

Revocable Infrastructure and Generative Dependency: An Open-Then-Enclose Mechanism

Wanhong HUANG
huangwanhong@serendip.ngo

Abstract

A party contributes a method to a commons and opens the infrastructure required to develop it. Others learn the method, build on it, train teams, and develop extensions, and their trajectories become organized around that infrastructure. The party then closes the infrastructure or reprices it. Nothing is taken: the others keep the method, keep what they learned, and keep everything they built. What they lose is the continuation. This paper analyzes that configuration. Its first claim is that the opening is not incidental to what follows. Opening infrastructure and inviting others to build on it confers discretionary power over the continuation of their work, and it confers that power precisely through their reliance, without any promise, contract, or fiduciary relation having been formed. Its second claim identifies what is stranded. Hold-up analysis strands relation-specific investment, whose loss is the difference between an asset's value inside and outside a relation; here what is stranded is a developed generative capacity whose loss is a set of trajectories that can no longer be reached, and that set is exactly the object no observation records. Its third claim concerns time: refusing access to someone who has not begun and withdrawing access from someone who has built are not the same act at different prices, because the second operates on a capacity that exists partly through the first party's own opening. Its fourth claim is that the open period creates for the opening party an option whose value rises with others' reliance, and that this option accrues whether or not anyone intended it, so that neither prior generosity nor absence of a plan is a defense. Its fifth claim is that legitimate origination of a resource does not license unlimited restructuring of trajectories others have developed with it. Its sixth claim locates the remedial handle in exit capacity rather than in access rights. Three propositions follow: exposure accumulates monotonically with reliance, so the participants who trusted the opening most are the most exposed; the contraction of a repertoire can be established by a single witness while its magnitude remains bounded but unidentified; and exit capacity caps exposure uniformly in time whereas an access guarantee only defers it, and defers it in a way that increases the loss realized if the guarantee ever lapses. The paper classifies no platform, firm, or episode, proposes no policy, and reaches no legal conclusion.

1 Introduction

The configuration this paper studies is easy to state and hard to classify. A party contributes a method to a commons and simultaneously opens the infrastructure required to develop that method further. Others take up the method, invest years in it, build applications, train teams, form communities, and develop extensions that exist nowhere else. In doing so they organize their work around the opened infrastructure, because that is what building on it means. The party then closes the infrastructure, or reprices it so that continued use is not viable. The others retain the method. They retain everything they learned and everything they built. What they lose is the ability to continue.

The difficulty is that the party who opened the infrastructure may have done nothing that any ordinary account of wrongdoing recognizes. It devised the method. It owns the infrastructure. It gave the method away for free, and gave access away for free, and may be entirely at liberty to stop. There was no promise to continue, no contract requiring continuation, and no relation of the kind that generates fiduciary duties. If the analysis stops at permissions, the configuration contains nothing to analyze.

Yet something in it resists that conclusion, and the resistance is not merely sentimental. The party's discretionary power over the others' work did not exist before the opening and does not derive from any exercise of force, fraud, or market position. It was produced by their reliance, and their reliance was produced by the opening. A party that opens infrastructure and invites others to build on it thereby acquires power over what they will be able to do next, and acquires it in proportion to how thoroughly they take up the invitation. This is an unusual way for power to arise, and the account of what may be done with it should be correspondingly careful.

This paper analyzes the configuration in six claims and three propositions. The first claim is that inducement without promising is a distinct normative structure: no obligation to continue providing follows from having provided, but discretionary power acquired *through* another party's reliance is differently situated from the same power acquired otherwise, and that difference bears on what may be done with it. The second claim identifies the stranded object. Hold-up analysis identifies relation-specific investment and measures loss as the difference between an asset's value inside and outside the relation. The object stranded here is not an asset but a developed generative capacity, and its loss is a set of trajectories that can no longer be reached. That set is exactly what no record contains, since the trajectories were never realized. The third claim concerns time. Refusing access to a party that has not yet begun and withdrawing access from a party that has built are not the same act with different costs, because the second operates on a capacity that exists partly through the first party's own opening. The fourth claim is that the open period creates for the opening party an option whose value increases with others' reliance. The option accrues whether or not anyone intended it, which is why prior generosity is not a defense and a prior plan is not a requirement. The fifth claim is that legitimate origination of a resource grounds claims over that resource and does not thereby license unlimited restructuring of trajectories others have developed with it. The sixth claim locates the remedial handle: because what is stranded is a continuation rather than an asset, the instrument that fits is exit capacity rather than a right of access.

The formal part establishes three results. Under a specialization dynamic, the gap between what a participant can do with the infrastructure and what it can do without accumulates monotonically, and it accumulates fastest for the participants who invested most; the ordering of exposure therefore tracks the ordering of reliance, so that the party which trusted the opening most is the party most exposed by it. Second, the contraction of a participant's reachable repertoire can be established from a single trajectory witness while its magnitude remains bounded but unidentified, which places the configuration in the position of supporting a claim that something was lost without supporting any claim about how much. Third, an access guarantee and an exit capacity are not two versions of the same remedy: exit capacity bounds exposure uniformly in time, while an access guarantee suppresses the closure event without reducing the exposure, so that the loss realized if the guarantee lapses is larger the longer the guarantee held.

Several things follow that the paper does not claim. It does not claim that opening infrastructure is suspect, that closure is wrongful, or that anyone who has relied on an open resource has a right to its continuation. It classifies no platform, provider, firm, or episode. It reaches no legal conclusion; the jurisprudential form of the fifth claim was explicitly set aside in the source discussion and is reserved for a companion project. And it establishes no diagnosis: whether an instance of this mechanism is exploitation depends on participant standing, an admissible comparison, and a

benefit-through relation, all of which belong to the diagnostic framework this paper depends on rather than to the mechanism this paper describes.

Section 2 states the configuration, derives its scope condition from a case the source discussion rejected, and distinguishes the mechanism from control of conditions simpliciter. Section 3 reviews the traditions that have analyzed induced dependence and records what each supplies and forbids. Section 4 argues the six claims, each with its strongest known objection and a reply, and records the dependence structure among them. Section 5 declares the formal objects and proves the three propositions. Section 6 decomposes the motivating configuration and exhibits five countermodels, one of them the source discussion’s own rejected example. Section 7 records open questions by register, and Section 8 states the limits and the defeat conditions.

