the directives operate at the marginal-adjustment level rather than at the architectural-correction level.

The chapter takes care to specify what the asymmetry is not. The asymmetry is not a normative ranking. The chapter does not say the Chinese order is preferable to the Western order. The Chinese order's override-capacity does not produce substrate-coupled regulation across all the order's substrates; the order exhibits cascade patterns at the substrates §§11.4 through 11.7 documented. The Chinese order's override-capacity is exercised across the substrates the order's communicative architecture admits as legitimate objects of architectural action; the order's communicative architecture does not admit all the substrates the order's continued operation depends on. The

asymmetry between the two orders is cybernetic in its structure: the Chinese order retains the override-capacity at the substrates its communicative architecture admits; the Western order has lost the override-capacity across all the substrates its communicative architecture would need to admit for substrate-coupled regulation. The asymmetry's specific operational signature is what §11.9 documents at the empirical level.

11.9 The Casino Architecture Under Sovereign Overrule

The asymmetry's empirical anchoring requires the documentation of the casino architecture's appearance and disappearance at non-Western financial-architecture jurisdictions. The chapter's symmetric application has now produced the analytical finding that the asymmetry §11.8 specifies is not the asymmetry between architectures with and without casino-character. It is the asymmetry between architectures where casino-character is sovereign-overrulable and architectures where the discourse-level closure of the order's constructedness has been reached and casino-character is no longer overrulable.

The non-Western financial-architecture jurisdictions where the regulator retains the position and the communicative grammar to override the price-formation system at will exhibit the casino-architecture mechanism Chapter 9 §9.4 specified: variance decomposition with the reflexive variance dominating the substrate-tracking variance, reflexive instruments, derivatives layers, short-selling apparatus, leveraged structured products. The mechanism is not absent from these orders. The mechanism is present, with the formal architecture operative whenever the regulator does not actively suppress it. The finding is what occurs after the casino-character emerges in these orders: the regulator overrules the architecture through the order's standing communicative grammar, halting the casino-mechanism's operation at the discretionary level.

The Chinese Order

In late January 2024, the Chinese securities-lending apparatus produced a casino-character cascade in the A-share equity market. The cascade's features were the standard casino-architecture features Chapter 9 documented: short-selling positions accumulating against the substrate-tracking variance, derivatives instruments operating with reflexive variance dominating substrate-coupled variance, leveraged structured products amplifying the reflexive coupling. The cascade was producing measurable price-substrate decoupling at the A-share market's principal indices.

What followed the January 2024 cascade is what the section requires the reader to register. The China Securities Regulatory Commission, between late January and early February 2024, issued the following interventions through its standing regulatory authority: suspension of the lending of all restricted A-shares for short-selling; ban on short-selling of stocks bought on the same day; raising of minimum margin ratios from 50 percent to 80 percent (100 percent for privately-offered investment funds); introduction of a one-day waiting period (T+1) for re-lending of borrowed shares; cap on the size of the securities re-lending business with the announcement that no new business would be permitted. The cumulative effect was a 24 percent reduction in securities-lending volume within approximately one month. The institutional record is documented in the China Securities Regulatory Commission's official communications across late January and early February 2024 (the CSRC press releases dated 28 January 2024 on securities-lending suspension; the 6 February 2024 directive on margin-ratio elevation; the institutional analysis at the State Council Information Office's subsequent reports); the *Caixin*, *Bloomberg*, *Financial Times*, and *Wall Street Journal* coverage of the intervention sequence; and the academic-analytical literature including Liu and Wang 2024, *Journal of Asian Economics* 92, on the intervention's structural features.

The interventions were issued through the CSRC's standing regulatory authority. They did not require legislative action. They did not require a market-consensus process. They did not require translation through electoral or shareholder cycles. The architecture's communicative grammar admitted the operational sentence "we are halting securities lending of restricted A-shares" as a directly executable regulatory directive. The

casino-character, having emerged through the architecture's normal operation, was overrule-suppressed by the regulator in the position to issue the directive and in the communicative grammar that made the directive an articulable institutional act.

The Saudi Order

The Saudi case demonstrates a different mechanism through which the override-capacity operates: the casino-suppressors are built into the regulatory architecture itself as standing rules, with the regulator retaining additional discretionary override-capacity for cases the standing rules do not capture.

Short-selling has been legal on the Saudi stock exchange (Tadawul) since April 2017 (institutional investors only at first), expanded to all eligible investors in March 2021 (Saudi Capital Market Authority 2017, *Implementing Regulations of the Capital Market Law: Securities Borrowing and Lending Regulations*; the institutional record at the CMA's annual reports across the period; the academic analysis at Alqahtani and Klein 2021, *Pacific-Basin Finance Journal* 70, on the post-2017 market microstructure; Al-Hajieh, Redhead, and Rodgers 2011, *Research in International Business and Finance* 25(3), on the pre-reform institutional architecture; Hassan and Lewis 2014, *Handbook on Islam and Economic Life*, Edward Elgar, Chapter 25 on the Gulf-region capital-market reforms). The framework includes structural casino-suppressors built into the regulatory architecture itself: the short ratio to average daily traded volume of any security is capped at 10 days; total net short positions cannot exceed 10 percent of the free float; daily price-fluctuation limits bound how far a stock can move within a single trading day, with newly listed stocks limited to plus-or-minus 30 percent in their first three days of trading (raised from a prior plus-or-minus 10 percent limit) and standard listings operating under similarly bounded daily limits. The derivatives market includes single-stock futures and an MSCI Tadawul 30 (MT30) index serving as the underlying for the exchange's derivatives apparatus.

The 2006 Tadawul crash demonstrated that casino-character can emerge in the Saudi order when its structural casino-suppressors are absent or insufficiently calibrated. The empirical record is documented at Al-Twaijry, Brierley, and Gwilliam 2003, *Corporate Governance: An International Review* 11(4), pp. 305-317, on the pre-crash regulatory architecture; Lerner and Leamon 2017, 'The CMA and the Saudi Stock Market Crash of 2006', Harvard Business School Case Study, on the cumulative documentation of the 2006 cascade; Asem and Tian 2010, *Emerging Markets Review* 11(4), pp. 357-378, on the institutional-investor pattern across the period; the cumulative *Arab News* and *Reuters* archival record across 2006-2008. The Tadawul All-Share Index fell approximately 65 percent from its February 2006 peak across the subsequent year following a substantial speculative bubble produced by an order in which retail-investor participation had concentrated in instruments whose price-formation had decoupled from substrate-state. The regulatory response across the subsequent decade was the construction of the framework of structural suppressors that now operates: caps on short positions, daily fluctuation limits, foreign-investor constraints (until amendments opened the market more fully), and active Capital Market Authority intervention authority (the principal sources include the Saudi Capital Market Authority's annual reports across the period; Al-Twaijry, Brierley, and Gwilliam 2003, *Corporate Governance: An International Review*, on the pre-reform architecture; the *Arab News* and *Reuters* coverage of the 2006 crash and the subsequent regulatory reconstruction).

The Saudi order is the casino-architecture mechanism with structural suppressors built into the rule-architecture itself, plus regulator-overrule capacity for cases the structural suppressors do not capture. The finding the Saudi case contributes to the chapter's argument is that the casino-architecture-suppression mechanism need not operate only through discretionary intervention as in the Chinese case; it can operate through standing rules embedded in the regulatory architecture itself, provided that the rules have been written into the architecture by an authority positioned to write them and provided that the architecture's communicative grammar admits the rules as legitimate operational constraints on the price-formation apparatus. The Western architecture has rules of similar formal character (circuit breakers, position limits, margin requirements) but lacks the positioning conditions that would make the rules operate at architectural-correction level rather than at marginal-adjustment level. The Saudi rules operate at architectural-correction level because the

architecture's communicative grammar admits the regulator as the constructor of the rules.

The Emirati Order

The Emirati order exhibits a similar pattern to the Saudi order, with the regulator-overrule capacity available at the architectural level through both standing rules and discretionary intervention authority.

Short-selling has been legal on Abu Dhabi Securities Exchange (ADX) since October 2017 and Dubai Financial Market (DFM) since December 2017, both following the Saudi precedent. Both DFM and ADX operate derivatives markets including single-stock equity futures; the Dubai Gold and Commodities Exchange (DGCX) has operated as a regional commodity-derivatives venue since November 2005; NASDAQ Dubai operates as the international financial exchange within the Dubai International Financial Centre regulatory framework (the institutional record at the DFM, ADX, and NASDAQ Dubai annual reports across the period; the analytical-economic record at Charfeddine, Najah, and Teulon 2016, *Journal of Multinational Financial Management* 36, pp. 38-56, on the GCC capital-market integration). The Securities and Commodities Authority (succeeded by the Capital Market Authority under Federal Decree-Law No. 32 of 2025) retains regulatory-supervisory-executive authority over the entire UAE capital-market apparatus. The Emirati order is similar to the Saudi order: the casino-architecture mechanism is present, with regulator-overrule capacity available at the architectural level.

The Three-Condition Specification

The Chinese, Saudi, and Emirati cases together specify three conditions under which the override-capacity operates at the architectural-correction level. The conditions operate conjointly rather than separably: each condition is required, none is sufficient, and the override-capacity's operation requires all three.

The first of the conditions is the power to act at the architectural level, which requires that the regulator occupy a position from which directives at the architectural-correction level can be issued. The position need not be politically unified across the order's entire institutional structure; the position must include the operational authority to issue and enforce directives that override the price-formation apparatus, the industrial-organisation apparatus, and the market-structure apparatus. The Chinese, Saudi, and Emirati regulators all occupy such positions through different institutional configurations: the CSRC through its delegated authority from the State Council; the Saudi Capital Market Authority through its statutory authority under the Capital Market Law; the Emirati Capital Market Authority through its statutory authority under Federal Decree-Law No. 32 of 2025.

The second condition is communicative availability. The directives the regulator can issue at the architectural-correction level must be articulable inside the order's communicative grammar as legitimate institutional acts. The architecture's discourse must admit the operational sentence "we are halting this" or "we are reconfiguring that" as a directly executable instruction rather than as a market-distorting intervention requiring elaborate procedural justification. The Chinese, Saudi, and Emirati orders' communicative grammars all admit the sentence; the Western order's communicative grammar does not.

The third condition is the discourse's admission of the order's constructedness. The order's discourse must admit the order as a constructed thing whose configuration is open to revision rather than as a natural arrangement whose modification would constitute interference with a self-regulating mechanism. The closure of the discourse's admission of the order's constructedness has the property that the order's discourse cannot articulate the order as constructed without foreclosing the discourse's claim to describe the order from a position outside the order's discourse. The Chinese, Saudi, and Emirati orders have not reached this closure; the orders' discourses continue to admit the orders as constructed configurations the orders' authorities can modify at the architectural level. The Western order has reached the closure; the order's discourse cannot articulate the order as constructed without foreclosing the discourse's claim to describe the order from a position outside the order's discourse.

The Chinese case satisfies all three conditions at present, for the substrates currently inside the planning grammar (semiconductors, EV batteries, industrial clusters, rail infrastructure, manufacturing capacity, supply-chain depth, STEM formation, casino-architecture suppression). Whether the Chinese architecture exercises the override capacity in substrate-protective directions for other substrates is a contingent question Chapter 11 §§11.4-11.7 documented asymmetrically. The property sector, the human-capital substrate under *neijuan*, and the lateral-innovation substrate are domains where the Chinese architecture's planning grammar does not currently admit the substrate as an object of substrate-protective action; the Chinese order's overrule capacity does not extend uniformly across all substrates the order produces depletion in. The finding is that the capacity is available; whether the capacity is exercised in substrate-coupled directions depends on whether the substrate-protective claim is communicatively available inside the architecture's planning grammar. Communicative availability is the necessary mediator. Power without communicative availability does not produce amendment. Communicative availability without power does not produce amendment either. The two conditions are conjoint, and the third condition (the discourse's admission of the order's constructedness) determines whether the order can recognise its own constructedness sufficiently to revise the planning grammar across substrates the grammar does not currently admit.

11.10 The Comparative-Finding Consolidation

The chapter has applied the analysis symmetrically to the two orders. The findings can be consolidated at a single table at this point.

	Western order	*Chinese order*
Cybernetic architecture	Same	Same
Conant-Ashby regulator-model relation	Operative	Operative
Horizon-mismatch theorem applies	Yes	Yes
Autoaccroissement signature	Present	Present
Cycle-mismatch substrates	All seven Chapter 10 documented	Property, *neijuan*, lateral innovation, information feedback
Cycle-match substrates	None at the dominant cycle	Industrial policy, infrastructure planning, EV/semiconductor capacity
Override-capacity at architectural level	Foreclosed by discourse-level closure of the order's constructedness	Retained at the planning-grammar-admitted substrates
Communicative grammar admits "we are turning this off"	No	Yes (at the admitted substrates)
Bounded by	The order's institutional features	The planning grammar's admitted substrates
Substrate-coupling outcome	Reproduces despite repeated reform episodes	Variable, contingent on the substrate's planning-grammar admission

The two orders' cybernetic features differ at the level the cybernetic chapters specified. The two orders exhibit different cascade signatures at the substrates the chapter has documented. The two orders' relations to the

discourse-level admission of the order's constructedness differ at the level the symmetric application has identified as constitutive of the orders' amendment-capacities. The casino-architecture-under-sovereign-overrule finding is one of the chapter's principal empirical demonstrations alongside the property-sector cascade documented at §11.4, the *neijuan* substrate-depletion documented at §11.5, the lateral-innovation substrate's inadequacy documented at §11.6, and the information-feedback substrate's asymmetric coverage documented at §11.7. The chapter's symmetric application has registered both orders.

The symmetric application the chapter has conducted should not be read as a normative ranking of the two orders, as a recommendation that the Chinese order's institutional architecture be adopted by Western jurisdictions, or as a prediction that the Chinese order will sustain its override-capacity across the contemporary period, since the latter question is contingent on whether the planning grammar's admitted-substrate boundary remains compatible with the order's continued operation, and is not a question the chapter's symmetric application has addressed. The chapter is equally silent on whether the Western order can recover its override-capacity, since that question is whether the order's communicative grammar can be reconstituted at the level the discourse's closure has reached, and the chapter's empirical record concerns only what the present discourse admits. What the chapter has produced is a single mechanical finding: the same cybernetic architecture, configured with one structural difference at the level of communicative grammar, produces different agent-amendability outcomes at the level of the order's capacity to correct itself.

Chapter 12, which follows the present chapter, examines what the cumulative diagnostic record the book has produced closes and what it leaves open. Chapter 12's procedure walks the libertarian tradition's contemporary discourse against the cumulative record, position by position, with each position meeting the chapter or chapters that produced the empirical or analytical finding the position cannot be sustained against. The procedure does not foreclose the positions from outside the tradition; the work of foreclosure has been conducted across the prior chapters by the apparatus the tradition's own canonical sources permit when their conditions are honoured at the level the canonical sources gave them. The chapter that follows registers what the cumulative work has produced.

The standalone Epilogue that follows the present chapter operates at a register the apparatus the book has constructed admits but does not itself require. The diagnosis the Epilogue conducts is one reading the cumulative record admits; the structural diagnosis the present chapter and the prior chapters have produced is complete on its own terms, and the existential-phenomenological reading the Epilogue conducts deepens what the structural findings already specify without replacing the structural findings or requiring the reader to accept the Epilogue's register before the structural diagnosis stands.

CHAPTER 12

What the Cumulative Record Closes

12.0 What This Chapter Asks

The reader who has finished Chapter 11 holds the cumulative diagnostic record the book has produced. The empirical record across Chapters 1 through 3 documents the conditions the libertarian tradition's canonical sources specified against the contemporary Western and Chinese orders. The structural-mechanism specification across Chapters 5 through 8 produces the cybernetic and Ellulian apparatus through which the conditions' non-satisfaction is necessary by construction rather than contingent. The casino architecture and the cannibalisation cascade across Chapters 9 and 10 document the empirical-architectural form the cybernetic and Ellulian findings take at the substrates the contemporary Western order's continued production depends on. The Chinese symmetric application across Chapter 11 produces the comparative finding the steering-wheel asymmetry registers. The present chapter examines what the cumulative record closes and what it leaves open.

12.1 The Tradition's Contemporary Discourse Examined Against the Record

The libertarian tradition's contemporary discourse, examined across the period from approximately 1980 to the present at the principal texts and the institutional articulations the chapter sets out, articulates the defence of the contemporary Western order through positions whose structural-rhetorical organisation the chapter must register before the cumulative record's examination against each can be conducted.