The philosophical and formal parts of this paper are *formally independent* and *justificatorily dependent*. No proposition cites a thesis, and every proposition survives the rejection of all six theses. What does not survive is the claim that the propositions are worth proving, which rests on the theses being at least approximately right about where the interest of the configuration lies.

2 The Temporal Structure and Its Scope Condition

This section performs the problem analysis. Its objective is to state the configuration precisely enough that the reader can see what distinguishes it from adjacent structures, to recover a scope condition from a case the source discussion considered and rejected, and to derive requirements that an adequate account must satisfy.

2.1 The Configuration

Let G denote a generative organization: a method, technique, grammar, or practice that can be taken up, exercised, and developed further. Let C denote a condition required to develop G beyond a certain point, held by a party B and governed by an access policy B sets. Let $A_1, \dots, A_n$ denote participants who take up G .

The configuration proceeds in four stages. In the first, B places G in a commons and opens C . In the second, the participants take up G and build: they learn, invest, specialize, hire, produce extensions, and form communities, and each develops a trajectory that runs through C . In the third, dependence forms, in the specific sense that each participant’s ability to continue its trajectory now presupposes access to C on approximately the terms that obtained. In the fourth, B restricts C : closes it, reprices it, changes its terms, or narrows its permissions.

After the fourth stage each participant still holds G , still holds its extensions, and has lost nothing that can be inventoried. What has changed is the set of continuations available to it. If B benefits from that change, the configuration is a candidate for the diagnostic the companion framework supplies; whether it satisfies that diagnostic is a separate question this paper does not address.

Three features distinguish the configuration from adjacent structures. The opening and the closure are performed by the same party. The dependence that makes the closure consequential was produced during the open period, by the participants’ own activity, in response to the opening. And the object affected by the closure is a capacity the participants retain in full.

2.2 The Control Condition and a Rejected Example

The source discussion first proposed a different case: a party devises a language, releases it into a commons, waits until many have learned it, and then acts so that those who learned it can no

longer extend it. The discussion rejected this case, and the reason it gave is a scope condition for the whole project: in that case the party *cannot fully control the condition of the generativity*. A language, once learned by a population, is extended by that population through use. There is no lever the originator holds whose operation would foreclose extension. The case therefore fails not because the mechanism is absent but because the mechanism has no place to act.

The rejection yields a requirement. The mechanism described here operates only where some party holds a condition that is (i) necessary for a class of continuations, (ii) not reproducible by the participants within the relevant horizon, and (iii) governed by a policy that party can set. Where any of the three fails, closure is either unavailable or ineffective, and the configuration collapses into ordinary competition or into nothing at all.

The replacement case satisfies all three. A party holds computational infrastructure and devises an algorithm; the algorithm goes to the commons and the infrastructure is opened; participants build; the infrastructure is closed or priced beyond reach. Compute at the relevant scale is necessary for a class of developments, is not reproducible by most participants within any short horizon, and is governed by a policy its owner sets. The case is stronger than the language case in precisely the way the scope condition requires, and it is the case this paper analyzes.

It is worth recording what the scope condition costs. It excludes from the mechanism many configurations that resemble it: cultural forms, natural languages, widely diffused techniques, and any practice whose continuation depends only on the practitioners. The mechanism is narrower than the intuition that motivates it, and the paper regards this as a virtue rather than a limitation to be argued away.

2.3 Distinction From Control of Conditions Simpliciter

A companion project analyzes control of the conditions under which a generative organization expands, as distinct from control of the conditions under which it is exercised. That project's configuration and this one share the object of control and differ in structure.

In the companion configuration, the controlling party already holds the condition when the affected participant begins, and the asymmetry is a standing feature of the field. The affected participant may never encounter the controlling party. Nothing that happens between them explains the outcome, because nothing happens between them.

Here the controlling party first makes the condition available and induces the participants to build around it. The asymmetry is not a standing feature of the field but a product of the interaction, and the interaction is one the controlling party initiated. The participants are not strangers to the controller; they are its users, and they became dependent by accepting what it offered.

The difference matters for what can be said. In the companion configuration there is no relation, so any account requiring a relation is silent. Here there is a relation, and it has a history, and the history is one in which the controlling party's own conduct produced the vulnerability it later holds. That is more material to work with, and correspondingly more that can go wrong in the analysis.

2.4 Requirements on an Adequate Account

Four requirements follow.

First, an adequate account must distinguish an obligation to continue providing from a constraint on what may be done with power acquired through others' reliance. Conflating them yields the conclusion that anyone who opens anything must open it forever, which is both implausible and, if believed, a reason not to open anything.

Second, it must identify the stranded object correctly. If the object is relation-specific investment, existing hold-up analysis is adequate and the project has nothing to add. The account must therefore say what, if anything, is stranded beyond investment, and must accept the consequences of that answer for measurement.

Third, it must make the temporal asymmetry do work. If withdrawing access is analytically identical to never providing it, the whole configuration reduces to a distributional question about who holds what, and the sequence is decoration.

Fourth, it must yield a remedial direction that does not reproduce the problem. An account that concludes with a right of access converts the commons into a fixed arrangement and reintroduces the enclosure risk from the other side, a tension the repository records as unresolved.

3 Traditions That Analyze Induced Dependence

This section reviews the literatures that bear on the configuration. Its objective is to record what each tradition supplies, what constraint each imposes, and where each stops, so that the paper's own claims can be stated as additions to a described position rather than as discoveries in an empty field. No source in this corpus states the configuration or any of the paper's claims.

3.1 Hold-Up and Relation-Specific Investment

The closest economic antecedent is the analysis of appropriable quasi-rents. Klein, Crawford, and Alchian show that once a party has made an investment whose value is specific to a relation, the other party can appropriate the difference between the investment's value inside the relation and its value in the next best use, and that the anticipation of this possibility shapes contracting and integration decisions [14]. Hart and Moore develop the property-rights account in which residual control rights determine the distribution of surplus in states the contract does not cover, and in which ownership matters because contracts are incomplete [10].

This tradition supplies the paper's central structural insight and its principal challenge. The insight is that a party can be made worse off by an entirely lawful exercise of a right the other party always held, and that the mechanism runs through the first party's own prior investment. The challenge is the question of what this paper adds: if the configuration is a hold-up, the analysis exists.

The paper's answer is developed in Section 4.2. In outline: the hold-up literature identifies a quantity, the appropriable quasi-rent, which is defined as a difference between two values of an asset. The configuration here has no such quantity, because the affected object is not an asset whose value can be computed in an alternative use. Its next-best use is not lower; it is undefined, because what is affected is the set of developments the participant could have undertaken, and that set has no realized counterpart against which a difference could be taken.

3.2 Switching Costs, Lock-In, and Network Effects

Farrell and Klemperer synthesize the analysis of markets in which switching costs and network effects bind customers to suppliers, and establish that firms compete *ex ante* for the *ex post* power that lock-in confers, using penetration pricing and introductory offers [6]. Katz and Shapiro analyze systems competition and the consequences of network effects for compatibility and installed-base advantage [12]. Rochet and Tirole analyze platform competition where a platform's price structure allocates costs across the sides it intermediates [18].

This tradition supplies the paper’s fourth claim in nearly complete form. That an open period is an investment in later leverage, that competition for that leverage occurs before the leverage exists, and that the introductory offer is not a gift but a position, are all established results. The paper’s addition is a change of object rather than of mechanism: the switching-cost literature analyzes customers whose alternative is another supplier of the same good, whereas the participants here have organized a developmental trajectory around the condition, and their alternative is not another supplier but a different future.

The tradition also imposes a constraint the paper accepts. Penetration pricing is ubiquitous, largely lawful, and often welfare-improving in the analyses that identify it. A structural resemblance to penetration pricing therefore supports no adverse conclusion by itself.

3.3 Reliance Without a Promise

Fuller and Perdue distinguish the restitution, reliance, and expectation interests in contract damages, and argue that the case for judicial intervention is strongest where a party has changed position in reliance on another’s undertaking and weakest where only an expectation of gain is disappointed [8]. The distinction is the closest available articulation of why a party that has built on an opening stands differently from a party that merely hoped for one.

The analogy is imperfect in a way that matters, and the paper states the imperfection rather than exploiting it. The reliance interest is an interest in a position changed in reliance on a *promise*. There is no promise here. The analogy establishes that changing position in reliance is a recognized ground of concern and does not establish that it is a ground of concern in the absence of an undertaking.

Baier’s analysis of trust supplies what the contract framing cannot. Trust, on her account, is accepted vulnerability to another’s discretionary power over something one cares about, and the moral question about a trust relation is whether it could survive each party’s knowledge of what the other is doing [2]. The configuration produces exactly the structure Baier describes, with none of the machinery that ordinarily attends it. Gouldner’s analysis of reciprocity as a generalized norm that functions as a starting mechanism for relations records that the reception of a benefit is not normatively inert [9], though the norm he describes runs from recipient to giver and therefore cuts against the paper’s direction as easily as with it.

3.4 Commons, Infrastructure, and Enclosure

Ostrom establishes that communities sustain shared resources through institutional arrangements that are neither private property nor central regulation [16], and Hess and Ostrom extend the framework to knowledge while treating the extension as a research programme [11]. Benkler analyzes commons-based peer production as a mode of production without proprietary exclusion or managerial direction [3]. Frischmann analyzes infrastructure as a shared resource whose social value derives substantially from the downstream activity it enables, and argues for commons management where spillovers resist appropriation [7]. Boyle analyzes the second enclosure movement as the extension of property rights over material formerly regarded as common [5]. Romer’s treatment of ideas as nonrival and partially excludable supplies the property that makes the method’s retention costless to the closing party [20].

Frischmann’s analysis bears most directly, because the infrastructure at issue is infrastructure in his sense and because his argument for commons management is an argument about what is lost when a resource is managed to capture value rather than to enable downstream activity. What his account does not contain is the temporal structure: the case for commons management is

made against private management, not against private management that follows a period of open management it induced others to rely on.

Boyle’s enclosure category names the political-economic form and imposes a caution. Applying the category requires identifying the specific rights extended. The mechanism here extends no right. The condition was always owned; only the policy changed. An analysis limited to rights extension will not detect it, which is a reason to describe the mechanism separately rather than to file it under enclosure.

3.5 Generativity as a Property of Platforms

Zittrain analyzes generativity as a property of technical platforms — their capacity to produce unanticipated change through unfiltered contributions from large, varied, uncoordinated audiences — and argues that generative platforms are unstable, because the problems generativity creates generate pressure toward controlled, non-generative successors [29].

This is the closest antecedent in vocabulary and the most important to distinguish, since it uses the word *this project* uses. Zittrain’s generativity is a property of a platform, and his trajectory runs from open platform to closed appliance under the pressure of security and reliability failures. The property at issue here belongs to the participants rather than to the platform, and the trajectory runs from open condition to closed condition under the pressure of capture rather than of failure. The two analyses meet at the observation that openness is not self-sustaining, and diverge on what is lost when it ends: for Zittrain, the platform’s capacity to be surprised; here, particular participants’ capacity to continue particular developments.

3.6 Platform Position, Rent, and Structural Power

Srnicek analyzes platforms as intermediaries whose position derives from controlling the terms on which others interact [23]. Khan argues that a firm’s structural position can produce competitive harm that price-based tests do not register [13]. Birch analyzes rentiership, in which value is appropriated through ownership and control rights rather than through commodity production [4]. Terranova’s analysis of free labor records the pattern of freely given activity meeting narrow capture [24].

These supply the political-economic form of the closing party’s position and the observation that harms of this shape are invisible to instruments organized around prices and transactions. None analyzes the sequence.