The chapter walks the contemporary defensive literature against the substrate-coupling failures the cumulative diagnostic record documents. The exercise is to identify, in the writings of the contemporary defenders, the positions from which the substrate-coupling failures are answered. The principal contemporary defenders include Peter Boettke at the level of Hayekian scholarship (Boettke 2018, *F. A. Hayek: Economics, Political Economy and Social Philosophy*, Palgrave Macmillan; Boettke and Coyne 2009, 'An Entrepreneurial Theory of Social and Cultural Change', in *Markets and Civil Society*, edited by Víctor Pérez-Díaz, Berghahn Books, pp. 77-104); Gregory Mankiw at the level of mainstream economics pedagogy (Mankiw 2021, *Principles of Economics*, ninth edition, Cengage Learning); Tyler Cowen and Alex Tabarrok at the level of contemporary economic commentary (Cowen and Tabarrok 2018, *Modern Principles of Economics*, fifth edition, Worth Publishers); Milton and Rose Friedman at the level of the deregulatory programme's articulation (Friedman and Friedman 1980, *Free to Choose: A Personal Statement*, Harcourt Brace Jovanovich); the Cato Institute's policy publications across the period from approximately 1985 to the present, including the *Cato Handbook for Policymakers* in successive editions (most recently Cato Institute 2022); the Heritage Foundation's *Index of Economic Freedom* across the same period; Deirdre McCloskey at the level of the bourgeois-virtues case (McCloskey 2010, *Bourgeois Dignity*; McCloskey 2016, *Bourgeois Equality*, University of Chicago Press); Steven

Pinker at the level of the comparative-civilisational case (Pinker 2018, *Enlightenment Now*, Viking); Daron Acemoglu and James Robinson at the level of the institutional-comparative case (Acemoglu and Robinson 2012, *Why Nations Fail*, Crown); Bryan Caplan at the level of the democratic-irrationality case (Caplan 2007, *The Myth of the Rational Voter*, Princeton University Press); Robert Higgs at the level of the state-growth thesis (Higgs 1987/2012, *Crisis and Leviathan*, Oxford University Press); and the *Wall Street Journal* editorial position across the period from approximately 1980 to the present. The set is not exhaustive but it is representative across the principal articulations.

The examination of the literature reveals a structural feature the chapter must register before proceeding. The substrate-coupling failures the cumulative record documents are answered, across this set of writers, through positions that operate at three distinct registers. The first register is the register at which the failures are denied as failures: the order's features are the features the theorems describe, the apparent failures are anomalies or external interferences or contingencies subsequent extensions of the order's features will resolve. The second register is the register at which the failures are conceded but assigned to insufficient extension of the order's features: further deregulation, further marketisation, further extension of the price-mechanism's reach would produce the substrate-coupled outcomes the theorems specify. The third register is the register at which the failures are conceded but answered through comparative defence: whatever the order's deficiencies, the contemporary Western order is comparatively superior to any alternative order the contemporary world admits as a serious option.

The three registers, examined across the principal contemporary articulations, exhaust the defensive moves the literature makes. A given defender may operate from inside one register or may move between them across different writings or different moments within a single writing. The realisation register, the deregulatory register, the comparative-superiority register: each is the position from which the substrate-coupling failures the cumulative record documents are answered when the failures are taken up by the contemporary discourse. The chapter takes each register in turn against the cumulative record the book has produced. The examination is what produces the chapter's findings; the findings are not what the chapter sets out to demonstrate.

12.2 The First Position Meeting the Record

The first position, taken at its strongest contemporary articulation, holds that the contemporary Western order is the realisation of the libertarian tradition's theorems. The conditions Smith specified in *The Wealth of Nations* (1776/1976) and *The Theory of Moral Sentiments* (1759/1976) are taken to obtain at the level the theorems require. The conditions Ricardo specified in *On the Principles of Political Economy and Taxation* (1817/1951) for the comparative-advantage theorem are taken to obtain. The conditions Hayek specified in "The Use of Knowledge in Society" (Hayek 1945, *American Economic Review* 35(4), pp. 519-530) for the price-mechanism's substrate-coupled knowledge-aggregation are taken to obtain. The conditions Mises specified in *Human Action* (1949) and Friedman specified across his economic writings are taken to obtain. The position's empirical claim is that the conditions obtain in the order. The position's analytical claim is that the order's features are the features the theorems describe.

The position's principal contemporary articulations include Boettke 2018 at the level of Hayekian scholarship, where the framework's contemporary applicability is defended at the institutional-comparative register the work conducts at; Mankiw 2021 at the level of mainstream pedagogy, where the price-formation system is described as the aggregation of competitive equilibrium in the form the textbook presentation requires; Cowen and Tabarrok 2018 at the level of the *Modern Principles of Economics* exposition, where the order's coordination outcomes are described as the substrate-coupled outcomes the price-mechanism produces; the contemporary *Marginal Revolution* commentary across the period from approximately 2003 to the present; and the *Wall Street Journal* editorial position. The position holds that the price-formation system aggregates distributed substrate-coupled knowledge in the form Hayek's 1945 argument requires; the competitive-selection mechanism produces the comparative-advantage outcomes Ricardo's theorem specifies; the voluntary-exchange

architecture instantiates the property-rights-and-trader-principle conditions the canonical sources specified; the monetary apparatus operates within the stability conditions Friedman (1968, *American Economic Review* 58(1), pp. 1-17) specified.

The position meets Chapter 2's empirical record. The record produced across §§2.1 through 2.7 documents the conditions condition by condition against the contemporary Western order's institutional and empirical features. The Smith conditions on moral embeddedness, local proximity, reputation-discipline, and anti-conspiracy vigilance the conditions S1 through S4 of §1.5 specified do not obtain at the level the position requires. The contemporary Western order operates through anonymous transactions at scale, with the anonymity foreclosing the moral-embeddedness condition the theorem operates against. The order operates through credit-rating agencies, regulatory-disclosure infrastructure, and brand-management apparatus, with the reputation-replacement foreclosing the reputation-discipline condition the theorem operates against. The order operates through the financialised sector's standard operating mode, with the conspiracy-of-the-trade Smith warned against at *The Wealth of Nations* I.x.c.27 having become the operating mode rather than the deviation the theorem operates against.

The position meets the Hayekian methodological conditions §1.5 specified. Hayek's 1945 argument requires that the price-formation system aggregate substrate-coupled information rather than reflexive content. The casino architecture documented at Chapter 9 demonstrates that the contemporary Western order's price-formation system aggregates reflexive content in the form Hayek's argument identified as the failure case. The price-formation system the contemporary financial-architecture operates through is not the price-formation system Hayek's argument operates against. The substrate-coupled knowledge-aggregation the theorem specifies does not occur at the substrate the theorem operates against. The position's empirical claim that the conditions obtain at the level the theorem requires meets the empirical record that the conditions do not obtain at that level.

The position meets the Ricardian conditions §1.5 specified. The conditions R1 through R3 of capital immobility, asymmetric labour mobility, and bounded national economies are constitutive of the theorem's operation, as the canonical text at *On the Principles* Chapter VII and the contemporary scholarship at Schumacher 2012b (*Free Trade and Absolute and Comparative Advantage*, Universitätsverlag Potsdam) reconstruct. The contemporary Western order operates through capital-account liberalisation that has eliminated R1 across the period documented at Eichengreen 2008 (*Globalizing Capital*, Princeton University Press). The order operates through the integration of national economies into the global financialised order that has dissolved R3 across the period documented at Tooze 2018 (*Crashed*, Viking). The conditions do not obtain at the level the theorem operates against. The position's claim that the order's features are the features the comparative-advantage theorem describes meets the empirical record that the conditions the theorem specified as the architecture its operation requires do not obtain at the level the theorem operates against.

The position meets the cannibalisation cascade documented at Chapter 10. The substrates the order's continued production depends on, which include the engineering culture, the supplier ecosystems, the human capital, the research-and-development capacity, the infrastructure, the ecological substrate, the cognitive-emotional integrity of the order's participants, and the transactional substrate, exhibit the cycle-mismatched depletion the horizon-mismatch theorem at Chapter 5 §5.6 specified as the necessary signature of cycle-mismatched regulation. The depletion is not anomalous; it is what the cycle-mismatched regulation the order operates under produces by construction.

The position cannot be maintained against the record at the level the position operates at. The position's first empirical claim, that the conditions the theorems specified obtain in the contemporary order, is foreclosed by the empirical record across Chapters 1 through 3 and Chapters 9 and 10. The position's analytical claim, that the order's features are the features the theorems describe, is foreclosed by the cybernetic and Ellulian apparatus across Chapters 5 through 8, which specifies that the order's features are the conditions under which the theorems' conditions are foreclosed rather than the conditions under which the theorems' conditions obtain. The first wall.

The wall is not a wall the chapter has built. The wall is what the libertarian tradition's own canonical conditions return when applied to the libertarian tradition's own claims about the contemporary Western order;

the chapter has done no external critique, taking Smith's conditions and Ricardo's conditions and Hayek's conditions and Friedman's conditions, applying each at the level the canonical sources specified, and reporting what the application returns. What the application returns is the record the prior chapters documented. The realisation position cannot be sustained against the record produced by the application of the tradition's own conditions to the order the position defends.

12.3 The Third Position Meeting the Record

The chapter takes the third position before the second because the third is the more frequent retreat from the first. A defender whose position 1 cannot be sustained against the empirical record frequently retreats to a comparative claim rather than to the deregulatory claim of position 2. The comparative claim concedes the empirical deficiencies and holds that the contemporary Western order, deficient or otherwise, is comparatively superior to its alternatives by the substrate-coupled criteria the libertarian tradition admits as the criteria of evaluation.

The position's principal contemporary articulations include McCloskey 2010 and 2016, where the comparative case is articulated at the level of the bourgeois-virtues thesis and the great-enrichment thesis; Pinker 2018, where the comparative case is articulated at the level of the Enlightenment-civilisational thesis; Acemoglu and Robinson 2012, where the comparative case is articulated at the level of the inclusive-versus-extractive-institutions thesis; Caplan 2007, where the comparative case is articulated against the democratic-irrationality reading of the order's discontents; and the contemporary Cato and Heritage policy literature, where the comparative case operates as the underlying defensive logic of the *Index of Economic Freedom* and the analogous indexing operations.

The position holds that the order's substrate-coupling failures, granting them, are not failures the contemporary world has alternatives to. The Chinese order, the various social-democratic orders, the various state-capitalist orders, the various post-socialist orders, all exhibit substrate-coupling profiles the comparative claim takes to be inferior to the contemporary Western order's at the levels the libertarian tradition admits as the levels of evaluation. The position's structural form is a comparative claim across the institutional-totality dimension: the contemporary Western order, deficient at the substrates the cumulative diagnostic record documents, is at least less deficient than the alternatives.

The position meets Chapter 11's symmetric application. The comparative finding produced at §11.10 is that the two orders' cybernetic features are the same at the architectural level: both orders exhibit the substrate-decoupled-optimisation signature, both exhibit cascade patterns at substrates the orders' continued operation depends on. The two orders' cycle-match profiles differ at the substrates the orders' communicative architectures admit as legitimate objects of state-directed coordination. The Chinese order's communicative architecture admits a broader set of substrates as legitimate objects than the Western order's communicative architecture admits. At the substrates inside the Chinese order's planning grammar (semiconductor capacity, electric-vehicle battery manufacturing, industrial-cluster development, rail and infrastructure networks, manufacturing-capacity expansion, supply-chain depth, the STEM education pipeline, casino-architecture suppression), the Chinese order has retained the override-capacity at the architectural-correction level. At the substrates outside the planning grammar (the property sector, the *neijuan* substrate, the lateral-innovation substrate, the information-feedback substrate), the Chinese order exhibits the cascade pattern the Western order exhibits across all seven substrates Chapter 10 documents.

The comparative finding the symmetric application produces does not stand at the uniform-comparative level the position requires. The Chinese order is comparatively superior to the Western order at the substrates inside the Chinese order's planning grammar and comparatively inferior to the Western order at the substrates outside it. The comparative claim cannot be sustained as the uniform-comparative claim the contemporary articulation requires. The position must be reformulated as a substrate-by-substrate claim, with the comparison conducted at each substrate against the substrate-specific cycle-match-or-mismatch profile the two orders exhibit at that substrate. The uniform-comparative defence the contemporary articulation rests on does not survive the

symmetric application.

The chapter must register one further specification before the second wall is described. The diagnosis the cumulative record produces is at the register of the order's substrate-coupling outcomes, the cycle-match-or-mismatch profile the order's regulator-substrate relations exhibit, the casino-and-cascade signatures the substrate-decoupled-optimisation produces. The diagnosis is not at the register of the order's political-institutional features. The contemporary Western order's institutional features include the civil-liberties protections of the constitutional architectures across the Western democracies, the electoral accountability the institutional record across the period from the eighteenth century to the present documents, the judicial independence the rule-of-law architecture documented across the comparative-constitutional literature (Tamanaha 2004, *On the Rule of Law*, Cambridge University Press) registers, the freedom of association the institutional protections across the contemporary Western democracies maintain, the freedom of the press the institutional record across the contemporary Western media architectures registers, and the rule of law operating against state power the political-philosophical case across the liberal tradition's principal articulations defends. The political case for these features operates at registers the cumulative diagnostic record does not address. The principal contemporary political-philosophical articulations of the case include Rawls 1971 (*A Theory of Justice*, Harvard University Press), Berlin 1969 ("Two Concepts of Liberty," in *Four Essays on Liberty*, Oxford University Press), Pettit 1997 (*Republicanism: A Theory of Freedom and Government*, Oxford University Press), Habermas 1996 (*Between Facts and Norms*, MIT Press), and Tomasi 2012 (*Free Market Fairness*, Princeton University Press). The case can be defended through arguments the cumulative diagnostic record does not foreclose, at registers the political-philosophical literature has constructed.

The political case's separability from the economic-comparative case is the specification the chapter must register at the level the diagnosis operates at. The cumulative record forecloses the economic-comparative claim that the contemporary Western order's substrate-coupling is comparatively superior to the substrate-coupling of any alternative order the contemporary world admits as a serious option. The cumulative record does not foreclose the political-comparative claim that the contemporary Western order's institutional features are preferable to the institutional features of any alternative order. The political-comparative claim is preserved as an open question the cumulative record does not close; the claim admits substantive defence through arguments the cumulative record does not address; the claim operates at registers the political-philosophical literature has constructed. The chapter does not take a position on the political-comparative claim. The chapter registers what the cumulative record does and does not foreclose.

The third position cannot be sustained against the record at the level the position's contemporary articulation operates at. The uniform-comparative defence at the level of substrate-coupling outcomes is foreclosed by the symmetric application's substrate-by-substrate finding. The position's reformulation as a substrate-by-substrate comparative claim survives the symmetric application but at the cost of conceding the uniform-comparative defence the contemporary articulation rests on. The political-comparative claim, separable from the economic-comparative claim, survives the symmetric application as an open question the cumulative record does not address. The second wall, with the political case explicitly preserved on its own register, and the substrate-by-substrate comparison admitted as a reformulation the cumulative record does not close.

The wall is not a wall the chapter has built. The wall is what the symmetric application of the cumulative record's apparatus to the two contemporary orders returns when the application is conducted at the substrate-by-substrate level the diagnostic apparatus operates at; the chapter has done no comparative ranking of the orders, having reported what the symmetric application returns. The comparative-superiority position cannot be sustained at the uniform level its contemporary articulation requires; the position can be sustained at the substrate-by-substrate level only as a reformulation, with the political-comparative claim preserved as a separable case the cumulative record does not address.

12.4 The Second Position Meeting the Record

The second position holds that the order's failures, conceded as failures, are failures of incompleteness rather than failures of the libertarian tradition's theorems. The position's prescriptive claim is that further deregulation, the removal of further state interference, and the further extension of the price-mechanism to substrates the order has not yet extended it to would produce the substrate-coupled outcomes the order's features are capable of producing. The position holds that the theorems remain valid and the order's failures are not failures of the theorems but failures of the theorems' incomplete instantiation in the order's institutional architecture.

The position's principal contemporary articulations include Friedman and Friedman 1980 at the level of the deregulatory programme's full articulation; the Cato Institute's policy publications across the period; the Heritage Foundation's *Index of Economic Freedom* across the period; Higgs 1987/2012 at the level of the state-growth thesis on the historical-institutional register; and the Boettke and Storr 2002, 'Post-Classical Political Economy: Polity, Society and Economy in Weber, Mises and Hayek', *American Journal of Economics and Sociology* 61(1), pp. 161-191 treatment of the analytical foundations. The position holds that the order's substrate-coupling failures are produced by external interference (state regulation, distorting subsidies, regulatory capture) rather than by the order's own features. The position's prescriptive claim is that the removal of the state regulators' interference would permit the order's features to produce the substrate-coupled outcomes the theorems specify.

The position requires the conditions the libertarian tradition's theorems specified be contingent rather than constitutive. The position presupposes the conditions can be progressively satisfied by further extension of the order's features, with the further extension producing the substrate-coupled outcomes the theorems specify. The position meets Chapter 1's reconstruction of the conditions at the level the canonical sources gave them.

The conditions Smith specified in *The Theory of Moral Sentiments* (1759/1976), particularly the impartial-spectator framework of Part III §§1-2 and the moral-psychological substrate of Part I §I on sympathy, are constitutive of the *Wealth of Nations* argument's operation. The textual reconstruction Chapter 1 §1.2 conducted at archival depth documents Smith's specification of an entire moral-psychological substrate within which the impartial spectator's recognition operates; the substrate is constitutive of the argument; without the substrate, the argument cannot be conducted as Smith presented it. The contemporary scholarship recovering the conditional character of Smith's argument across Otteson 2002 (*Adam Smith's Marketplace of Life*, Cambridge University Press) and Hanley 2009 (*Adam Smith and the Character of Virtue*, Cambridge University Press) confirms the constitutive specification. The position's claim that the Smith conditions can be progressively satisfied through further extension of the order's features is not the claim Smith's text supports; Smith's text specifies the conditions as the architecture the invisible-hand theorem operates against, not as features the architecture can produce through further extension.

The conditions Hayek specified in "The Use of Knowledge in Society" (1945) are constitutive of the price-mechanism's substrate-coupled knowledge-aggregation at the level Hayek's argument operates against. The argument requires that prices aggregate substrate-coupled information rather than reflexive content; the order's price-formation system must aggregate the dispersed substrate-coupled tacit knowledge of the order's participants through the act of exchange; the order's regulatory architecture must operate at action-cycles compatible with the substrate-cycles the substrates' replenishment requires. The methodological conditions are not external features that can be progressively satisfied. The conditions are constitutive of the cybernetic-coordination order the claim operates against. The contemporary Western order's price-formation system aggregates reflexive content rather than substrate-coupled information at the level Chapter 9 documents; the order's regulator's action-cycle is shorter than the substrates' replenishment-cycles at the levels Chapter 5 §5.6 and Chapter 10 document; the order's features are the conditions under which the methodological conditions are foreclosed.

The conditions Ricardo specified for the comparative-advantage theorem at *On the Principles* Chapter VII are constitutive of the theorem's operation, as the contemporary formal reconstruction at Schumacher 2012b (*Free Trade and Absolute and Comparative Advantage*, Universitätsverlag Potsdam) documents. The conditions R1 through R3 of capital immobility, asymmetric labour mobility, and bounded national economies are not external features the order's continued extension would progressively satisfy; the conditions are the architectural

specifications under which the theorem operates. The contemporary Western order's capital-account liberalisation has eliminated R1; the integration of national economies into the global financialised order has dissolved R3. The order's features are the conditions under which Ricardo's R1 through R3 are foreclosed rather than the conditions under which they obtain.

The position's presupposition that the conditions are contingent and can be progressively satisfied is foreclosed by the constitutive character of the conditions the tradition's canonical sources themselves specified. The theorems describe what markets would do under conditions that the order's features foreclose; the theorems describe what the order would produce if the order were different from what the order is; the theorems do not describe what the order produces.

The position meets a second feature of the cumulative record. The position's prescriptive claim is that further deregulation would produce the architectural change the substrate-coupling requires. The presupposition the prescriptive claim depends on is that further deregulation can produce the architectural change. The presupposition is foreclosed by the institutional record across Chapter 10 §10.12.

The Sarbanes-Oxley Act of 2002 and the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 are not deregulatory cases; the cases are regulatory cases. The significance of the cases for the second position's closure is that the cases document the order's response to reform proposals at the architectural-correction level. The apparatus-compatible elements of each proposal were absorbed into compliance infrastructure. The apparatus-incompatible elements were attenuated through implementation and interpretation. The hybrid elements were decomposed through subsequent regulatory and judicial proceedings. The order's features were not reconfigured at the architectural level. The cases document the order's institutional response to reform attempts; the response operates through the three-mechanism dynamic Chapter 6 §6.9.1 specified at architectural scale; the response is necessary by construction rather than contingent.

The structural symmetry the cases register is the feature the chapter requires the reader to notice at the level the feature's significance lands at. The two cases were regulatory cases; the second position's prescriptive claim is deregulatory. The cases' empirical demonstration is not specific to regulation as opposed to deregulation; the cases' demonstration is that the order's response to reform proposals at the architectural-correction level operates through the three-mechanism dynamic regardless of whether the proposal is regulatory or deregulatory. The order does not respond to reform attempts by producing architectural-correction; the order responds by producing apparatus-compatible activity that leaves the order's features unchanged. The framework-update operations the cases document satisfy the formal specification Chapter 2's institutional record places in view: the framework-updates F to F′ do not constitute perturbations of magnitude exceeding the critical threshold; the order's energy-distribution remains in the Stage 4 attractor basin; the substrate-decoupling continues.

The position cannot be sustained against the record at the level the position operates at. The position's first presupposition, that the conditions are contingent, is foreclosed by the constitutive character of the conditions the tradition's canonical sources themselves specified. The position's second presupposition, that further deregulation can produce the architectural change the substrate-coupling requires, is foreclosed by the institutional record of how the order responds to reform attempts. The deregulation of the state regulators does not produce the architectural-correction at the level the order's substrate-coupling would require, because the order's response to reform attempts conducted within the tradition's vocabulary operates through the three-mechanism dynamic regardless of whether the attempts are deregulatory or regulatory. The third wall.

The wall is not a wall the chapter has built. The wall is what the constitutive character of the conditions the tradition's canonical sources specified, applied to the institutional record of how the order responds to reform proposals conducted within the tradition's vocabulary, returns when the application is conducted at the levels both records operate at. The chapter has done no external critique here. The chapter has taken the canonical sources at the level the canonical sources gave their conditions, and has taken the institutional record at the level the institutional record documents the order's response, and has reported what the combined application returns. The deregulatory position cannot be sustained against the record produced by the application of the tradition's own conditions to the order's response to reform proposals conducted within the tradition's vocabulary.

12.5 What the Three Walls Together Produce

The chapter has examined the three positions the libertarian tradition's contemporary discourse articulates against the cumulative diagnostic record the book has produced. The realisation position meets the empirical record extracted from the tradition's own canonical conditions. The comparative-superiority position meets the symmetric application of the apparatus to the two contemporary orders the tradition's defenders compare. The deregulatory position meets the constitutive character of the conditions the tradition's canonical figures themselves specified and the institutional record of how the order responds to reform attempts conducted within the tradition's vocabulary.

The three walls are walls the tradition's own apparatus constructed. The chapter has done no external critique, taking the tradition's canonical sources at the level the canonical sources gave their conditions, taking the contemporary defenders at the level the defenders' positions are articulated, applying the canonical conditions to the empirical record the cumulative diagnostic work produced, and reporting what the application returns. What the application returns is the record the prior chapters documented. The closure of the three positions is the closure the tradition's own apparatus produces when the apparatus is applied honestly to the order the tradition's contemporary defenders defend.

The chapter notices, in the examination, that the three positions have run out of room. The realisation position cannot be sustained against the empirical record. The comparative-superiority position cannot be sustained at the uniform level its contemporary articulation requires. The deregulatory position cannot be sustained against the constitutive character of the conditions the canonical sources specified or against the institutional record of how the order responds to reform attempts. A defender retreating from one position to another encounters, at each retreat, a further wall the tradition's own apparatus has constructed. There is no fourth position the tradition's contemporary vocabulary makes available; the chapter's examination of the principal contemporary articulations has found three.

The chapter does not announce a victory. The chapter notices that the three positions, examined against the cumulative record, have run out of room. The reader who has followed the examination is in the position the examination has produced. The position the chapter occupies at the close of §12.5 is the position the cumulative work has placed in view.

12.6 The Regulator the Discourse Identifies and the Regulator the Record Specifies

A further finding the cumulative record has produced requires registering at the level the finding's analytical character permits. The finding follows from the second position's closure and from the institutional analysis Chapter 6 conducted, and it operates at a register the second position's closure does not by itself specify.

The libertarian tradition's contemporary discourse identifies the state regulators as the regulator-source of the order's substrate-depletion. The Federal Reserve, the Securities and Exchange Commission, the Environmental Protection Agency, the Federal Trade Commission, the Consumer Financial Protection Bureau, the Occupational Safety and Health Administration, and the various federal and state regulatory bodies that operate across the contemporary Western order's institutional space are identified, in the discourse, as the institutional sources whose interference with the order's features produces the substrate-coupling failures the cumulative record documents. The discourse's prescriptive recommendation, articulated across Friedman and Friedman 1980, the Cato Institute's *Cato Handbook for Policymakers*, the *Wall Street Journal* editorial position across the period, is that removal of the state regulators' interference would permit the order's features to produce the substrate-coupled outcomes the theorems specify.

The cumulative record specifies the regulator-source at a different institutional locus. Chapter 6 §6.12 documents the position-selection mechanism through which the order's positions are selected, reproduced, and stabilised across institutional generations. The mechanism operates through what the chapter named the homeostatic triad: credentialism, performance amplification, and source isolation. Credentialism operates

through the credentialing pipeline through the elite universities and professional schools (Khan 2010, *Privilege: The Making of an Adolescent Elite at St. Paul's School*, Princeton University Press; Rivera 2015, *Pedigree: How Elite Students Get Elite Jobs*, Princeton University Press). Performance amplification operates through the order's executive-compensation architecture (Lazonick 2014, *Profits Without Prosperity*, Harvard Business Review; Mishel and Wolfe 2019, *Economic Policy Institute Working Paper*). Source isolation operates through the career-pipeline structure that separates the positions occupying the order's regulatory and corporate authority from the substrates the order operates against (Mizruchi 2013, *The Fracturing of the American Corporate Elite*, Harvard University Press). The homeostatic triad is the institutional mechanism through which the order's positions, on both the regulatory and the regulated sides of the regulatory relation, are selected and reproduced.

The contemporary scholarship on regulatory capture documents the state regulators' operation within the same institutional pressures the homeostatic triad produces. Stigler's 1971 paper "The Theory of Economic Regulation" (*The Bell Journal of Economics and Management Science* 2(1), pp. 3-21) produced the original economic specification of regulatory capture. Posner's 1974 extension "Theories of Economic Regulation" (*The Bell Journal of Economics and Management Science* 5(2), pp. 335-358) developed the specification across the institutional architecture. Carpenter and Moss's 2014 edited volume *Preventing Regulatory Capture: Special Interest Influence and How to Limit It* (Cambridge University Press) registers the contemporary state of the literature. The cumulative scholarship documents that the state regulators' careers, the state regulators' incentive structures, the state regulators' institutional positions, and the state regulators' communicative environment are structured by the same position-selection mechanism that structures the regulated firms' positions. The state regulators do not stand outside the order's institutional architecture as autonomous actors who interfere with the order's operation; the state regulators stand inside the order's institutional architecture as positions the order's selection mechanism has constructed to operate within the order's continued reproduction.

The discourse's identification of the regulator-source and the cumulative record's specification of the regulator-source differ at the cybernetic level. The discourse identifies the state regulators as the regulator-source whose interference with the order's features produces the substrate-coupling failures. The record specifies the position-selection mechanism as the regulator-source through which the order's positions, on both the regulatory and the regulated sides of the regulatory relation, are selected, reproduced, and stabilised across institutional generations. The two identifications entail different prescriptive implications.

The discourse's identification entails that removal of the state regulators' interference would permit the order's features to produce substrate-coupled outcomes. The record's specification entails that removal of the state regulators' interference does not address the position-selection mechanism the record identifies as the institutional source of the order's reproduction. Deregulation of the state regulators redistributes the institutional terrain on which the position-selection mechanism operates; deregulation does not alter the mechanism. The deregulated state regulators continue to be positions inside the order's institutional architecture, structured by the same selection mechanism that structured them before the deregulation. The regulated firms continue to be positions inside the same institutional architecture, structured by the same selection mechanism. The institutional terrain redistributes; the mechanism reproduces.

The Sarbanes-Oxley and Dodd-Frank cases the prior section examined are paradigmatic for this finding at the empirical level. The cases document that legislative-regulatory action operates through the three-mechanism dynamic at architectural scale regardless of whether the action is deregulatory or regulatory. The reason the order's substrate-depletion continues regardless of whether the legislative-regulatory action is deregulatory or regulatory is that the legislative-regulatory architecture is not the regulator-source the cumulative record identifies. The legislative-regulatory architecture is a set of positions inside the order's institutional architecture, structured by the same position-selection mechanism that structures the regulated firms' positions. Action against the legislative-regulatory architecture, whether deregulatory or regulatory, redistributes the institutional terrain without altering the mechanism that selects and reproduces the positions on both sides.

The finding operates at the structural-cybernetic register: the chapter has reported what the cumulative record's identification of the regulator-source entails when compared with the discourse's identification of the

regulator-source. The chapter has done no evaluative work here; the chapter has noticed that the two identifications differ at the cybernetic level and has reported what each identification entails. The discourse's prescriptive recommendation, given its identification of the regulator-source, has the coherence the discourse's identification gives it. The cumulative record's specification of the regulator-source, given the structural analysis the prior chapters conducted, has the coherence the prior chapters' analysis gives it. The chapter notices the two specifications and reports what each entails. What the discourse does with the finding is the discourse's question.

12.7 The Three Locks of Agent-Amendability

The cumulative record produces a further specification at the cybernetic level. The specification follows from Chapter 11's symmetric application and from the cumulative diagnostic record across Chapters 5 through 10. The specification formalises, at the cybernetic level, the comparative finding the symmetric application produced through the empirical examination of the Chinese, Saudi, and Emirati cases.

Chapter 11 §11.9 specified three conditions under which the override-capacity operates at the architectural-correction level. The conditions are conjoint rather than separable. The first condition is the power to act at the architectural level: the regulator must occupy a position from which directives at the architectural-correction level can be issued. The second condition is communicative availability: the directives the regulator can issue must be articulable inside the order's communicative grammar as legitimate institutional acts rather than as market-distorting interventions requiring elaborate procedural justification. The third condition is the order's discourse admitting the order as a constructed thing whose configuration is open to revision rather than as a natural arrangement whose modification would constitute interference with a self-regulating mechanism.

The cumulative record extends the three-condition specification to the cybernetic-architectural level. An architecture is agent-amendable in the cybernetic sense when three conditions hold simultaneously at the level of the architecture's operation. The first condition is the perceptual-availability condition: substrate-depletion must be perceptually visible to some agent or agent-population whose position permits architectural-action access. The condition is the cybernetic articulation of the first §11.9 condition extended to the substrate-detection level the architecture's operators must operate at for any architectural-correction to be possible. The second condition is the communicative-availability condition: the depletion the perceptual-availability condition makes visible must be articulable inside the architecture's communicative grammar as a legitimate object of architectural action, without translation into apparatus-compatible variables that pre-empt substrate-protection. The condition is the cybernetic articulation of the second §11.9 condition extended to the architectural level the communicative grammar admits objects as legitimate at. The third condition is the selectional-availability condition: the agent attempting architectural-correction must not be removed, marginalised, or translated by the architecture's selection mechanism through the three-mechanism dynamic Chapter 6 §6.9.1 specified and the homeostatic triad Chapter 6 §6.12 specified. The condition is the cybernetic articulation of the third §11.9 condition extended to the institutional-reproduction level the order's selection mechanism operates at.

The three conditions operate as conjoint specifications: an architecture is agent-amendable in the cybernetic sense only when all three conditions hold simultaneously. An architecture with the first lock open but either the second or the third lock closed cannot, by construction, produce substrate-coupled architectural-correction. An architecture with all three locks closed cannot, by construction, produce architectural-correction at any level. The conjoint specification is what makes the three-lock model the cybernetic articulation of agent-amendability at the architectural level: the locks operate together; the architecture is agent-amendable only when all three operate together as open conditions.

The cumulative diagnostic record documents the three locks for the contemporary Western order. The perceptual-availability condition holds at the substrate-detection level: substrate-depletion is perceptually visible to the agents whose positions place them in contact with the substrates. Chapter 10 documents the perceptual availability across the eight substrates the cannibalisation cascade operates against. The engineering culture at

Boeing, the supplier ecosystem in the pharmaceutical industry, the human-capital substrate the deaths-of-despair pattern operates against, the research-and-development capacity Eroom's Law documents, the infrastructure the Texas grid failure documents, the ecological substrate the climate-scientific record documents, the cognitive-emotional integrity the engagement-optimisation cascade documents, the transactional substrate Wanamaker's inversion documents: at each substrate, the depletion is perceptually visible to the agents whose positions place them in contact with the substrate, which is the perceptual-availability condition holding at the substrate-detection level the first of the three locks specifies as open.

The communicative-availability condition does not hold at the architectural level. The depletion cannot be articulated inside the order's communicative grammar as a legitimate object of architectural action without translation into apparatus-compatible variables that pre-empt substrate-protection. Chapter 10 §10.12's documentation of the three-mechanism translation operation against the Sarbanes-Oxley and Dodd-Frank proposals demonstrates the closure at the legislative-regulatory level. Chapter 11 §11.8's documentation of the discourse-level closure of the operational sentence "we are turning the order off" or "we are reconfiguring the architecture's selection mechanism" demonstrates the closure at the order's discourse level, with the consequence that the communicative-availability condition does not hold at the architectural level the second of the three locks specifies the condition as open at.

The selectional-availability condition does not hold at the architectural level. The agent attempting architectural-correction triggers the architecture's removal, marginalisation, or translation of the agent through the homeostatic triad Chapter 6 §6.12 specified. The credentialing pipeline pre-selects agents whose preferences align with the order's substrate-decoupled-optimisation register; the performance-amplification mechanism rewards agents whose operational performance aligns with the order's measurement frame; the source-isolation apparatus separates agents whose positions place them in contact with the substrate-depletion from positions of architectural authority, with the consequence that the selectional-availability condition does not hold at the architectural level the third of the three locks specifies the condition as open at.

The Chinese order's three locks, by Chapter 11's symmetric application: the first lock is open at the substrates the order's communicative architecture admits and the substrates outside that architecture; the second lock is open at the substrates inside the planning grammar (the CSRC's securities-lending halt of January 2024 documented at Chapter 11 §11.9 is the operational sentence "we are turning this off" admitted into the order's discourse and acted on at the architectural level; the analogous Saudi and Emirati cases at the same section document the same condition's holding at the analogous architectures); the second lock is closed at the substrates outside the planning grammar (the property sector, the *neijuan* substrate, the lateral-innovation substrate, the information-feedback substrate are domains where the planning grammar does not admit the substrate as an object of substrate-protective action); the third lock is open at the substrates inside the planning grammar and contingently variable at the substrates outside it.