3.7 Exploitation Theory and Its Constraints

Roemer defines exploitation against a counterfactual arrangement rather than against another party’s holdings [19], which is the form the diagnostic question takes here. Wertheimer establishes that mutually beneficial and consented-to transactions can still be exploitative [26], which blocks the inference from the participants’ voluntary uptake to the configuration’s innocence. Sample locates the wrong in a failure to respect the value of the other party [21], and Vrousalis locates it in self-enriching instrumentalization of vulnerability, a species of domination [25]. Vrousalis’s account reaches this configuration where the companion configuration escaped it, because here there is a relation and the vulnerability was produced within it.

Zwolinski’s constraint applies with unusual force [30]. An analysis organized around induced dependence invites the inference that any transaction occurring under conditions of dependence is thereby exploitative, and that inference would classify essentially all continuing commercial relations. Wollner’s analysis of non-individual, non-agential, and structural exploitation supplies the

Table 1: Traditions bearing on the open-then-enclose configuration, what each supplies, and the constraint each imposes on the paper’s claims.

Tradition	Supplies	Constraint imposed
Hold-up and quasi-rents	Lawful exercise of a retained right can appropriate value created by another’s prior investment	If the stranded object is investment, the existing analysis suffices and this project adds nothing
Switching costs and lock-in	The open period is competition for later power, not a gift	Penetration pricing is ubiquitous and often welfare-improving; resemblance supports no verdict
Reliance interest	Changed position in reliance is a recognized ground of concern	The interest presupposes a promise, and there is none here
Trust	Accepted vulnerability to another’s discretionary power	Trust may be misplaced without anyone having wronged anybody
Reciprocity	Receiving a benefit is not normatively inert	The norm runs recipient-to-giver and cuts both ways
Infrastructure commons	Value residing in enabled downstream activity	The argument is against private management, not against private management following induced openness
Enclosure	The political-economic category and vocabulary	Application requires naming rights extended; none are
Platform generativity	Openness is not self-sustaining	The property analyzed is the platform’s, not the participants’
Rent and platform position	The form of the closing party’s advantage	No analysis of the sequence
Exploitation theory	Counterfactual comparison; consent is not exculpatory; a category for agentless wrongs	Dependence must not be allowed to imply exploitation, or the category empties
Capability	The affected object is opportunity rather than achievement	Specification choices are unavoidable and consequential
Partial identification	Report bounds rather than points	Bounds that contain zero support no magnitude claim

category for a wrong arising without an identifiable perpetrator [27]. Young’s distinction between forward-looking responsibility arising from participation in structural processes and liability isolating a perpetrator identifies the form a response plausibly takes [28].

Sen’s distinction between achieved functionings and the capability set supplies the object the configuration affects [22], and Robeyns records the specification choices any operationalization requires [17]. Anderson’s argument that egalitarian justice concerns the character of social relations rather than a purely distributive criterion bears on the sixth claim, since the difference between a party that can leave and a party that cannot is a difference in relation rather than in holdings [1]. Manski’s framework for partial identification supplies the reporting discipline the second proposition requires [15].

4 Inducement, Stranding, Timing, Options, Origin, and Exit

This section argues the paper’s six claims. Its objective is to give each claim an argument, to state the strongest objection known to the author, and to reply to it, so that a reader who rejects a claim can see what the rejection costs. The section makes no use of the formal results and is not used by them.

4.1 Inducement Without a Promise

Thesis 4.1 (Inducement without a promise). Opening a necessary condition and inviting others to build on it confers on the opening party discretionary power over the continuation of their work, and confers it through their reliance. This differs normatively from possessing the same power without having induced the reliance that constitutes it, and the difference bears on what may be done with the power rather than on whether the opening must be maintained.

Argument. Three observations combine. First, before the opening, the party had no power over the participants' work, because they were not doing it. Second, the power now held is proportional to the depth of their reliance, and their reliance was a response to the invitation. Third, nothing in the ordinary apparatus that accompanies such power — promise, contract, fiduciary appointment, regulatory licence — was engaged. So a power ordinarily surrounded by constraints has arisen without them, by a route that runs through the conduct of the party who now holds it.

Baier's characterization identifies what makes this more than a description of market structure [2]. The participants are in a position of accepted vulnerability to another's discretion over something they care about, which is the structure of trust; and her test for whether a trust relation is in good order is whether it survives each party's knowledge of the other's actual policy. A relation in which the opening party knows it is accumulating convertible leverage, and the participants believe they are being helped, fails that test whatever the permissions say.

The thesis is deliberately weak in one respect. It asserts no obligation to continue providing. A party may open a resource and close it, and the argument above gives no reason it may not. What the argument bears on is the further step: converting the dependence into terms. There is a difference between ceasing to help and using the fact that one has helped.

Strongest objection. Openness is a gift, and gifts create no obligations in the giver. Worse, a norm holding that giving generates constraints will predictably reduce giving, so the thesis is self-defeating on its own terms: parties who might have opened resources will keep them closed to avoid acquiring obligations they did not seek. Gouldner's norm of reciprocity even suggests the debt runs the other way [9].

Reply. The objection succeeds against a thesis asserting an obligation to continue and does not engage the thesis asserted. Nothing here requires the opening party to keep the resource open, to give notice, or to price it at any level. What is at issue is whether the resulting dependence may be used as leverage, and the distinction between the two is not a technicality: an institution can require the second constraint while imposing no continuation duty at all, for instance by requiring portability rather than availability. The incentive worry is real, and Section 7 records it as an empirical question rather than answering it here. Gouldner's norm is acknowledged as cutting the other way, which is why the argument does not rest on it.

4.2 What Is Stranded Is a Trajectory

Thesis 4.2 (Trajectory stranding). What the closure strands is not relation-specific investment but a developed generative capacity, whose loss consists in trajectories that can no longer be reached rather than in a difference between an asset's values in two uses.

Argument. The hold-up construction requires a quantity: the difference between an investment's value in the relation and its value in the next best alternative [14]. That construction presupposes that the investment has a next best use, so that the difference is defined.