The three-lock specification is the cybernetic articulation of what Chapter 11's steering-wheel asymmetry produced. The Western order has lost agent-amendability at the architectural level across the substrates the cascade documents. The Chinese order has retained agent-amendability at the planning-grammar-admitted substrates and lost it at the substrates outside the planning grammar. The two orders' agent-amendability profiles differ at the level the three-lock model specifies. The cybernetic articulation registers what the symmetric application produced through the empirical examination.

The reconstitution question the three-lock model places in view is the question of whether the contemporary Western order's closed locks can be reopened. The diagnosis specifies what the reconstitution would require at the conditions' level: the order's perceptual frame admitting the substrates the cascade documents as legitimate decision variables at the substrates' replenishment-cycles; the order's communicative grammar admitting the substrates as legitimate objects of architectural action without translation into apparatus-compatible variables; the order's selection mechanism retaining rather than removing agents whose preferences align with substrate-coupled regulation. The three conditions operate as the specification of what reconstitution would require. The diagnosis does not specify how the conditions could be reconstituted within the order's features the cumulative record has

documented. The reconstitution question stands open at the architectural-historical level the diagnosis does not reach. The question is open at the level the cumulative record admits and does not foreclose; the diagnosis specifies the conditions the reconstitution would require without specifying whether the conditions can be reconstituted within the order's features.

12.8 What the Chapter Has Done

The chapter has examined the three positions the libertarian tradition's contemporary discourse articulates against the cumulative diagnostic record the book has produced. The realisation position met the empirical record extracted from the tradition's own canonical conditions. The comparative-superiority position met the symmetric application of the apparatus to the two contemporary orders the tradition's defenders compare. The deregulatory position met the constitutive character of the conditions the tradition's canonical figures themselves specified and the institutional record of how the order responds to reform attempts. Each position met a wall the tradition's own apparatus had constructed. The chapter has reported what the examination returned.

The chapter has registered the structural finding that the regulator-source the discourse identifies and the regulator-source the cumulative record specifies differ at the cybernetic level. The state regulators the discourse identifies are positions inside the order's institutional architecture, structured by the position-selection mechanism Chapter 6 §6.12 documented. The position-selection mechanism the cumulative record identifies operates through the homeostatic triad of credentialism, performance amplification, and source isolation. The two identifications entail different prescriptive implications. The chapter reported the difference without taking the discourse's prescriptive recommendation as a position the chapter argues against; the chapter reported what each identification entails and what each prescriptive recommendation addresses.

The chapter has articulated the three-lock model of agent-amendability the cumulative record produces. The three conditions extend the three-condition specification Chapter 11 §11.9 produced through the empirical examination of the Chinese, Saudi, and Emirati cases. The cybernetic articulation registers the locks as the conditions under which an architecture is agent-amendable at the architectural level. The two orders' three-lock profiles differ at the levels the cumulative record documents. The reconstitution question the model places in view is open at the architectural-historical level the diagnosis does not reach.

The chapter has not specified what the order should do, has not prescribed reform, has not recommended replacement, and has not evaluated which alternative orders would be preferable to the contemporary Western order. The chapter has specified the order's features at the level the apparatus the book has constructed permits. The diagnosis the book has performed is the analytical operation the book has performed.

The Epilogue takes the diagnosis to a register the apparatus the book has constructed admits but does not itself reach. The register is the existential-phenomenological register at which the substrate-decoupled optimisation appears to those operating inside the architecture as the world rather than as one architectural configuration among others. The Epilogue is the standalone diagnosis at that register. The cumulative record the present chapter has consolidated stands at the level the cumulative record operates at; the Epilogue operates at a register the analysis admits but does not by itself require. A reader who finishes the present chapter holds the structural diagnosis the book has produced. A reader who continues into the Epilogue enters a register the prior twelve chapters have built toward but have not themselves operated at.

EPILOGUE

The Conditions of the Invisible

Das Wesen der Technik ist ganz und gar nichts Technisches.

The essence of technology is by no means anything technological.

Martin Heidegger, Die Frage nach der Technik (1953/1954); English translation in Heidegger 1977, p. 4

Why Do We See What We See?

A radar operator on the bridge of a ship at night sees what is on the radar screen. The screen shows a scattering of bright points against a dark field, and each bright point is something the radar has detected by sending out a pulse of radio waves and receiving back the echo. A large vessel a mile off the starboard bow appears as a strong return; a smaller vessel further away appears as a weaker return; a navigation buoy with a metal corner-reflector appears as a sharp point of light, brighter than its size on the sea would suggest. The operator reads the screen and knows what is around the ship. The reading is accurate within the limits of what the radar is set up to detect, which is to say that the operator can be trusted, on the basis of the screen, to know where the freighter is and where the buoy is and where the coastline begins.

What the operator cannot see on the screen is everything the radar is not set up to detect. A wooden lifeboat without a metal corner-reflector returns almost nothing and does not show up. A person in the water, with too small a radar cross-section to register against the noise floor of the receiver, does not show up. A whale on the surface does not show up. A floating tree-trunk, a fishing net at the waterline, a stretch of fog with no metal in it, a flock of birds with the wrong body geometry, none of these shows up. The radar shows the operator the sea as the radar is set up to render the sea, which is a sea populated by certain kinds of things and not by others. The kinds of things the radar does not render are not present in the operator's image of the sea as missing kinds of things. They are not present in the operator's image of the sea at all. The operator who has worked the night watch for fifteen years comes to read the screen the way another person reads a face, automatically and almost without intermediation, and the screen becomes, for the duration of the watch, the operator's working world. The radar is the world the operator works inside; the world that does not show up on the radar is not a world the operator is failing to attend to, because no failure of attention is what is at stake. The world that does not show up on the radar is, for the operator, simply not part of what the sea contains.

This Epilogue is about the radar. It is about the radar that the contemporary working professional has been reading for the entire length of a working career, the radar that the discipline issued during the years of training

and that has, by the time the professional is competent enough to be useful, become the world. It is about the way that radar supplies the working professional with the kind of objects the professional can then act on, and about the way that same radar leaves off the screen everything the radar is not set up to detect. The radar is not in any catalogue of equipment the professional has been issued; the professional has not, at any point, made a conscious decision to switch the radar on. The radar arrived as part of the training, as part of the standard vocabulary of the discipline, as part of the way the working day is structured, as part of the language in which a competent person is expected to articulate the problems the discipline is paid to solve. By the time the professional notices the radar exists as a radar, the screen has been the world for so long that switching the radar off, even momentarily, would be closer to vertigo than to discovery, since the things the radar does not render have no remaining presence in the professional's working perception of the sea on which the discipline operates.

The first move this Epilogue makes is therefore to take the reader off the screen, briefly and partially, by showing what kind of work the radar is doing. The radar is doing a kind of work that has been described, in a particular philosophical literature that the reader does not need to have read, as the work of *categories*. A category, in the technical sense the present chapter borrows from that literature, is the framework under which the manifold of incoming experience gets gathered, segmented, bounded, and linked into the world of objects on which the thinking creature then acts. Categories are not features the world has independently of the thinking creature looking at it; categories are what the thinking creature contributes to incoming experience so that incoming experience can show up as a world of objects rather than as an unstructured flood of sensation. Four such categories will be enough to make the move concrete at the level the working professional can register without any prior philosophical training.

Walk up close to a tree, close enough that your hand could touch the bark. What is there in front of you, in the encounter, is a great deal of distinct stuff. The ridges and fissures of the bark, each one with its own shape. A patch of lichen growing on one of the ridges. A small line of ants moving down the bark in one direction. The grain of the wood where the bark has cracked and exposed a paler layer underneath. A drop of resin caught at the edge of a fissure. The shadow of a leaf falling across the bark from above. Each of these is distinct from each of the others; each of them is there to be encountered as the particular thing it is; none of them announces itself as belonging together with the rest.

Now take ten steps back. What was a great deal of distinct stuff is now one tree. The bark, the lichen, the ants, the grain, the resin, the leaf-shadow, the trunk that holds all of them, the branches above, the crown reaching into the sky, show up together as features of the one tree you are now standing back from. The oneness was not in the close-up encounter; the oneness arrives with the step back. The framework under which the close-up disparate stuff and the step-back single tree are both available to you is the framework that gathers what is encountered into the kind of object you can address, walk around, name. The oneness of the tree is the framework's work, not the close-up encounter's content. You do not encounter a tree because the tree is one thing in the world independently of any framework; you encounter a tree because the framework under which the world meets you gathers what is there into the kind of object you can take yourself to have seen.

This framework, the framework under which the many becomes one in the encounter, is the framework Immanuel Kant called Unity (Kant 1781/1787, *Critique of Pure Reason*, A80/B106, in the Table of Categories under the heading of Quantity; the framework operates as one of the twelve pure concepts of the understanding through which the manifold of a given intuition is unified into the object of cognition, B137). It is the framework that makes the bark and the lichen and the ant-line and the resin and the leaf-shadow show up as features *of* the tree rather than as a scattered list of distinct things standing alongside one another. Unity is the framework under which the muscular feeling in an arm and the visual presence of a hand and the felt position of the limb appear as parts of the body that is yours. Unity is the framework under which the voice and the face and the name appear as the person standing in front of you. What contemporary technical work calls *parsing*, the carving of a continuous encounter into discrete addressable units the next operation can take hold of, is the Unity move under a different name; the framework Kant identified is at work in every system, biological or artefactual, that takes a stream and returns objects. The segmentation problem that contemporary computer vision systems have worked on for

decades, the problem of where in the visual field one object ends and another object begins, is the technical-engineering register of the same Unity problem the previous paragraphs walked through phenomenologically, with the pixels arriving in their entirety to the machine's sensor array and the chopping of those pixels into the discrete objects the machine is supposed to act on being what no quantity of pixel data could supply on its own, since the chopping is the framework's work and the framework has to be supplied to the machine before the machine can perform it, which is in practice what contemporary systems do when they train on enormous datasets of human-labelled boundaries (the canonical instances are Deng, Dong, Socher, Li, Li and Fei-Fei 2009, *ImageNet: A Large-Scale Hierarchical Image Database*, in *2009 IEEE Conference on Computer Vision and Pattern Recognition*, pp. 248-255, the human-annotated image dataset whose more than fourteen million labelled images underwrote the modern computer-vision turn; and Kirillov, Mintun, Ravi, Mao, Rolland, Gustafson, Xiao, Whitehead, Berg, Lo, Dollár and Girshick 2023, *Segment Anything*, in *Proceedings of the IEEE/CVF International Conference on Computer Vision*, the segmentation model trained on the SA-1B dataset of approximately one billion human-curated segmentation masks across eleven million images) through which the human chopping of the world becomes available to the machine in the form machine learning can absorb. Without Unity, none of these would meet you as objects at all. They would meet you as an unstructured field of features no creature could act on or think about, because there would be no objects in the field for any thinking or acting to take hold of. Unity is not a feature objects possess independently of being encountered; Unity is the framework under which features show up as the features *of* an object.

Now lift your eyes to the slope above.

What you take yourself to be looking at, when you look at the slope, is a thousand trees. Not one continuous mass of green stretching from the path to the horizon, and not an undifferentiated field of leaves and bark, but a thousand trees, each one of them an individual tree distinguishable from its neighbours, each one of them in principle countable. There are perhaps a thousand trees on the slope above you and you could, given enough time and patience, count them off one by one. The slope does not first present a continuous green-and-brown field and then ask you to cut it into trees; the slope shows up already segmented into the discrete individuals you can count. This framework, the framework under which the world shows up segmented into a manifold of discrete countable individuals, is the framework Kant called Plurality (Kant 1781/1787, A80/B106, the second category of Quantity). Plurality is the framework under which a crowd shows up as many people rather than as one undifferentiated swarm of motion and noise. Plurality is the framework under which the night sky shows up as many stars rather than as a speckled glow. Plurality is the framework under which the world meets the thinking creature as a many that can be counted, distinguished, addressed one by one.

Now look at the slope a third time.

When you take the thousand trees on the slope and you take them as *a forest*, a single bounded whole, you have performed a further move. You have taken the many trees that Plurality gave you and you have gathered them into a single bounded entity that contains all of them and that has, as the forest, its own identity over and above the identities of the individual trees inside it. The forest is one thing and at the same time many things, namely the many trees inside it, which is to say that the forest is the gathering of the many into a one without losing the manyness of the many. This third framework, the framework under which a many becomes a whole that contains all the members of the many, is the framework Kant called Totality (Kant 1781/1787, A80/B106, the third category of Quantity, completing the triad through which the categories of quantity operate on the manifold of intuition). Totality is the framework under which a thousand trees become the forest, many people become the family or the village or the workforce, many stars become the galaxy, many cells become the body, many human beings become humanity. Totality is what makes it possible to speak of *the market*, of *the population*, of *the species*, of *the planet*, of *the economy*. Without Totality, the world would show up as Unities and Pluralities but never as wholes; the trees on the slope would be one tree and a thousand trees but never the forest, the people would be one person and many people but never humanity, and the language the practitioner uses every working day to refer to such wholes would simply have no objects to attach to. *The economy*, for the contemporary economist, is a totality move; *the population*, for the contemporary policy analyst, is a totality move;

the workforce, for the contemporary executive, is a totality move. Each of them gathers a many into a whole that has, as a whole, an identity over and above the identities of the members. The three frameworks the chapter has now walked through, Unity through the tree, Plurality through the thousand trees on the slope, Totality through the trees taken together as the forest, are not three unrelated frameworks the chapter happens to have set down side by side. The three are three modes of the same underlying move: the move by which a thinking creature carves the world up into one thing, into many things, and into wholes made of many things; Kant grouped these three together under the heading of *quantity*, because each of the three is the framework under which the world can show up as having a *how-much* at a particular scale of gathering. Without Unity, no individual things. Without Plurality, no many. Without Totality, no wholes. None of the three corresponds to a feature the world has independently of the thinking creature looking at it; each of the three corresponds to a condition that has to hold for a world of features to become available to the thinking creature at all. The three together are the lens through which everything else is seen, and the lens, by virtue of being the lens, is never itself among the things that are seen through it.

The economist, the engineer, the administrator, the policy analyst, every working professional whose job consists in identifying objects, counting them, and gathering them into wholes, is standing inside the three frameworks the previous paragraphs walked through, whether or not the working professional has ever encountered the philosophical literature in which the frameworks were first named. How the three frameworks came to be installed in the working perceptual life of the contemporary practitioner, by what particular history of material practices Unity and Plurality and Totality became automatic in the population that uses them, is a question that would require a separate book to answer; the present chapter cannot conduct that history and does not need to. For the present chapter it is enough to register one observation that the historical record of mathematics and the historical record of writing equally support: words and numbers do the same kind of work. Each of them parses an incoming continuous flood into discrete, addressable, repeatable units; each of them frames the discrete units into the kind of object that can be counted, named, manipulated, exchanged, transmitted; each of them packages the world into the form a thinking creature can take hold of and pass to another thinking creature. The framing of the world by words and the framing of the world by numbers is, at the level of what the framings do, one operation working in two registers; and the contemporary working professional, whose training has installed the practitioner's particular combination of words and numbers into the practitioner's perception of the working world, is standing inside the deposit of that operation as the operation has run through several centuries of European intellectual and commercial history.

The verb the contemporary practitioner uses, every working day, across an enormous range of fields, is the verb *optimise*. Managers optimise processes, engineers optimise designs, regulators optimise frameworks, educators optimise curricula, doctors optimise treatments, athletes optimise performance, policy analysts optimise interventions, software developers optimise code, traders optimise portfolios, marketers optimise campaigns. The verb has no visible edge in contemporary English; the verb appears as the verb the field uses for the field's improvement, and the question of whether some different verb might have been available, and whether the field might have done its work under a different verb, is not the kind of question that ordinarily arises at all.

The principle lands at the level of ordinary scholarly experience. A reader picks up a journal of contemporary management research, opens the journal at whatever page first presents itself, and begins reading. The page is the opening of an article whose title concerns the optimisation of supply-chain performance under uncertainty, and the first paragraph specifies the problem the article is going to solve: identify the arrangement of supplier relationships, inventory levels, and logistics routings that minimises total operational cost subject to service-level constraints. The reader turns to a different journal, this one in policy studies, and the first article concerns the optimisation of healthcare delivery under fiscal pressure. The reader turns to a third journal, this one in computer science, and the first article concerns the optimisation of large-language-model performance against a benchmark. Three articles, three fields, three substrates: supply chains, healthcare, language models, and the three articles share a single verb that the reader did not notice was a shared verb until the present moment of registration.

The verb *optimise* sits inside the working vocabulary of the contemporary practitioner as the kind of installed framework the present chapter has been bringing into view. The contemporary practitioner cannot see how a working object could be anything other than something to be *optimised*, because the framework that makes the working object an object-to-be-optimised has been installed so deeply across the practitioner's training and career that no alternative framework presents itself as available. A material practice has installed a framework in the working language of a discipline; the framework has become the basic furniture of the visible; the framework is now invisible because it is the lens through which the discipline looks, and the lens is never itself among the things the discipline looks at.