Consider what a participant holds after building for several years on the open condition. It holds the method, which was free. It holds trained personnel, code, domain-specific extensions, a

community, and an accumulated understanding of the problem. Almost none of this is destroyed by the closure. It is not that these assets are worth less elsewhere; it is that the participant's next development — the one the accumulated capacity was for — does not occur. The affected object is the continuation, and a continuation has no salvage value because it was never a thing.

This is the difference the project's vocabulary is for. Sen's distinction between achieved functionings and the capability set marks it in the general case [22]: what the participant retains is its achievements, and what it loses is a region of what it was positioned to achieve. Section 5 makes the point precisely by representing the affected object as a reachable repertoire and showing that its contraction admits a witness but not a measure.

The consequence is uncomfortable and the paper states it plainly. If the stranded object is a set of unreached trajectories, no damages figure is derivable from it, because the counterfactual repertoire is exactly what nothing observed records. A response to this configuration cannot be compensatory in the ordinary sense, and any account that promises compensation is promising a quantity it cannot produce.

Strongest objection. A loss with no measure is a loss with no content. If nothing was taken, nothing was destroyed, and no magnitude is identifiable, the reasonable conclusion is that the participant is disappointed rather than harmed, and disappointment is not a category of injury.

Reply. The objection conflates existence with magnitude, and the distinction is standard in inference under partial identification [15]. Proposition 5.8 shows that the existence of a contraction follows from a single trajectory that was reachable under the open policy and is not reachable under the closed one, which is a claim about condition-necessity and is often straightforwardly checkable, while the magnitude requires the whole counterfactual repertoire and is not identified. A framework can support the first without the second, and reporting the first while refusing the second is the honest position rather than an evasion of it.

4.3 Withdrawal Is Not Refusal

Thesis 4.3 (Temporal asymmetry). Refusing a party access to a condition before it has begun and withdrawing access after it has built are not the same act at different costs. The second operates on a capacity that exists partly because of the withdrawing party's own prior opening, and this is a difference in the structure of the act rather than in its magnitude.

Argument. Distinguish three acts. In *refusal*, a party declines to provide a condition to someone who has not organized anything around it. In *withdrawal*, a party ceases to provide a condition others had come to use. In *induced withdrawal*, a party ceases to provide a condition it opened, invited others to build on, and allowed them to organize around.

Refusal leaves the other party where it was. Withdrawal returns the other party to something like where it was, minus what it spent. Induced withdrawal does neither, because the participant's current capacity was formed under the condition's availability and is shaped by it; there is no prior position to return to, since the participant that existed before the opening no longer exists. The withdrawing party is not declining to build something; it is unmaking a structure it helped constitute.

The point is not that induced withdrawal is worse. It is that it is a different relation, and that accounts organized around what each party is entitled to withhold cannot represent the difference, because the entitlement to withhold is identical in all three cases.

This thesis carries most of the paper's weight. Without it, the sequence is decoration and the configuration reduces to the standing asymmetry the companion project analyzes.

Strongest objection. The thesis makes early generosity riskier than permanent closure. A party that never opens acquires no constraints; a party that opens and later closes acquires them. This is

perverse: it penalizes exactly the conduct that produced the benefit, and it does so retroactively, since the constraints attach after the opening on the basis of what others did.

Reply. The perversity is conceded as a real cost and located rather than denied. It is a cost of the norm, not an objection to the description: whether induced withdrawal differs structurally from refusal is a question about the acts, and the answer does not change because one answer has awkward incentive effects. What follows is a design problem rather than a refutation. If the constraint is formulated as a portability or exit requirement attaching at the moment of opening — a known cost, priced in advance — rather than as an obligation crystallizing later out of others' reliance, the retroactivity disappears and the disincentive becomes an ordinary cost of provision. Section 5 shows that this reformulation is not merely more palatable but strictly stronger, since it bounds exposure where an access guarantee only defers it.

4.4 The Dependency Option

Thesis 4.4 (The dependency option). The open period creates for the opening party an option — the ability to convert others' dependence into terms — whose value increases with their reliance. The option accrues whether or not the opening party sought it, so that prior generosity is not a defense and prior intention is not a requirement.

Argument. Three claims. First, at the end of the open period the opening party can do something it could not do before: set terms that participants will accept rather than abandon their trajectories. That is an option in the ordinary sense, held and exercisable at the holder's discretion. Second, its value is increasing in the participants' reliance, which Proposition 5.5 states formally. Third, it accrues by the structure of the situation and not by anyone's decision, since nothing in its formation required the opening party to intend it.

The switching-cost literature has established the corresponding market result: firms compete *ex ante* for *ex post* power, and introductory offers are investments in that power rather than transfers to customers [6]. The thesis restricts this to the case where what is locked in is a developmental trajectory rather than a purchasing pattern, and draws out a consequence about argument rather than about market structure.

That consequence is the thesis's point. Two defenses are commonly offered for configurations of this shape, and the option analysis defeats both. The first is that the opening party was generous and should not be penalized for it; but the option accrued during the generous period and its value was produced by the generosity, so the generosity is not separable from the position it created. The second is that no one planned this; but the option accrues without a plan, so the absence of a plan establishes nothing. What remains after both defenses fail is not a verdict but the original question, now properly posed: whether the option was exercised, and to whose benefit.

Strongest objection. If every opening creates an option, every opening is suspect, and the thesis converts an ordinary feature of provision into a standing accusation. Since options are created by any relation with any duration, the analysis proves far too much.

Reply. The thesis identifies a structure and asserts no verdict, and the distinction is the one Zwolinski's constraint is designed to enforce [30]. Holding an option is not exercising it, and exercising it is not exploiting anyone: the diagnostic conditions of standing, an admissible comparison, and a benefit-through relation are supplied by the companion framework and are not satisfied by the mere presence of an option. The thesis's work is negative and precise: it removes two bad defenses without supplying a positive conclusion.

4.5 Origin Does Not License Restructuring

Thesis 4.5 (Origin without unlimited licence). Legitimate origination of a resource grounds claims over that resource. It does not thereby license unlimited restructuring of trajectories that others have developed with it.