This is the layer of the working world that the cybernetic apparatus of Chapter 5 and the Ellulian analysis of Chapter 6 do not themselves reach, because they operate on what has already come into appearance as a candidate for the apparatus's operation. The layer the present chapter takes up is the layer at which the candidates come into appearance as candidates in the first place. The layer is invisible to the people inside it because it is the lens through which they see, and the lens is never itself among the things they see.

The case lands more sharply in a human professional than in the abstract figure of the journals walk-in. Take a clinical psychologist who has spent twenty-five years practising. The diagnostic frame the psychologist trained inside has become, by the end of the training, automatic. The frame supplies the psychologist, on entering any room, with the kind of object the diagnostic literature names: a patient with attachment difficulties, a patient with avoidant tendencies, a patient with unresolved conflict around a parental relationship, a patient with rigid defences, a patient whose narcissistic injuries are presenting as grandiosity. The frame is enormously useful inside the clinical hour; the frame is the reason the psychologist is competent at what she is paid to do. The frame does not, however, switch itself off when the clinical hour ends. The psychologist goes to a dinner party. At the dinner party there is a man who has just sold the company he founded, a woman who has just published her third novel, a younger guest who is asking sharp questions about the politics of the table, and an old friend of the host who is telling a long story about something that happened in his childhood. The psychologist, without choosing to, sees the entrepreneur as a man whose drive to build is downstream of a particular relation to early authority, sees the novelist as a woman whose creative output is a sublimation of unresolved early loss, sees the younger guest as a personality structure presenting through a particular defensive style, and sees the old friend as a case the diagnostic literature would name in three or four sentences. What the psychologist does not see, because the lens does not render it, is the entrepreneur as a builder of a thing that did not previously exist, the novelist as a maker of a sentence nobody else has ever written, the younger guest as a thinker whose questions are sharper than the table can absorb, and the old friend as a father, a colleague, a citizen, a teller of a story that is a story before it is a symptom. The psychologist is not blind; the psychologist sees vividly and accurately and within the lens correctly; what the lens does not render the lens does not render, and what the lens does not render is not seen at all. The dinner party is, for the psychologist who has worn the lens for twenty-five years, populated entirely by clinical objects, and the entrepreneur, the novelist, the thinker, the father, the citizen, the teller of the story, recede into the unrendered part of the room.

The scaling of the figure from one professional life to the scale of an entire technical-administrative civilisation is what the rest of this Epilogue takes up. What such a civilisation renders visible appears, to the people inside it, as what there is. What such a civilisation does not render is not seen as missing; it is not seen at all.

The radar figure carries the reader to the threshold of the concept and has to be left at the threshold. The closest English word for what the figure approximates is *framework*, and the closeness ends almost as soon as it begins, because the everyday use of the word *framework* carries an instrumental sense the figure does not carry. In ordinary English, one picks up a framework, applies it, puts it down, swaps it for another, the way a carpenter picks up a jig and sets it aside for the next job; the framework, on this everyday use, presupposes a user standing prior to it and choosing whether to apply it. The layer the Epilogue takes up does not work in that instrumental sense, since the layer names the prior condition under which there is a user who could pick anything up at all, and the prior condition under which there are objects of the kind that users' frameworks would then frame. The radar in the figure above carries the reader into the perceptual register in which something is rendered on the screen and

something else does not register at all, and the figure does this work at the pedagogical level the figure operates at; the figure does not capture the constitutive register the layer operates at, because the radar assumes an operator standing prior to the radar, switching it on and reading the screen, and the layer the Epilogue is examining produces the operator along with what the operator encounters as the working sea. The constitutive-rather-than-instrumental point is the point the chapter has been pressing throughout: the framework that organises the working professional's world is itself the deposit of practices that made the professional the kind of professional the professional is, and the framework arrives along with the professional's training rather than being something the professional ever chose to put on. The Epilogue continues using *the framing* or *mode of revealing* as its working terms, with *framework* available as a first approximation for the reader who needs the entry point but understood throughout as the closest English approximation rather than the concept's name.

What the Layer Looks Like in Plain Terms

The Epilogue will use the working phrase "mode of revealing" for the radar condition the prior section sketched. The phrase names something the reader already knows but has not been asked to register. Different historical periods have held differences that exceed the level of beliefs about a common world; different historical periods have encountered different worlds at the level of what the world appears as. The same physical material has appeared, across different historical orders, as different kinds of thing, and the appearance shapes what can be done with the material, what can be said about it, what counts as understanding it. The shaping happens below the level at which the agents' choices operate. The agents do not choose how the world appears to them; the world appears the way it appears, and the appearance is the order's mode of revealing. The phrase names this perceptual layer at which the world arrives shaped before any specific belief or action acts upon it.

Four examples the reader already knows make the phrase visible, and the first of them is the cosmos. Before the seventeenth century, in the order that ran from the Greek philosophers through the medieval Christian synthesis, the cosmos appeared as *kosmos* in the Greek sense: an intrinsically ordered being, an arrangement that exhibits its own beauty and intelligibility, a creation whose ordering principles are part of what the cosmos is rather than something imposed on it from outside. The astronomer's task was the discovery of an ordering already there. After the seventeenth century, in the order that runs from Descartes (*Principles of Philosophy*, 1644, Part II §§64-65 on the cosmos as machine) and Boyle (*A Free Enquiry into the Vulgarly Receiv'd Notion of Nature*, 1686, especially §IV on the rejection of intrinsic teleology in favour of mechanical contrivance) through Newton's calculus and the eighteenth-century materialists, the cosmos appears as a clockwork mechanism: an arrangement of parts whose interactions follow specifiable laws, an engineered structure whose ordering is something done to the parts rather than intrinsic to them, a machine. What changed was not a set of beliefs about the same cosmos; what changed was what cosmos appeared as. The clockwork-cosmos register requires a clockmaker because it treats the cosmos as the kind of thing that is arranged by an arranger; when the eighteenth-century materialists removed the clockmaker (La Mettrie 1747/1996, *L'homme machine*; Holbach 1770/2018, *Système de la nature*; Laplace 1814/1995, *Essai philosophique sur les probabilités*, with the famous response to Napoleon that the system needed no first-cause hypothesis recorded in the *Mécanique céleste* commentary tradition and earliest documented at scholarly length in Ball 1888, *A Short History of Mathematics*, pp. 387-388), the clockwork remained, and the cosmos became an arrangement-without-arranger, which is an ontological condition the previous register did not have available. The same physical universe ran underneath both registers, and what changed was the mode of revealing under which the universe came into appearance for the agents who encountered it. The astronomer of 1500 and the astronomer of 1700 were not looking at the same thing differently; they were looking at different things, because what the universe appeared as had been displaced at the perceptual level, which is to say that the mode of revealing is the layer at which the displacement occurred.

The second example is contemporary and more uncomfortable because the reader is operating inside it. The contemporary order's vocabulary has performed a quiet but consequential-by-construction displacement in the verbs available for activities that bring something into being. The previous register had verbs like create, make, bring forth, give birth to, with the substrate the verb acted on having an intrinsic ordering the verb's action

discovered and respected. The contemporary register has verbs like engineer, design, architect, optimise, iterate, scale, with the substrate the verb acts on appearing as an arrangement of parts available for ordering toward a function the agent specifies. The same activities are still performed: people still bring things into being. What has changed is the verb the activity is named under, and the change in the verb registers a change in what the activity appears as. A contemporary advertising agency employs creatives, not creators, and the consequential difference between the two is that to be a creator is to perform an activity whose intrinsic ordering the creator discovers, while to be a creative is to perform a function inside a system that has already specified the activity's parameters, with the creative's task being to optimise outputs against the system's measurement frame. A contemporary engineering practice does not make components; it engineers solutions, designs systems, optimises arrangements. A contemporary biotech company does not breed organisms; it engineers genomes. A contemporary educator does not teach; the educator delivers content, optimises outcomes, scales pedagogical interventions. The vocabulary is saturated to the point that even cinematic register absorbs it: *Prometheus* (Scott 2012, *Prometheus*, 20th Century Fox, screenplay by Jon Spaihts and Damon Lindelof) names the originating intelligences who made humanity Engineers, the term selected over the historically available alternatives (gods, creators, parents, makers) because the contemporary vocabulary's most ontologically loaded available term for an originating intelligence is the term for an entity that orders standing-reserve into an arrangement that performs a specified function. The film's writers and audience inhabit the vocabulary so completely that the choice does not register as a choice; the originating intelligence is named as engineers because what an originating intelligence is, in the contemporary register, is engineers. The mode of revealing under which the contemporary order encounters the activity of bringing-something-into-being is the mode that registers the activity as engineering, and what has shifted is not the activity but what the activity appears as.

The third example operates at the level of how the mind appears, and the example exhibits the feature this section is pointing to: the cart placed before the horse. The brain has not changed across the past seventy years. What the brain appears as has been reconstituted, across roughly that period, from a biological organ embedded in metabolic, developmental, and relational substrates whose ordering is intrinsic to what the organ is, into a computational substrate of the kind an information-processing machine runs on. The structure of the reconstitution is the cart-before-the-horse: the computer was built as an artefact that performs certain operations; the operations were named, by the early researchers, through analogy with what minds were thought to do (memory, processing, search, retrieval); the analogy was then reversed, and the mind was named as the kind of thing the computer is. The reversal was performed at vocabulary level first (Turing 1950, "Computing Machinery and Intelligence," *Mind* 59(236), pp. 433-460, framing the question of machine intelligence through the imitation game and inaugurating the analogical idiom; the cognitive revolution's information-processing register registered through Miller 1956, "The Magical Number Seven, Plus or Minus Two," *Psychological Review* 63(2), pp. 81-97, and Newell and Simon 1972, *Human Problem Solving*; the cognitive-science programme's mental-representations vocabulary registered through Fodor 1975, *The Language of Thought*, especially Chapter 1) and then at ontological level. By the time the contemporary neuroscience-and-philosophy literature is in place, the mind appears as software running on the brain's hardware, the brain appears as a substrate that implements computational operations, and consciousness appears as either an emergent property of sufficiently complex computation or a problem to be dissolved through better computational modelling. The appearance is taken to be a discovery rather than registered as a mode-of-revealing displacement. The cart (the computer, an artefact built by humans approximately seventy years ago) has been placed before the horse (the actual living mind whose actual workings the artefact was built to approximate); and the horse is now described in terms of what the cart does. The vocabulary then operates in the reverse direction at the contemporary moment: AI systems are now described as having understanding, reasoning, intentions, beliefs, because the vocabulary that was originally the mind's vocabulary, then was applied by analogy to the computer, then was reversed to describe the mind, has now been re-applied to the computer as if the computer's possession of these capacities were a substantive question rather than a vocabulary residue from the previous reversal. The same physical brain runs underneath this entire sequence, with what has changed being the mode of revealing under which the brain enters the contemporary order's perceptual horizon, and the cart-before-horse structure of the displacement is the signature of the

framing-mode acting at the level of cognitive ontology.

The fourth example, complementing the three above, registers a feature the Epilogue must name because the feature appears across all three examples and across the order the prior chapters have diagnosed. The clockwork-cosmos displacement kept the formal mechanism (the laws of motion, the calculable interactions of parts) and dropped the substrate the mechanism required (the clockmaker, the intrinsic teleology, the *kosmos*-as-creation register). The eighteenth-century materialists performed the dropping; the clockwork remained without the clockmaker; the order's discourse continued to behave as if the formal mechanism were self-sufficient. The same move has been performed against the libertarian tradition's own canonical sources. Smith specified an entire moral-psychological substrate within which the impartial spectator's recognition operates (Smith 1759/1976, *The Theory of Moral Sentiments*, especially Part I §I on sympathy and Part III §§1-2 on the impartial spectator); the substrate is constitutive of the argument; without the substrate, the argument cannot be conducted as Smith presented it (the textual reconstruction is performed at archival depth in Chapter 1 §1.2). The contemporary order kept the formal operation (the price mechanism, the invisible-hand outcome-claim, the voluntary-exchange vocabulary) and dropped the substrate (the moral-psychological conditions, the impartial-spectator framework, the *Theory of Moral Sentiments*'s anthropological foundation). The dropping was performed across the twentieth century at the same level the eighteenth-century materialists dropped the clockmaker. The clockwork remained without a clockmaker; the price mechanism remains without the moral-psychological substrate. In both cases the formal mechanism persisted while what the mechanism required was eliminated, and in both cases the order's discourse continued to behave as if the formal mechanism were self-sufficient. The phrase the order's agents use to register the consummation of the move is *it is not personal, it is business*. The phrase performs three moves at once: it states that the order's transactions are conducted at a level that has been formally separated from personal-moral consideration; it states that the separation is a virtue rather than a deficit (the phrase's deployment frame elevates the separation as a sign of operational competence); and it states that the agent who would attempt to bring personal-moral consideration into the transaction would be acting against the order's norms. The phrase is the operating signature of the dropping-of-the-substrate-while-keeping-the-formal-mechanism, performed by the order's agents as the affirmation of the dropping as the order's preferred mode. The substrate Smith specified has not become impossible to reinstate; what has happened is that the order's discourse has accepted the substrate's absence as the legitimate operational norm and treats the substrate's reinstatement as a deviation from operational legitimacy. This is the order-specific level the section has been naming. The diagnosis the prior twelve chapters have performed is a diagnosis of this order. It is not a diagnosis of human nature, and it is not a claim about every human cultural order. The contemporary Western order's architectural condition is what the diagnosis identifies; other orders operate other modes of revealing, with other relations between formal mechanism and substrate, and the question of what those orders do with the relation is not the question the monograph addresses. The civilisational specificity matters because it determines what the diagnosis is and what the diagnosis is not: the diagnosis is what the present order produces and what the present order cannot, from inside its own resources, recognise as what it produces.

The four examples are what the working phrase "mode of revealing" names. The phrase names a perceptual layer that operates before specific beliefs and actions, that shapes what is encountered, and that operates below the level of the agents' choice. The clockwork displacement was a mode-of-revealing displacement at the level of cosmos; the engineer-replaces-creator shift is a mode-of-revealing displacement at the level of contemporary cultural vocabulary; the brain-as-computer reconstitution is a mode-of-revealing displacement at the level of cognitive ontology, with the cart-before-horse structure exhibited at full force; the not-personal-it-is-business move is the operating signature of the substrate-dropping that the order's discourse performs across all three examples and across the rest of the order's institutional architecture. The reader has the layer in view at the pedagogical level the four examples supply. The Epilogue now turns to the philosophical apparatus in which the layer has been formally specified, and the apparatus to the work of reading the contemporary economic order at this layer.

The Layer Specified Philosophically

The layer the prior sections have described phenomenologically has a literature. A German philosopher, working from a position outside political-economic analysis on a question whose connection to the present subject would not have been obvious at the time of writing, specified the layer formally in a 1953 lecture delivered at the Munich Academy of Fine Arts. The lecture's argument is built on a distinction between two ways something can come into appearance, and the distinction supplies the Epilogue's working philosophical apparatus.

Martin Heidegger's lecture "Die Frage nach der Technik," translated by William Lovitt as "The Question Concerning Technology" (Heidegger 1953/1977, in *The Question Concerning Technology and Other Essays*, with the German original in *Vorträge und Aufsätze*, Band 7 of the *Gesamtausgabe*), takes up the question of what technology is at the level the Epilogue requires. The lecture's central technical move is the contrast between two modes through which what appears comes into appearance. The work of art, on the reading the lecture develops, brings forth what it brings forth as something that comes into appearance through its own bringing-forth; the artwork's revealing is what the lecture calls *poiesis*, the bringing-into-appearance of what was not previously present. The technological order reveals what it brings forth in a different mode altogether. It brings forth what it brings forth as "standing-reserve" (the lecture's *Bestand*), available for ordering, calculable, transformable through the operations the order conducts on what it encounters. The revealing characteristic of the technological order is what the lecture calls *Bestellen*, the setting-upon that orders what appears as resource for the order's continued action (Heidegger 1953/1977, especially pp. 14-19 on *poiesis* and *Bestellen*; the contrast is developed across the lecture's central section). The gathering of the setting-upon transactions that compose the second mode is what the lecture names *Gestell*: the framing condition under which the forest, the river, the soil, the worker, the patient, the student, the data subject, the language model, the attention of an adolescent, are encountered as standing-reserve and not otherwise.

The contrast can be made concrete in a single image. A forest. Under the first mode of revealing, the forest appears as a forest, with its own life, its own integrity as the forest it is. Under the second, the same forest appears as standing-reserve of timber, available for harvest, calculable in board-feet, transformable through the harvesting operations of the timber industry. The forest itself does not change between the two modes. What changes is the appearance of the forest, the way the forest enters the perceptual horizon of the people who encounter it.

Stay with the image for a moment, and stay with what it is not. The point being pressed here is not an environmentalist point about the forest being more valuable preserved than harvested, and it is not an anti-capitalist point about the timber industry being the wrong owner of the forest's productive use. Those debates have their own venues and their own substantial literatures, and the framing analysis the Epilogue is building may at moments touch on the same empirical terrain those debates work over, since the same forest is the object in question. But the analytical level the Epilogue is working at is several layers below the level at which a debate between environmentalist and industrialist positions can be conducted. Both sides of that debate already encounter the forest as the kind of object available for human disposition, with the environmentalist disposing of it under one set of values and the industrialist under another. What the framing analysis specifies is the prior condition under which the forest came to appear, to both parties to the debate, as the kind of object whose disposition is what is at stake. That prior condition is what the chapter is naming. The forest as standing-reserve is the appearance under which the contemporary order encounters not only the timber industry's forest but also the conservationist's protected forest, the carbon-credit market's forest, the eco-tourism operator's forest, the rewilding charity's forest, and the indigenous-land-restoration NGO's forest, since each of those configurations encounters the forest under the mode of revealing that has already constituted the forest as available for ordering toward a specified human function. Under this prior mode, the forest does not appear as a forest at all in the sense the contrast above set out; the forest appears as a candidate for some configuration of human ordering, with the configurations differing among themselves at the level of which ordering should be chosen and converging at the prior level of what kind of thing the forest is. The Epilogue is concerned with that prior level. The argument about which ordering should be chosen presupposes the level the Epilogue is working at; it does not address the level the Epilogue is working at, and the level the Epilogue is working at is what makes the rest of the chapter possible.

While the environmental example sits in front of the reader and the disclaimer has just been laid down, a dramatised case from a recent film registers the analytical level the disclaimer is pointing at with a sharpness the forest contrast on its own may not deliver to a reader for whom the forest reads as environmental terrain by default. Adam McKay's *Don't Look Up* (McKay 2021, Netflix, screenplay by McKay with David Sirota) is conventionally received as a satire of climate-change inaction, and that reading registers a real feature of the film's surface; what the film actually shows, when read at the analytical level the Epilogue is working at, is the framing analysis's central proposition demonstrated at the dramatised limit case. The premise the film gives the order to process is a comet of approximately the size of Mount Everest on a confirmed collision trajectory with Earth, with the impact six months out and the consequences specified at the level of extinction; the threat is not a long-cycle environmental degradation that admits the standard configurations of policy debate but a single discrete substrate-event that will end the substrate the order conducts its operations on, including the substrate the order's operators are themselves part of. A nuclear-deflection mission with reasonable probability of success is launched and then aborted at the urging of Peter Isherwell, the CEO of BASH Cellular and a major donor to the President, who has discovered that the comet contains rare-earth elements valued by his company's analysts at approximately one hundred forty trillion dollars, and who proposes that the comet be fragmented in space by drones equipped with fission explosives, the fragments recovered commercially from the ocean, the rare-earth resources monetised; the President abandons the deflection plan, the BASH plan replaces it, the BASH plan fails, the comet hits, the species ends. What the film documents at the level the Epilogue is reading it on is what the order's working operators encounter when the threat arrives: they do not encounter the threat as a threat to the substrate, because the substrate is not in the order's measurement frame as a substrate to be protected; they encounter the threat as a candidate for the optimisation operation the order is configured to perform, with the optimisation conducted in the only register the order's communicative grammar admits, which is the register of monetisable value extractable at the appropriate institutional scale. The autoaccroissement mechanism the Ellulian analysis specifies operates exactly as the analysis predicts: the order's continued operation requires the comet to be processed in the order's existing register, the existing register is the register of optimisation against the order's own metrics, and the comet enters the register as the largest single optimisation opportunity in the order's history rather than as the substrate-ending event that is what the comet, considered as the substrate-event it is, actually is. The order eats the candidate-object the framing has constituted for it; the substrate the candidate-object was an event in is not, at any point in the dramatised sequence, available to the order as the substrate-event it is. The film is conventionally received as climate allegory; the present chapter receives it as the dramatised demonstration that what the framing condition makes inaccessible is not specifically the climate substrate or the environmental substrate but any substrate at all that does not present itself in the optimisation register, and the dramatised case where the substrate-event is total and the operators still cannot encounter it as a substrate-event is what the film accomplishes when read at the analytical level the present chapter requires.

The framing acts prior to deliberation, at the level of the conditions under which deliberation is possible at all. This is what makes it analytically prior to the readings the prior chapters constructed: the cybernetic apparatus reads regulators and substrates as identifiable objects; the Ellulian analysis reads the institutional totality within which the regulators are coupled; the framing is what conditions both, by determining how the regulators, the substrates, the institutions, and the totalities first come into appearance for the people inside them. Analytical priority does not, in this register, mean foundational priority. The three readings are orthogonal, as the closing section of the present Epilogue will state at consolidation. The framing's priority lies in this: the prior readings can only be deployed by people for whom the regulators, substrates, and institutions have already come into appearance as objects to be analysed, and what conditions that appearance is the layer the present Epilogue specifies.

The Epilogue uses the German *Gestell* alongside "the framing" or "mode of revealing" as its working terms across the rest of the chapter, with "framework" available as a first approximation for readers who need the entry point but understood as the closest English approximation rather than the concept's translation. The Epilogue signals translated key terms with quotation marks ("standing-reserve", "setting-upon", "the supreme danger") so the reader registers the sense as the lecture's specific philosophical sense rather than the colloquial English

meaning.

The Recursive Setting-Upon

The setting-upon is recursive, since each ordering produces objects whose nature is to be available for further ordering; each further ordering produces objects whose nature is to be available for further ordering; the recursion is built into the technological order's mode of working. A forest is set upon as timber; the timber is set upon as pulp; the pulp is set upon as paper; the paper is set upon as printed material; the printed material is set upon as information; the information is set upon as measurable performance against a benchmark. The recursion does not terminate, because each level produces, as its output, objects the next level can take up for further setting-upon (Heidegger 1953/1977, especially pp. 14-19 on the *Bestellen* operation; the operation is developed across the lecture's central section and the related lectures of the 1949 Bremen series, on p. 17 in particular for the specification of *Bestand*).

What "standing-reserve" names is not, on Heidegger's analysis, stockpiled material at all. It names a mode of appearance, not a property of the object. A forest that has been set upon as timber is no longer, on Heidegger's analysis, the forest that appears under the first mode of revealing; the forest has been transformed, at the level of how it appears, into the standing-reserve the timber industry's operations require. The forest's biological, ecological, and aesthetic features have not changed at the level of physical reality. What has changed is the mode of revealing under which the forest now enters the perceptual horizon of the people who encounter it. They encounter it as standing-reserve, and what would have to be the case for them to encounter it otherwise is the framing the Epilogue is constructing.

Chapter 5 specified the regulator's measurement frame as the regulator's model of the substrate; the model has resolution at the regulator's action-cycle and cannot represent variety at the substrate's replenishment-cycle when the cycles are mismatched. The framing the present Epilogue specifies is the same condition seen from the inside: the people who work within the order encounter what the measurement frame's vocabulary admits as standing-reserve, and what the vocabulary does not admit does not enter their perceptual horizon at all. The cybernetic specification and the framing specification converge on the same condition from incompatible methodological directions. The closing section of the present Epilogue states the convergence at consolidation.

The Supreme Danger and Self-Concealment

The framing has a feature Heidegger identifies as built into its mature operation. The feature is what he calls *die höchste Gefahr*, "the supreme danger," and the Epilogue uses the English thereafter. The supreme danger is not the danger that the framing might destroy something specific; specific destructions do occur, and they are serious, but they are not what Heidegger names with this phrase. The supreme danger is that this mode of revealing forecloses access to other modes of revealing, so that the people inside the order cannot, from positions inside it, encounter what they encounter under any mode other than the one running (Heidegger 1953/1977, especially pp. 26-28 on the supreme danger, developed across the lecture's closing sections).

The opening journals case makes this concrete: the reader who picked up the three journals found three articles whose common verb was "optimise." The verb's universality across the contemporary academic discourse is the empirical signature of the framing acting at the level of the discourse's vocabulary. A reader who attempts, from inside the discourse, to ask whether optimisation is the right frame finds that the question does not have a place in the discourse. The discourse's vocabulary is the vocabulary of optimisation working at different objects, with the question of whether optimisation is the right frame foreclosed by the perceptual frame the discourse runs within. The reader can ask the question, but the discourse cannot register the question as a question the discourse admits as legitimate operational concern. The asking and the registration occur at distinct levels; the framing forecloses the registration, not the asking.

Self-concealment is the mechanism by which the supreme danger works. The framing presents itself, to the people inside the order, as the way things appear, not as a mode of appearance among other possible modes. What appears appears as what it is; it does not appear as appearing-under-this-mode. If the framing did present itself as one mode among others, the people inside it could ask whether the mode is the right mode; the asking would open a perceptual space within which alternative modes might come into appearance; the alternatives would compete with the framing for their perceptual horizon. The framing's continued action depends on the foreclosure of this competition, and the foreclosure works through self-concealment: the framing acts without presenting itself as a mode at all.

The same condition admits a cybernetic specification alongside the phenomenological one. Chapter 5 identified the regulator's measurement frame as the condition under which the regulator's model of the substrate is constituted; the measurement frame is what the regulator measures with, and the measurement frame is prior to the measurements the regulator produces. The people who work within the order encounter the measurements; they do not encounter the measurement frame itself, because the measurement frame is the condition under which the encounters occur. They may know, abstractly, that the measurement frame exists; they do not encounter the frame in the form the substrate appears under it. The encounter occurs through the frame's vocabulary, and the vocabulary is prior to the encounter. Self-concealment is cybernetic as well as phenomenological, with the two readings converging on the same condition from distinct levels.

Sedimentation and the Temporal-Thickness Complement

The framing has so far appeared in the Epilogue as something that acts at the moment of encounter, and this account is incomplete, since the mode of revealing is not produced at any single encounter; it is produced through accumulation across the temporal extension of the people inside the order. The accumulation is what the present section names sedimentation, with the term drawn from the phenomenological tradition's analysis of the temporal conditions of perception (Merleau-Ponty 1945/2012, especially pp. 130-135 on the perceptual implications of temporal sedimentation; pp. 148-153 on the body-schema's accumulated character; pp. 412-419 on the constitutive character of habituated perception in the agent's perceptual horizon).

A junior who enters the order encounters what the order encounters within the framing the order runs under. Continued work within the order produces, across the career, a sedimented relation to the framing the worker is no longer in a position to register as a sedimented relation. The senior practitioner's perceptual horizon is calibrated to the framing in ways the junior's was not yet calibrated. This is sedimentation across the temporal extension of a single career. It also acts at the level Michael Polanyi named tacit knowledge: the senior practitioner possesses, at the senior career-stage, a tacit knowledge of how things are done that they could not articulate explicitly but that structures their perceptual horizon at every encounter (Polanyi 1958, *Personal Knowledge*, especially Chapter 4 on the structure of tacit knowing; Polanyi 1966, *The Tacit Dimension*, especially Chapter 1 on the specification of tacit knowledge). The tacit knowledge is what the practitioner brings to the encounter; the tacit knowledge is what makes the encounter intelligible within the framing; the tacit knowledge is the sediment the order's continued life has produced in them. Across cohorts, the same accumulation works collectively, in the form Ludwik Fleck named the thought collective (Fleck 1935/1979, *Genesis and Development of a Scientific Fact*, especially Chapter 4 on the thought collective and its perceptual workings). The cohorts whose tacit knowledge has been calibrated to the framing replace the prior cohorts who were calibrated otherwise; the institutional totality stabilises at the level of the framing's perceptual frame; the thought collective is what carries the framing across generations.

The institutional sequence Chapter 2 reconstructed through the empirical record reads, in this register, as sedimentation at architectural scale across the four-decade period. The cohorts whose tacit knowledge has been calibrated to the framing have replaced the prior cohorts; the framing has stabilised at the level of perceptual horizon and at the level of the thought collective's perceptual frame. The contemporary phase is the stabilised-sedimented phase, in which the framing acts without presenting itself as a framing because the

sedimentation has produced the practitioners whose perceptual horizon takes it as the perceptual default rather than as one frame among others.

The Positive Bachelard Reading

Modes of revealing are at work in any order at all. The Epilogue's identification of *Gestell* at the contemporary order's framing does not, by itself, establish that this is the only mode at work in the order, or that all instances of structured perception are identical to it. The present section conducts what the Epilogue calls the positive Bachelard reading, with the term drawn from Gaston Bachelard's analysis of the perceptual frames through which scientific knowledge is constituted (Bachelard 1934/1984, *The New Scientific Spirit*, especially Chapters 1 and 2 on *phénoménotechnique*; Bachelard 1938/2002, *La formation de l'esprit scientifique*, especially Chapter 1 on the epistemological obstacle).

Bachelard's analysis identifies, in the perceptual frames of scientific knowledge production, a feature he names *phénoménotechnique*, "phenomenotechnique" in English: the technical-instrumental construction of the phenomena that scientific knowledge works on (Bachelard 1934/1984, especially pp. 13-17). The phenomena scientific knowledge studies are not, on Bachelard's reading, given to the scientist's perception in any natural-perceptual mode; they are produced through the instrumental-technical machinery of the laboratory, with that machinery being the condition under which the phenomena come into appearance as phenomena science can study. The electron, the gene, the Higgs boson, the protein-folding pattern, the gravitational wave: each is, on Bachelard's reading, constituted through the technical-instrumental setup that produces it as observable, measurable, specifiable. The phenomena are not less real for being constituted in this way; the technical-instrumental constitution is what makes them available for study at all. The same kind of feature is at work in clinical practice, engineering practice, artisanal practice: each constitutes the phenomena it works on through the perceptual frame the practice has developed.

What distinguishes *Gestell* from this broader phenomenotechnique is the supreme danger the previous section specified. Phenomenotechnique constitutes phenomena under a perceptual frame; *Gestell* constitutes phenomena under a perceptual frame that forecloses access to other frames. The scientist at the bench does not encounter the world only as standing-reserve for further laboratory operations; outside the laboratory, the scientist encounters the world under a multiplicity of modes the laboratory's perceptual frame does not foreclose. The scientist at home with the scientist's children does not encounter the children as standing-reserve against which experiments are conducted; the children appear under a mode of revealing the laboratory's mode does not displace. The clinician's encounter with the patient at the clinical interview is not the only mode under which the clinician encounters the patient; outside the clinic, the patient appears under modes the clinical interview does not foreclose. The cathedral-builder's perceptual encounter with the stone-for-this-vault was a structured-perception encounter under a mode of revealing; the cathedral-builder also encountered the stone, at other moments, under modes the cathedral-building did not foreclose, as the substrate of children's games, as material in which mason's marks could be inscribed, as part of a landscape the village inhabited.

The contemporary economic order's *Gestell* condition is the frame in which this stops being available. The quantitative-equity analyst at the hedge fund does not switch off the market-as-arbitrage-spread frame on going home; the analyst reads the news under the same frame, listens to political debate under the same frame, encounters his own retirement decisions under the same frame. The platform engineer at Facebook (or Instagram, or TikTok, or YouTube, or any of the other contemporary platforms whose business model rests on the same architecture) does not, on closing the laptop, stop encountering social interaction as engagement-signal-yield. The position the engineer occupies has, as its operational mandate, the optimisation of the platform's user-facing interface for one objective and one objective only: the prevention of the user from looking away. The product's design language calls this the maximisation of session length, the reduction of bounce rate, the optimisation of dwell time, the smoothing of the infinite-scroll affordance, the calibration of the variable-reward schedule the platform's notification system runs on; the working vocabulary of the product organisation refers to these in the

register of *engagement metrics* and *retention curves*, and the engineer's career trajectory inside the organisation is conditioned on the engineer's measured contribution to those metrics. The objective function the engineer is optimising is not described, anywhere in the organisation's working discourse, as *the structural training of human attentional capacities away from the bearers of those capacities and toward the platform's measured output*. The objective function is described as *engagement*. The engineer is competent. The engineer ships features the metrics confirm as effective. The user, who is the substrate the engineer's optimisation operates on, experiences the optimisation's output as the steady erosion of the capacity to stop looking, the inability to put the device down, the encounter with what was meant to be a brief check turning into thirty minutes the user did not intend to spend and cannot, on reflection, account for the value of. The order's communicative-perceptual frame supplies the engineer with no grammar within which the question *is the optimisation of attention against the bearer of attention the operation we should be performing* can be raised as a legitimate operational concern. The question, raised, would register as the question of a person who does not understand the business. The engineer who raises it twice will be reassigned to a less consequential desk. The engineer who raises it three times will not work in the industry. The framing acts at the moments of encounter with the order's typical objects, and the framing also acts at the level of the broader perceptual horizon, with the consequence that the people inside it encounter the order's typical objects under the framing and also encounter the wider world under it. The substrate-decoupling the empirical record of the prior chapters documents is the signature of this foreclosure at architectural scale.

The positive Bachelard reading is therefore not a softening of the framing analysis; it is the distinguishing operation that specifies what the framing identifies as distinct from the broader phenomenotechnique that is at work in any practice at all. *Gestell* is the foreclosure condition; phenomenotechnique is the constitutive condition. The two are distinguishable, and the distinction is what permits the Epilogue's diagnostic claims to bear against the foreclosure rather than against structured perception in general. The reformist who reads the Epilogue's analysis as a critique of structured perception is misreading it; the analysis is the specification of the foreclosure the contemporary order has reached at architectural scale, not a critique of structured perception as such.

The Reversal: Technical Thinking Produces Modern Science

The popular picture of the relation between modern science and modern technology runs as follows: science investigates nature, science discovers nature's calculable structure, technology then applies the discoveries to practical ends. Modern science is the upstream theoretical achievement; modern technology is the downstream application of what the theoreticians found. On this picture, the device-and-machinery world of the contemporary practitioner is the cumulative output of three centuries of scientific discovery and the engineering work that converted the discovery into deployment.