Argument. The inference the thesis denies is: B made G and owns C ; therefore B may do as it likes with G and C ; therefore B may do as it likes with respect to what others have made using G and C . The final step does not follow. The objects in the conclusion are not the objects in the premises. The participants' extensions, teams, communities, and developmental positions are not B 's work, were not made by B , and are not owned by B ; they are affected by B 's decisions about C without being among the things B 's ownership of C concerns.

This does not establish that B may not close C . It establishes that *ownership of C is not the argument*. If B may close C despite the effects, that must be because those effects are permissible for some further reason — that they are unforeseeable, or unavoidable, or outweighed — and not because B 's title settles the question. The thesis relocates the burden without discharging it, which is the same structure the companion diagnostic uses.

Anderson's relational framing sharpens what is at stake [1]. The question is not whether B 's holdings are legitimate but what relation between B and the participants the arrangement constitutes, and a relation in which one party's discretion governs the others' developmental futures is a relation about which something can be asked even when every holding is unimpeachable.

The source discussion reached this position by a route the paper records and does not follow. It observed that intellectual-property commentary already resists the inference from creation to unlimited control over what has entered a commons, and connected this to a family of harder cases: whether an artist may destroy work that has entered public life, whether those who generate a person thereby hold authority over that person, and the limits of authority over one's own existence. The researcher then explicitly set these aside as too distant and returned to the economic question. This paper honors that decision. The jurisprudential form of the thesis — which interests are protected, against whom, and with what remedy — is reserved for the companion legal project, and the argument above is confined to the general claim that title over a resource is not an argument about others' trajectories.

Strongest objection. The participants accepted terms. Open access came with conditions, and those conditions reserved the right to change. A party that builds on a resource whose availability is expressly revocable has assumed the risk, and complaining afterwards is asking to be relieved of a bargain it understood.

Reply. Two responses, the first narrow and the second broad. Narrowly, consent to a permission structure is consent about permissions. It is not consent to a particular reconfiguration of one's own capability, which is not among the things the terms describe and typically not among the things the consenting party could evaluate at the time. Broadly, Wertheimer establishes that consent and mutual benefit do not settle whether a transaction is exploitative [26], so the appeal to terms cannot be dispositive even if it is accurate. The objection nonetheless identifies exactly where a legal analysis would begin, and the paper does not pretend to have answered it in that register.

4.6 Exit Capacity Rather Than Access Rights

Thesis 4.6 (Exit capacity as the remedial handle). Because the stranded object is a continuation rather than an asset, the instrument that fits the configuration is exit capacity — portability, interoperability, exportability, redundancy, plural provision — rather than a right of access to a particular condition.

Argument. Two considerations. The first is diagnostic. If the injury is a foreclosed continuation, the remedy should restore continuability, and continuability does not require this condition; it requires *some* adequate condition. An access right over-specifies the remedy by naming a provider.

The second is structural, and it is the reason the thesis is not merely a preference. An access right freezes an arrangement, and freezing an arrangement converts a living commons into a fixed one, which is the failure mode the repository records: strong protection of a shared resource can itself suppress what the resource was for. A right of access to a particular condition also leaves the dependence intact and merely forbids its exercise, so that the exposure continues to accumulate behind the prohibition. Proposition 5.11 shows that this is not a rhetorical contrast but a difference in what the two instruments bound: exit capacity caps the gap uniformly in time, while an access guarantee leaves the gap growing and therefore leaves a larger loss to be realized if it ever lapses.

Anderson’s relational criterion supplies the interpretation [1]. The difference between a participant that can leave and one that cannot is not a difference in holdings but in standing within a relation, and it is available even where no distribution changes.

Strongest objection. Exit capacity is expensive, and its cost falls on the party that opened the resource. Requiring portability, interoperability, and exportability as a condition of opening will reduce openness, which harms the participants the thesis is concerned with. The thesis may therefore recommend an instrument that makes its beneficiaries worse off.

Reply. The trade-off is conceded and is empirical. Two things can be said about it without resolving it. First, the cost is knowable in advance and therefore priceable, which is what distinguishes it from an obligation crystallizing later out of others’ conduct — and this is the reformulation Section 4.3 already required on independent grounds. Second, the trade-off is between two goods rather than between a good and a wrong, so it is the kind of question institutional design is for; nothing in the thesis suggests the right level of exit capacity is the maximum.

4.7 Dependence Structure Among the Theses

This subsection records what fails if each thesis is rejected, so that the argument’s load-bearing members are identifiable.

Rejecting Thesis 4.1 leaves the opening morally inert, and the configuration reduces to a distribution of holdings plus a lawful decision. Rejecting Thesis 4.2 makes the configuration a hold-up, at which point the existing economic analysis is adequate and the project has nothing to add. Rejecting Thesis 4.3 makes the sequence decoration and collapses the configuration into the companion project’s standing asymmetry. Rejecting Thesis 4.4 restores two defenses — prior generosity and absence of plan — that the paper regards as bad. Rejecting Thesis 4.5 makes title dispositive and ends the inquiry at the first step. Rejecting Thesis 4.6 leaves the analysis without a remedial direction that survives its own critique of enclosure.

Theses 4.2 and 4.3 are load-bearing: the first distinguishes the project from hold-up analysis, and the second distinguishes it from the companion project. Thesis 4.3 is the most contestable, since it asks a structural difference to do normative work while conceding that the parties’ entitlements are identical across the three acts it distinguishes.

5 Formal Results

This section declares the formal objects and proves three propositions. Its objective is to establish precisely three things: that exposure accumulates with reliance and orders participants by how much they relied; that the contraction of a repertoire admits a witness but not a measure; and that

exit capacity and access guarantee bound different things. The section cites no thesis, and each result stands or falls on its stated assumptions alone.

5.1 Declared Objects

Let I be a finite set of participants and G a generative organization held by each. Let C be a condition governed by an access policy π drawn from a set Π equipped with a partial order $\preceq$ read as “at least as restrictive as”; write π^o for an open policy and π^c for a restricted one, with $\pi^c \preceq \pi^o$.

Each participant i holds at time t a pair $h_i(t) = (s_i(t), a_i(t)) \in \mathbb{R}_{\geq 0}^2$, where $s_i(t)$ records holdings specialized to the route running through C — code written against its interfaces, personnel trained on it, extensions presupposing it — and $a_i(t)$ records holdings usable on routes that do not run through C .