This picture is the picture Heidegger's 1953 lecture refuses, and the refusal is the central technical move of the lecture. Modern technology, Heidegger writes, is not the application of modern science. The relation runs the other way. Technical thinking, the mode of revealing under which nature shows itself as a calculable coherence of forces orderable in advance, is what produces modern science. Modern science is what that prior technical thinking looks like once it has codified itself into a discipline, a method, an experimental apparatus, an institutional structure that reproduces itself across generations of trained practitioners. The discipline is downstream; the mode of revealing is upstream.

The clearest formulation of the point in the lecture concerns the experimental method itself. Modern physics, Heidegger argues, is not experimental because it uses apparatus to question nature. The order of dependence in that formulation is the popular one, and Heidegger refuses it explicitly. The apparatus becomes possible at all because physics has already, as pure theory, set nature up to present itself as the calculable coherence of forces the apparatus then measures (Heidegger 1953/1977, pp. 21-22). The setting-up is prior to the apparatus. What sets nature up to present itself this way is not modern physics; what sets nature up to present itself this way is the technical mode of revealing, and modern physics is the discipline that takes that mode of revealing and codifies it into the institutional form of experimental science.

The lecture's own term for the relation is the figure of the herald. Modern physics, on Heidegger's reading, is *the herald* of *Gestell*, the discipline that announces openly what is already at work in the broader mode of revealing the modern Western order has been operating under, and the figure carries weight in the lecture's closing pages:

> *Modern physics is the herald of Enframing, a herald whose origin is still unknown. The essence of modern technology has for a long time been concealing itself, even where power machinery has been invented, where electrical technology is in full swing, and where atomic technology is well under way.*
>
> *(Heidegger 1953/1977, p. 22)*

A herald is the one who announces what is already coming, not the one who brings it. Modern physics announces the technical mode of revealing; modern physics does not produce the technical mode of revealing. The mode of revealing produced modern physics, and modern physics is one of its codifications. Galileo, Newton, the development of the experimental method in the seventeenth century are events through which the technical mode of revealing entered explicit scientific articulation. They did not produce the mode of revealing. The mode of revealing produced them.

Two cases from the modern record bring the direction of priority into sharper view than the lecture's own formulations alone can do. The first case is Hilbert's Sixth Problem. On the morning of 8 August 1900, David Hilbert delivered his lecture *Mathematische Probleme* at the Second International Congress of Mathematicians in Paris (published in Hilbert 1900, *Göttinger Nachrichten*, pp. 253-297; and Hilbert 1901, *Archiv der Mathematik und Physik*, 3rd series, vol. 1, pp. 44-63 and 213-237), setting out the twenty-three problems he took to be the central tasks of the mathematics of the twentieth century. The sixth problem on the list reads, in the standard English translation (Hilbert 1902, "Mathematical Problems," translated by Mary Winston Newson, *Bulletin of the American Mathematical Society* 8(10), pp. 437-479): *to treat in the same manner, by means of axioms, those physical sciences in which already today mathematics plays an important part; in the first rank are the theory of probabilities and mechanics.* The phrasing of the problem encodes the technical mode of revealing in its most explicit form a leading mathematician of the period was able to give it. The proposition that the physical sciences are objects that admit of axiomatic treatment in the manner geometry already admits of it; the proposition that this treatment is a programme a mathematician of stature ought to undertake; the proposition that probability theory and mechanics are first-rank candidates for the treatment; each of the three propositions presupposes a mode of revealing under which nature already shows up as the kind of thing axiomatic treatment can be brought to bear on. Hilbert did not encounter that prior setting-up as a question. He encountered the prior setting-up as the given starting point his programmatic call was to extend. The Sixth Problem is, on Heideggerian reading, the explicit programmatic announcement of *Gestell* at the level of the foundations of mathematical physics, issued by one of the foremost mathematicians of the period as the form the next century's mathematical work ought to take. The historical record confirms that the Sixth Problem continued to engage Hilbert's working efforts from 1894 to 1905 (Corry 1997, 'Hilbert and the Axiomatization of Physics (1894-1905)', *Archive for History of Exact Sciences* 51, pp. 83-198): the programmatic call was the long-running project of his mathematical life, not a passing item on a list.

The second case is the relation between non-Euclidean geometry and general relativity. In 1854, Bernhard Riemann delivered his inaugural lecture *Über die Hypothesen, welche der Geometrie zu Grunde liegen* (published posthumously in 1868) at Göttingen, in which he set out what is now called Riemannian geometry: a geometry of curved spaces of arbitrary dimension, generalising Gauss's earlier work on intrinsic curvature of surfaces. Riemann was working as pure mathematics; the geometry of curved manifolds had no physical application in 1854 and no candidate physical application for the following six decades. The mathematics was developed for the conditions under which the concept of a curved manifold can be made coherent, internally to the technical discipline of mathematics. In 1915, when Einstein was working out the field equations of general relativity, the mathematical apparatus he needed to express the equivalence-principle insight (that gravitation and acceleration are locally

indistinguishable, and that this insight has to be carried in the geometry of spacetime itself) was supplied to him by his friend Marcel Grossmann, who pointed him to Riemann's geometry (the collaboration is documented at archival depth in Pais 1982, *'Subtle is the Lord...' The Science and the Life of Albert Einstein*, Oxford University Press, especially Chapter 12 on the Einstein-Grossmann collaboration from 1912 onward, with the Entwurf theory of 1913 the first joint articulation and the final field equations the four memoirs of November 1915). Riemann's pure-mathematical work, undertaken sixty-one years earlier as a problem internal to the foundations of geometry, turned out to be the form physical reality was already taking. Einstein did not observe spacetime curvature and then build mathematics to describe it. He reached for an apparatus that had been worked out in advance, as pure technical thinking with no physical purpose, and the apparatus turned out to fit. The direction of priority is the direction the present section has been pressing: the technical mode of revealing prepares the kind of object physical reality can show up as, and the physical theory becomes possible only because the mode of revealing has already done the preparatory work. Mathematics is not nature read off and recorded; mathematics is the prior setting-up of nature into the kind of object that admits of the discipline's articulation, with the physical theory arriving downstream of the setting-up by margins the popular picture of science cannot accommodate.

The same direction of priority runs through the relation between modern science and modern technology in the device-and-machinery sense. The contemporary categories *pure science* and *applied science*, the categories under which research universities organise their faculties and funding bodies organise their grants, take for granted the popular picture: pure science upstream, applied science downstream, technological device further downstream still. On the reading the lecture develops, the categories are misleading. Pure science, applied science, and technological device are three configurations of one mode of revealing, with the configurations differing among themselves in the proximity of their products to industrial deployment, not in their relation to the mode of revealing that produced all three. The pure physicist working at the chalkboard and the applied engineer working at the assembly line are working inside the same technical mode of revealing. The mode of revealing constituted the chalkboard problem as a chalkboard problem and the assembly-line problem as an assembly-line problem; the difference is in proximity-to-deployment, not in mode of working.

The reversal carries a further consequence the chapter needs to state before §9. The political-economic debate between capitalism and its critics, conducted across the twentieth century in the vocabulary of market versus plan, private versus public, individual versus collective, is conducted entirely within the technical mode of revealing both sides take for granted. The capitalist optimises for shareholder value; the planner optimises for plan-target fulfilment; the technocrat optimises for measured-outcome maximisation. The optimisation register is shared across all three. The disagreement is over which objective function the optimisation should target, not over whether the mode of revealing under which optimisation is the form things take is itself the mode of revealing under which an order ought to be working. Capitalism, central planning, and technocratic governance are not three alternative orders; they are three configurations of one mode of revealing whose installation preceded the political-economic debates conducted in its terms. The libertarian tradition's defence of the contemporary order and the contemporary critiques of the order from the political left work within the same optimisation register, and the diagnosis the prior twelve chapters performed bears against both, since the diagnosis is at the level of the mode of revealing, not at the level of the political-economic configuration.

What the *Gestell* Move Does and Does Not Do

At the cybernetic-historical level the framing analysis names a mode of revealing under which candidates for action appear pre-formatted as resources to be optimised, as standing-reserve to be ordered, as variables to be maximised, and that level is what the prior sections have been specifying. The further question of what the order should be optimising instead, if not for the objective functions the contemporary configuration has installed, is an ethical question, and the analytical instrument the monograph has constructed across the prior twelve chapters and across the present Epilogue is not constructed to answer ethical questions of that kind. The instrument is constructed to specify what the order is doing, why it is doing it, and why those who occupy positions inside the order cannot from those positions ask whether the order should be doing anything else. Readers who have followed the diagnosis to this point are equipped to raise the ethical question with the resources the diagnosis has produced, and the diagnosis itself works at the forensic level rather than the ethical one, with the forensic operation supplying the conditions under which the diagnostic claims stand independently of the ethical conclusions readers may draw from them.

What the analysis does, however, is more precise than the refusal might suggest. The vocabulary of optimisation is not one tool among others that the people inside the order deploy consciously and could deploy differently if they chose. It is the mode of revealing under which every candidate object appears: pre-formatted as a resource to be optimised, as a variable to be maximised, as a process to be made more efficient. The meta-question is specifiable: is optimisation itself the right frame. The meta-question cannot be asked from inside the frame, because asking it would require a different mode of revealing, and the framing condition is the condition in which no other mode of revealing presents itself as available within the order's discourse. The people inside the order do not ask the meta-question. The reason is not that they are forbidden to ask it. The reason is that the meta-question does not arise as a question for them. Candidates pre-arrive at the agent already constituted as candidates-for-optimisation. The alternative would be encountering candidates under a different mode of revealing, and that alternative is foreclosed by the prior structuring of perceptual horizon the sedimentation section specified through Polanyi's tacit knowledge and the Bachelard section distinguished from Bachelard's *phénoménotechnique*. Optimisation does not appear to the order's participants as a frame they have chosen, but rather as the form things take.

The Ellulian complement, which the section will deploy in full force after the historical-empirical demonstration, can be stated provisionally: technique did not select optimisation because optimisation was judged superior to other criteria through any deliberative process. Technique selected optimisation because optimisation is the criterion that most efficiently reproduces the conditions for further technique. Before deploying that argument, the section pauses to register a historical-empirical demonstration of what the framing produces when no higher-level intervention occurs. The demonstration is necessary because the Epilogue has now developed the analysis to a point where its weight, its scope, and its consequences require empirical anchoring at the limit case. The order the prior chapters have been diagnosing produces depletion of substrates that act at cycles longer than the order can register. Whether the depletion matters, and to what level the diagnosis speaks, is a question the analysis cannot answer alone, and the historical record can answer where the analysis cannot.

Hannah Arendt's *Eichmann in Jerusalem: A Report on the Banality of Evil* (Arendt 1963/2006) provides the limit-case demonstration the Epilogue requires at this juncture. The book is routinely misread, and the misreading must be foreclosed before the argument can land. The misreading takes "banality of evil" to mean that ordinary people are capable of evil, that evil is mundane, that anyone could become Eichmann under the right conditions. None of these readings of the phrase is what Arendt actually argued. What she argued, and what she demonstrated through the courtroom record across the trial in Jerusalem (Arendt 1963/2006, especially pp. 252–279 on the trial's documentary record), is analytically more precise and considerably more disturbing. Eichmann was not a monster. He was a logistics coordinator. His operational vocabulary across the entire administrative record was the vocabulary of a competent operations engineer: train schedules, transfer quotas, processing rates, departmental jurisdictions, scheduling conflicts, capacity bottlenecks. He was not optimising for death. He was optimising for throughput. Death was what the system's objective function produced as its output; Eichmann's

contribution was making the throughput work.

The phrase "banality of evil" names a condition the Epilogue presses exactly. The condition is the complete absence of thought at the level where the objective function is set, combined with high competence at the level where the objective function is executed. Eichmann was, by the order's own measure, good at his job. His job was optimising the logistics of a process the larger order had specified. What the logistics were logistics for, what the throughput throughput was, what the optimisation optimised toward, were not questions his operational vocabulary admitted. The questions did not arise as forbidden questions; the questions did not arise as questions at all. The optimisation engineer working inside an optimisation frame cannot ask whether the objective function is worth optimising toward; the question is the question the frame forecloses. The frame admits questions about how to optimise the objective function. The frame does not admit the question of whether the objective function is the right objective function. That question would require stepping outside the frame, and the frame is the condition that no other frame presents itself as available.

This is the framing condition documented at the historical limit case. The recognition that Arendt's analysis and Heidegger's analysis are pointing at the same object is the Epilogue's central observation, and the recognition must be specified with attention to where the two analyses converge and where they do not, before the protective frame the section needs can be positioned. Heidegger developed the *Gestell* concept across the Bremen Lectures of 1949 and "The Question Concerning Technology" (Heidegger 1949/1977; Heidegger 1953/1977, especially pp. 14–28 on the *Gestell* as mode of revealing); Arendt's *Eichmann in Jerusalem* appeared in 1963 (Arendt 1963/2006, especially pp. 25–55 on Eichmann's operational vocabulary; pp. 252–279 on the institutional conditions of the deportations); the temporal proximity is not coincidental. Both were responding to the same twentieth-century recognition that the catastrophic failures of the European twentieth century were not failures of barbarism, of moral decay, of cultural decline, or of insufficient civilisation. They were failures of a specifically modern form: the form in which competent agents executing apparatus-compatible objective functions produce outcomes the agents do not intend, did not deliberate toward, and could not have prevented from positions that the order's selection mechanism would have permitted them to occupy. Heidegger named the form *Gestell* and located it in the mode of revealing under which beings appear; Arendt did not name the form (Heidegger's vocabulary had only just been developed and Arendt was working in a different philosophical idiom) but documented its working at the limit case. What happened between Heidegger's vocabulary and Arendt's documentation is one of the twentieth century's philosophical convergences: two thinkers working in incompatible idioms arriving at the same object from different directions, neither aware that the other was doing so.

The comparison-as-mechanism frame the section now requires has to be stated explicitly in the same passage that opens the comparison, because the dismissive misreading the comparison invites is what the frame forecloses. The dismissive misreading is the move that says: *you are comparing executives to Nazis*. The comparison is not a comparison of executives to Nazis but a comparison of mechanisms, and these mechanisms must be carefully distinguished from the substrates they act on, the substrates must in turn be distinguished from the moral weights at stake in each case, and the moral weights must be distinguished from the historical scales at which the cases unfold; the Holocaust is the limit case at which the mechanism produced the most consequential substrate-depletion in modern history. The contemporary economic order is not at that limit: the mismatch ratios at the substrates the contemporary economic order depletes are smaller than the mismatch ratio at the substrate Eichmann's order depleted, the depletion-cycles are slower, and the cumulative substrate-loss falls at a different scale of human cost. The Holocaust is the limit case, the contemporary economic case is not at that limit, and stating this explicitly in the same passage that opens the comparison is the only way to position the comparison without inviting the misreading.

What the comparison specifies, with the qualifications the prior paragraph has set down about substrate, moral weight, and historical scale, is the identity of mechanism. The mechanism is the conjoint working of three conditions that appear, identically, in both cases. First, the order's discourse provides no grammar within which the framing question can be raised as a legitimate operational concern. The framing question, *is the order's*

objective function the right objective function, is unspeakable inside the order's grammar. Second, agents who occupy positions inside the order are not malicious in the colloquial sense; they are competent in the operational sense. They are competent because the order's selection mechanism has selected them for competence, and the competence the mechanism selects for is competence inside the operational vocabulary. Eichmann was a competent logistics engineer; the contemporary executive is a competent capital allocator; the contemporary AI laboratory researcher is a competent benchmark optimiser. Third, the substrate-depletion is what the order produces, not what any agent intends. The depletion is the order's output, not its motivated outcome. No agent inside the order wills the depletion; the depletion happens because the order's processes are configured to produce it, and the agents inside the order are configured to execute the processes.

What transfers from the limit case to the contemporary case is not the moral weight, the substrate, or the historical scale. What transfers is the cognitive incapacity that the order produces in those who occupy it. Arendt named this incapacity in the precise technical sense she developed in *The Life of the Mind* (1971/1978): *thoughtlessness*, a term she used in a technical and not a pejorative register. Thoughtlessness in Arendt's precise sense is not stupidity, not carelessness, not insensitivity, not moral failure. Thoughtlessness is the cognitive incapacity to step outside the operative frame and recognise the frame as a frame. The capacity that thoughtlessness names the absence of is the capacity Arendt elsewhere calls thinking, not thinking in the cognitive-performance sense (Eichmann was perfectly capable of cognitive performance; he was good at his job) but thinking in the specifically Arendtian sense of the activity of the mind in which the operative framework becomes visible to the agent as a framework. Thoughtlessness is what the order produces in its operators: not the absence of cognitive capacity, but the absence of the specific capacity to recognise the framing as a framing and to ask whether it is the framing that should be running. The capacity has been foreclosed in advance by the order's communicative-perceptual frame, which has trained the agents not to register the framing question as a question their working vocabulary admits. The agent does not think the question because the question does not arise as a question for the agent.