Definition 5.1 (Effective expansion capacity). Participant i ’s effective expansion capacity under policy π is

$$\Gamma_i(t, \pi) = u(s_i(t), \pi) + v(a_i(t)),$$

with $u : \mathbb{R}_{\geq 0} \times \Pi \rightarrow \mathbb{R}_{\geq 0}$ non-decreasing in its first argument and non-increasing under restriction of its second, and $v : \mathbb{R}_{\geq 0} \rightarrow \mathbb{R}_{\geq 0}$ non-decreasing.

The additive separation is a modeling choice and is discussed in Section 7.

Definition 5.2 (Dependency gap). The dependency gap of participant i at time t with respect to the pair (π^o, π^c) is

$$D_i(t) = \Gamma_i(t, \pi^o) - \Gamma_i(t, \pi^c) = u(s_i(t), \pi^o) - u(s_i(t), \pi^c) =: \delta(s_i(t)).$$

The gap depends on the participant’s specialized holdings alone, since the alternative-route term cancels. It measures what the participant would lose were the policy to move from π^o to π^c , and it is defined whether or not that movement occurs.

Assumption 5.3 (Condition specificity). δ is non-decreasing with $\delta(0) = 0$.

The assumption states that specialization to a route increases what restricting that route costs, and that a participant with no specialized holdings loses nothing. It is an increasing-differences condition on u and is where the substantive content of Proposition 5.5 resides.

Assumption 5.4 (Specialization dynamic). While the open policy obtains, $s_i(t+1) \geq s_i(t)$ for every i and t .

The assumption states that specialized holdings do not spontaneously decrease while the route remains available. It is not innocuous: personnel leave, code rots, and a participant may deliberately diversify. It holds for participants who continue to build on the condition, and Section 7 records the diversifying case as unmodeled.

5.2 Exposure Accumulates With Reliance

Proposition 5.5 (Dependency accumulation). *Under Assumptions 5.3 and 5.4, $D_i(t)$ is non-decreasing in t for every i . If in addition δ is strictly increasing and $s_i(t+1) > s_i(t)$, then $D_i(t+1) > D_i(t)$. Moreover, if $s_i(t) \leq s_j(t)$ then $D_i(t) \leq D_j(t)$.*

Proof. By Assumption 5.4, $s_i(t+1) \geq s_i(t)$; by Assumption 5.3, δ is non-decreasing, so $D_i(t+1) = \delta(s_i(t+1)) \geq \delta(s_i(t)) = D_i(t)$. Strictness under the stated conditions is immediate. The final claim is monotonicity of δ applied to the ordering of the arguments. $\square$

Corollary 5.6 (Exposure tracks reliance). *The ordering of participants by dependency gap agrees at every time with their ordering by specialized holdings.*

The corollary is elementary and its interpretation is not. The participants most exposed by a closure are exactly those that built most thoroughly on the opening, and building thoroughly on an opening is what an opening invites. So exposure is ordered by uptake, and uptake is ordered by how far a participant credited the arrangement. Whatever else is true of the configuration, prudence within it consists in not taking the invitation entirely seriously.

Two limitations are worth stating alongside the result. The proposition is elementary, and its content is entirely in Assumption 5.3, which is assumed rather than established. And it describes exposure rather than harm: a growing gap is a growing quantity at risk, and nothing here says the risk is realized.

5.3 A Contraction With a Witness and Without a Measure

This subsection uses the set-valued representation developed in a companion project, where a participant's reachable repertoire under conditions C' is written as a superlevel set $\mathcal{P}(G; C') = \{\tau \in V : f_G^{C'}(\tau) \geq \varepsilon\}$ of a reachability functional f over a trajectory space V , with a threshold ε and an ambiguity band of half-width η within which membership is not determined by the available evidence. The construction is taken as given; only its consequences for this configuration are derived.

Assumption 5.7 (Policy monotonicity of reachability). For every $\tau \in V$, $f_G^{\pi^c}(\tau) \leq f_G^{\pi^o}(\tau)$.

Proposition 5.8 (Witness without measure). *Write $\mathcal{P}^o$ and $\mathcal{P}^c$ for the repertoires under π^o and π^c , and let $\Delta = \mathcal{P}^o \setminus \mathcal{P}^c$ be the contraction. Under Assumption 5.7:*

1. $\mathcal{P}^c \subseteq \mathcal{P}^o$.
2. $\Delta \neq \emptyset$ if and only if there exists a single τ^* with $f_G^{\pi^o}(\tau^*) \geq \varepsilon > f_G^{\pi^c}(\tau^*)$.
3. Under the ambiguity band, Δ satisfies

$$\{f_G^{\pi^o} \geq \varepsilon + \eta\} \setminus \{f_G^{\pi^c} \geq \varepsilon - \eta\} \subseteq \Delta \subseteq \{f_G^{\pi^o} \geq \varepsilon - \eta\} \setminus \{f_G^{\pi^c} \geq \varepsilon + \eta\},$$

and these bounds do not coincide for $\eta > 0$.

Proof. (1) If $\tau \in \mathcal{P}^c$ then $f_G^{\pi^c}(\tau) \geq \varepsilon$, and by Assumption 5.7 $f_G^{\pi^o}(\tau) \geq f_G^{\pi^c}(\tau) \geq \varepsilon$, so $\tau \in \mathcal{P}^o$. (2) Immediate from the definitions of the two superlevel sets. (3) The inner set contains only trajectories determined to lie in $\mathcal{P}^o$ and determined to lie outside $\mathcal{P}^c$; the outer set excludes only trajectories determined to lie outside $\mathcal{P}^o$ or determined to lie inside $\mathcal{P}^c$. The sets differ on the band of width 2η around ε for each functional, which is nonempty whenever $\eta > 0$ and the functionals take values there. $\square$

The asymmetry between clauses (2) and (3) is the result. Establishing that something was foreclosed requires exhibiting one trajectory reachable before and not after, which is a claim about the necessity of the condition for a specific development and is often checkable. Establishing how much was foreclosed requires the whole set, whose determination is obstructed by exactly the trajectories that were never realized — and they were never realized because they were foreclosed. The obstruction is not a defect of measurement technique; it is a structural feature of the object.