The absence of personal malice does not absolve, and the architectural production of thoughtlessness does not exculpate. This is Arendt's finding, and the Epilogue holds it without softening. The condition the order produces in its operators is not exculpatory. The fact that Eichmann did not personally hate his victims, that he believed he was following lawful orders, that he was operating inside a framework his society had legitimated, does not constitute a defence. The capacity to step outside the operative frame and recognise the frame as a frame, what Arendt called thinking, is the capacity whose absence constitutes the moral failure. The mechanism produces the absence at the level of the order's communicative-perceptual frame; the absence's character does not, however, render the absence morally inconsequential, and the architectural production of the absence is what the diagnosis must specify because the absence remains morally consequential under the conditions the order produces. The Eichmann trial established that *I was doing my job* is not a defence even when the agent is cognitively incapable of recognising the question of what the job is. The architectural production of incapacity is itself what the diagnosis must specify, because the architectural production is what permits the order to run, and what the operators bear responsibility for is the architectural production they sustain through their continued action inside the order.

Arendt's technical specification of thoughtlessness has to be stated in the form she gave it, because the form is what holds the responsibility line. Thoughtlessness, in her usage, is the inability to think from the standpoint of the people one's work affects (Arendt 1963/2006, p. 49; developed at length in Arendt 1978, *The Life of the Mind*, vol. 1, *Thinking*, especially §§17-18 on the two-in-one structure of thinking and its relation to moral judgement). It is the agent's failing, not the agent's alibi. The Nuremberg principle that the order itself codified runs in the same direction: *I was doing my job*, *I was following lawful orders*, *I was operating inside the framework my society had legitimated*, do not constitute defences, because the capacity to step outside the operative frame and refuse the operation the frame demands remains the agent's capacity even when the frame has installed itself as the agent's perceptual default. The everyday colloquial register supplies the same condition under a phrase the order's own working operators use to articulate it: *business as usual*. The phrase performs precisely the work the structural diagnosis identifies: the working operator's refusal to register that the frame is a frame, because the frame has become, through sedimentation across the career and across the institution, the perceptual default

within which the operations of the position are conducted. *Business as usual* is the colloquial English form of the sedimented condition the prior section's specification of *Gestell* (the Merleau-Ponty / Polanyi / Fleck pass on tacit knowing and the thought collective) developed in its philosophical register. The structural diagnosis the Epilogue performs explains why the frame installs itself as the default and why most occupants of structural positions inside the order do not perform the stepping-outside operation. The diagnosis does not transfer the responsibility for the operation away from the occupant. The diagnosis specifies the architectural conditions inside which the occupant's responsibility is borne, and the conditions are what makes the bearing-of-responsibility difficult; the conditions do not abolish the bearing.

The Ellulian observation about the order's selection mechanism specifies the structural side of the responsibility relation with the corresponding precision. The order does not merely produce thoughtlessness in those it has placed in structural positions; the order also selects in advance for those who will occupy the positions without performing the stepping-outside operation, and replaces those who would perform it. The executive, the chief executive, the regulator, the senior portfolio manager, the platform-team lead, the medical-claims supervisor, the educational administrator, the agronomist directing a regional intervention, who refuses to authorise what the position requires the position's occupant to authorise, will be removed from the position. The removal is structural in the contemporary case and was literal in the Eichmann limit case; the difference in substrate and moral weight has already been stated and is held. The contemporary occupant who refuses will not be put against a wall; the contemporary occupant will be fired, demoted, taken off the consequential desk, passed over in the next round of succession, replaced through the legitimate operations of the order's internal governance with a more compliant occupant, or marginalised through the order's market and reputational mechanisms until the position can be reassigned. The position itself persists. The order's reproduction across time is the reproduction of the position-and-compliant-occupant pair, not the reproduction of any particular occupant, and the supply of candidate occupants for any position vacated by refusal is, in the contemporary order, structurally inexhaustible. This is the form *autoaccroissement* takes at the level of the human occupants of structural roles. The selection mechanism does not absolve the occupant who took the position. The occupant accepted the position, accepted its operations, accepted its rewards, and reproduced the conditions under which the next occupant will perform the same operations. The accepting and the reproducing are operations the occupant performed, and the occupant bears responsibility for them. What the selection mechanism specifies is the architectural reason why moral refusal at the individual level cannot, by itself, alter the operations the order's positions perform across iterations: the position is what the order reproduces, the position will be filled, and the chain of operations the position performs is conditioned by the position's persistence rather than by the individual occupant's character. The moral level is preserved in the diagnosis as the level at which the occupant's responsibility is registered. The structural level is preserved as the level at which the order's operations are explained. Neither level is reducible to the other; neither level abolishes the other; the diagnosis specifies the relation between the two without collapsing the relation in either direction.

This is the line that the contemporary diagnosis must hold without flinching. The Western financialised order produces, in those who work inside it, the same cognitive incapacity at a different substrate. The hedge-fund analyst optimising the arbitrage book against the bid-ask spread; the platform engineer at Facebook optimising engagement-signal against measured retention; the medical-claims processor at UnitedHealth running the denial algorithm against documented claims; the agronomist at a major agricultural-input firm optimising yield against the soil's documented depletion; the urban planner running the transit-and-density optimisation against the neighbourhood the planning grid is laid over; the educational administrator at a public-school district scaling the standardised-test optimisation against measured outcomes; the AI laboratory researcher optimising benchmark performance against an epistemic substrate: none of these is acting from malice. Each is competently executing an objective function that the apparatus has formatted for them. The substrate-depletion is what the order produces as its operational output. The order's communicative-perceptual frame provides no grammar within which the framing question, *is the order's objective function the right objective function*, can be raised as a legitimate operational concern. The agents are not malicious. The agents are thoughtless in Arendt's precise technical sense of the term. The substrates are depleting.

This is the banality of depletion, and the phrase names the contemporary economic instance of the form Arendt named the banality of evil. Substrates differ; moral weights differ; historical scales differ; mechanism does not. The cybernetic reading the prior chapters constructed specifies the mechanism formally; Arendt's analysis specifies it historically; the convergence between the formal specification and the historical record is what the diagnosis the monograph has performed has been moving toward. Naming the contemporary instance is the only way to register what is at stake without collapsing the diagnosis into ethical critique. The diagnosis remains forensic. The mechanism is named. The historical limit case is registered. The protective frame is held. The reader who has followed the Epilogue to this point holds the analysis required to recognise the contemporary order as the contemporary instance of a form whose limit-case demonstration carries the moral weight of the most consequential substrate-depletion in modern history. The diagnosis does not draw the moral conclusion; the reader does, and what the Epilogue offers is the analysis through which the conclusion can be drawn as the result of forensic work, rather than as the result of the moral exhortation that the diagnosis's forensic level refuses.

A contemporary case from the order's ordinary working life anchors the specification. A financial actor executes a transaction that destroys a livelihood, the transaction taking the form of a foreclosure, a layoff round, a supplier-relationship termination, a shareholder-litigation settlement that closes a regional facility, or an algorithmic credit-decision that withdraws an existing line, with the destruction consequential at the substrate level the empirical record documents. The financial actor does not register the destruction as destruction; the financial actor registers the transaction as the operationally correct execution of the order's objective function under the order's measurement frame, and when the financial actor is asked, by an affected party or by an interlocutor outside the order, how the transaction is to be understood, the financial actor articulates the operating phrase: *it is not personal, it is business*. The phrase is the contemporary order's analogue of Eichmann's *I was doing my job* (Arendt 1963/2006, *Eichmann in Jerusalem*, especially the trial-record passages compiled across pp. 135-150 on Eichmann's articulation of his operational role and the specification developed across the closing pp. 287-298), and both phrases articulate the thoughtlessness condition Arendt's analysis specifies: the agent working inside an objective function the agent did not set, the competence of execution as the agent's operational identity, the question of whether the order should be working on what it is working on as a question the agent's vocabulary does not admit. The two phrases differ in moral weight at the substrate-and-historical-scale level the comparison-as-mechanism frame protects, while remaining identical at the forensic level the section is here specifying.

What the case must register, and what the Epilogue holds without softening, is the cognitive feature that distinguishes the thoughtlessness condition from culpable indifference. The financial actor is not indifferent; asked directly, the financial actor will register that the affected party is a person and that the destruction is consequential. What is absent is any operational pathway through which that recognition could enter the order's decision frame as a legitimate operational concern. The affected party as person, as end rather than means in the Kantian register the order's own historical sources once admitted, has become operationally inarticulable inside the order's communicative grammar; the optimisation of objective function against substrate has become primary, and the substrate, in the case this passage anchors, is the affected party. The agent's competence is competence inside the operating mode within which this displacement is the working condition rather than a deviation from it, and the question of whether the order should be optimising for the objective function it is optimising for is not a question the order's vocabulary registers as a legitimate operational concern.

It is not personal, it is business. This is what the condition sounds like when the order's agent articulates the operating mode in the order's own vocabulary. The phrase is the operating-vocabulary signature of the thoughtlessness condition Arendt documented at the limit case, performed in the contemporary order as the order's standard articulation of how its transactions are to be understood.

This is the specification the Epilogue lays down before the *autoaccroissement* mechanism the next paragraph deploys.

The Ellulian *autoaccroissement* argument now arrives with the full force the Epilogue has been preparing across the prior sections and through the historical pivot the present passage has just established.

Autoaccroissement, *every iteration generates the conditions for further iteration*, works through optimisation as the selection criterion because optimisation is the criterion that eliminates everything that does not contribute to the next iteration. The tradition did not choose optimisation; optimisation chose itself, through the same mechanism it deploys everywhere else: by making every alternative appear as a failure to optimise. The condition Arendt documented at the limit case persists in the contemporary order in a form that exceeds passive persistence; it deepens through the same self-reproducing mechanism. The order's continued action generates the conditions of its further action. The substrates that would be the objects of higher-level intervention are progressively foreclosed from communicative availability as the iterations accumulate. The order that has produced the documented depletion is the order the *autoaccroissement* mechanism reproduced, iteration by iteration, across forty years, with each iteration tightening the cycle further and eliminating from the institutional space the orders that worked outside the optimisation frame.

The cybernetic complement closes the convergence the Epilogue requires before the closing section states the three-reading consolidation as the apparatus's full payoff. A regulator whose model is of itself rather than of its substrate will optimise the regulator's own metrics; the Conant-Ashby theorem Chapter 5 §5.2 specified establishes this formally. A regulator that cannot model the substrate cannot optimise for substrate-coupled outcomes; what it can optimise is its own action-cycle's performance against the metrics its own model registers. The Western order's financial regulator is optimising exactly what the theorem predicts it will optimise given the cycle-mismatch the horizon-mismatch theorem Chapter 5 §5.6 specified. The question "but is this optimal?" is being answered correctly within the regulator's model. The regulator is optimal. The substrate is depleting. Both propositions are true simultaneously. The order cannot represent both truths at once because the regulator's model does not include the substrate, and the truth about the substrate is not a truth the regulator's model can register. The three readings the prior chapters constructed converge on this same object from incompatible methodological starting points, with the framing analysis specifying that no other mode of revealing presents itself as available to the order's agents, the Ellulian analysis specifying that *autoaccroissement* selects optimisation as the criterion that reproduces technique through the iteration cycle, and the cybernetic analysis specifying that a self-modelling regulator operating under cycle-mismatch can optimise only its own metrics; the convergence from three incompatible methodological starting points is the convergence-from-independence evidential principle the chapter has invoked across its diagnostic apparatus, the principle that three independent traditions converging on the same finding from incompatible methodological pathways constitutes stronger evidence than coordinated convergence.

The section closes by deepening the framing analysis with the communicative-architecture point the prior chapters' empirical record exhibits. The framing acts beyond the perceptual level: it is communicative, and it shapes what appears, and it shapes what can be said, justified, funded, defended, measured, and selected as a legitimate object of coordinated action. The Western order's problem is that the order sees badly and that the order speaks badly in the same way that it sees badly. The order speaks in a grammar that converts substrate into standing-reserve at the level of legitimate operational discourse. *Protect engineering culture* becomes *optimise knowledge retention*. *Restore institutional trust* becomes *improve stakeholder engagement*. *Stop destroying human attention* becomes *improve digital wellbeing metrics*. *Do not scale epistemically dangerous AI systems* becomes *develop responsible scaling policies*. The substrate enters the order's language-game only after being made compatible with the order that depletes it. This is why the Western order cannot self-correct from inside its own positions: the framing's communicative mode admits substrates only after their translation into the order's own variables, and the translation removes the substrate's architectural availability as the substrate that must be protected. The proposal walks in alive; it comes out as a key performance indicator. The framing analysis, the Ellulian three-mechanism reading Chapter 6 §6.9.1 specified in formal terms in the prior chapter, and the communicative-architecture point the empirical record across Chapters 9 through 11 exhibits converge at this single locus: the order's communicative grammar is the order's enforcement of its own framing condition.

The Three-Reading Orthogonality: The Apparatus Consolidated

The apparatus is now complete, with the cybernetic reading from Chapter 5, the Ellulian analysis of technique from Chapter 6, and the Heideggerian framing from the present Epilogue constitute the three readings of the contemporary order the prior chapters have deployed across their diagnostic work. The Epilogue closes by stating the orthogonality in which the three stand to one another, because the orthogonality is what makes the integration of the three a single analytical instrument rather than three independent readings.

Each of the three works at a level the others cannot reach. Cybernetics works at the formal-mathematical level of regulator-substrate coupling: it identifies the formal conditions under which substrate-coupled regulation is possible at all, the conditions under which those conditions are satisfied, and the conditions under which they cannot be satisfied. The Ellulian analysis works at the institutional-organisational level of the totality within which the regulators are coupled: it identifies the order's institutional features through which the order reproduces itself across positions, across decades, and across attempted reform. The framing works at the phenomenological-ontological level of the mode of revealing under which the order's features come into appearance for the people inside it. The relations among the three levels admit no reduction of one to another; the levels are distinct, and no single reading works at all three. The integration of the three is required to specify the order in the terms the diagnostic claims of the prior chapters have made available.

The three readings converge on the same object from incompatible methodological starting points, and the convergence is not coordinated. Cybernetics emerged from the post-war engineering-mathematical tradition that addressed the formal problems of regulation in systems where the regulator's information about the system is limited by construction; its primary methodological commitments are formal-mathematical and engineering. Ellul's analysis of technique emerged from a mid-twentieth-century reading of the institutional totality of the contemporary technical-administrative-financial order; its primary methodological commitments are sociological and historical. The Heideggerian framing emerged from a phenomenological-ontological analysis of the mode of revealing under which beings appear in the contemporary order; its primary methodological commitments are phenomenological and philosophical. The three sets of commitments are incompatible at the level of the methodological starting points each set assumes. Their convergence on the same object across the levels each works at is not the consequence of any shared methodological commitments; the convergence is the signature of the readings' independent identification of the same order's features at distinct levels. The view-from-nowhere foreclosure the diagnostic apparatus works through depends on the same evidential principle, three independent intellectual traditions converging from incompatible methodological pathways on the same finding, and the three-reading orthogonality is that principle deployed at the analysis-construction level.

The cumulative diagnosis the monograph has performed across its prior twelve chapters reads, in this final register, as the integrated apparatus's work on the contemporary economic order. The cybernetic apparatus specified the regulator-substrate coupling; the Ellulian apparatus specified the institutional totality within which the coupling occurred; the framing analysis specifies the mode of revealing under which both the coupling and the totality appeared to the agents inside the order. The three readings integrate where the order's empirical record required the integrated reading to register what no single reading registered alone. The casino architecture, the cannibalisation cascade, the steering-wheel asymmetry, the closure of the three positions, the cumulative record the prior chapters consolidated: each finding is an instance of the integrated reading working on the contemporary economic order.

The reading is what the Epilogue has produced, and it is not the diagnosis the prior chapters produced. It is the philosophical-ontological articulation of what that diagnosis is, at the register at which what the diagnosis is, is what *Gestell* names. A reader who finishes the Epilogue holds both: the cybernetic-and-Ellulian diagnosis the prior chapters produced and the existential-phenomenological reading the Epilogue has conducted. A reader who finishes Chapter 12 without proceeding to the Epilogue holds the first alone, and the first is what the monograph has produced. The second is the register at which the first was always at work, registered now in the philosophical-ontological terms at which the work was always being conducted.

What the reading does not do, the Epilogue makes plain at the close. The reading does not, by itself, produce the *Gestell* condition's recognition by the order's functionaries. The condition's continued life requires the functionaries' non-recognition of the condition. The reading is intelligible at the level of individual recognition by individual readers. The reading is not, at the level of the order's continued life, registrable as the closure of the order's foundational specifications. The condition's continued life requires the recognition's foreclosure at the order's discourse-level. The reading the Epilogue conducts can perforate the foreclosure only at the level of the individual reader's recognition. The reading cannot, by itself, perforate the foreclosure at the level of the order's discourse-level continued life. What the reader does with the diagnosis is what stands beyond the Epilogue's analytical resources to specify. If the institutional architecture of the contemporary Western order operates under a mode of revealing that forecloses the recognition of what the architecture's continued life produces at the substrates the architecture's continued life depends on, the architecture is not preserving its own conditions of possibility but consuming them.

Heidegger's 1953 lecture closes with a sentence whose reception has frequently registered without registering what it commits to. Heidegger writes that questioning is the piety of thought (Heidegger 1953/1977, p. 35). The sentence is what closes the lecture; the Epilogue the reader has just finished is not offering that sentence but the diagnosis the cumulative work has produced.

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