The appropriate reporting discipline is therefore the one partial identification prescribes [15]: report the witness, report the bounds, and do not report a magnitude the bounds do not determine. A framework that concedes this cannot support proportionate compensation. It can support a claim that a foreclosure occurred, and it can support instruments that do not require a magnitude, which is the subject of the next result.

5.4 Exit Capacity Bounds What an Access Guarantee Defers

Definition 5.9 (Access guarantee). An access guarantee $\mathcal{A}$ is a constraint requiring the policy to remain π^o for as long as the guarantee holds, together with a set of conditions under which it lapses.

Definition 5.10 (Exit capacity). An exit capacity $\mathcal{X}_\kappa$ is a structure such that any participant i with holdings (s_i, a_i) can, following a restriction to π^c , obtain alternative-route holdings a'_i satisfying

$$v(a'_i) \geq v(a_i) + \delta(s_i) - \kappa$$

at a cost bounded by κ in the units of Γ .

Proposition 5.11 (Bounding against deferral). *Under Assumptions 5.3 and 5.4:*

1. *Under $\mathcal{A}$ alone, $D_i(t)$ evolves exactly as in Proposition 5.5. If $\mathcal{A}$ lapses at time T , the realized loss is $D_i(T) = \delta(s_i(T))$, which is non-decreasing in T .*
2. *Under $\mathcal{X}_\kappa$, the realized loss following a restriction at any time is at most κ , uniformly in t .*

Proof. (1) The guarantee constrains the realized policy and does not enter Definition 5.2, which is defined for the pair (π^o, π^c) irrespective of which obtains. Hence D_i evolves as before, and the loss realized at a lapse is its then-current value, which is non-decreasing in T by Proposition 5.5. (2) After a restriction at time t , the participant obtains a'_i with $v(a'_i) \geq v(a_i(t)) + \delta(s_i(t)) - \kappa$, so its post-restriction capacity is at least $u(s_i(t), \pi^c) + v(a_i(t)) + \delta(s_i(t)) - \kappa = \Gamma_i(t, \pi^o) - \kappa$, and the loss is at most κ irrespective of t . $\square$

Corollary 5.12 (The value of a guarantee is the stringency of its exceptions). *An access guarantee whose lapse conditions can be satisfied confers no bound on the realized loss beyond the difficulty of satisfying them, and the loss it leaves available is larger the longer it has held.*

The corollary is the section’s most consequential claim and also its most conditional. It says that under the stated assumptions a guarantee with reachable exceptions is not a weak version of exit capacity but a different kind of instrument: it suppresses an event while the exposure behind it continues to grow, so that a longer period of protection leaves a larger loss to be realized when protection ends. If the assumptions hold, then a policy choice between guaranteeing access and requiring portability is not a choice between more and less of the same protection.

Three qualifications are required. The result assumes exit capacity is available at bounded cost, and κ may be large or unbounded for deeply specialized participants. It assumes the additive separation of Definition 5.1, which excludes complementarities between specialized and alternative routes. And it compares instruments on exposure alone, ignoring that an access guarantee may deliver benefits during its term that the comparison does not count.

6 The Supercomputer Configuration and Countermodels

This section applies the analysis to the configuration the source discussion constructed and then exhibits five countermodels. Its objective is to show which features do the work and to mark the boundaries of the mechanism by displaying structures that fail it.

6.1 Three Phases, No Wrongful Act

The configuration decomposes into three phases.

In the *opening phase*, the party contributes the method to a commons and opens the condition. Nothing in this phase is objectionable on any account, and the method’s non-rivalry means the contribution costs the party nothing it retains [20]. The phase’s significance is entirely prospective: it initiates the reliance whose accumulation Proposition 5.5 describes, and it creates the option Thesis 4.4 identifies.

In the *reliance phase*, participants build. Their specialized holdings grow, their dependency gaps grow with them, and their exposure orders itself by how thoroughly each took up the invitation. No party acts on any other in this phase. The asymmetry that will matter is produced by the participants’ own activity.

In the *closure phase*, the policy is restricted. Each participant retains the method and its extensions and loses a region of its reachable repertoire. Whether the closing party benefits, and whether it benefits through the reduction rather than merely alongside it, is the diagnostic question and is not settled by the phase structure.

No phase requires a wrongful act. The opening is a benefit, the reliance is the participants’ own, and the closure is an exercise of a retained right. This is the feature that makes the configuration difficult and the feature that makes Thesis 4.3 necessary: if the sequence carries no weight, there is nothing here at all.

6.2 Countermodels

Countermodel 6.1 (Closure without reliance). A party opens a condition; no participant builds anything specialized to it; the party closes it. Every participant’s specialized holding is zero, so by Assumption 5.3 every dependency gap is zero and no repertoire contracts.

The countermodel establishes that the opening alone does nothing. What matters is the reliance, which the opening invites but does not produce.

Countermodel 6.2 (Reliance without closure). A party opens a condition; participants build extensively; the condition remains open indefinitely. Dependency gaps grow without bound under Proposition 5.5, and no loss is ever realized.

This countermodel separates exposure from harm and is the reason the paper’s formal results are stated about exposure. A configuration can accumulate arbitrary exposure and produce no injury, which is why the presence of dependence supports no adverse conclusion — and is also why the configuration is one decision away from producing one.

Countermodel 6.3 (Closure without benefit). A party opens a condition, participants build, and the party closes it because operating it has become more expensive than the party can sustain. Participants’ repertoires contract. The party gains nothing: it does not acquire the participants’ extensions, does not sell them access, and does not improve its position relative to them.

This countermodel is the source discussion’s own, and it is the sharpest boundary the paper draws. Harm occurred, and it occurred through the mechanism, and the configuration is nonetheless not a candidate for the diagnostic, because the benefit-through relation the diagnostic requires is absent. The countermodel also shows that Thesis 4.4 is correctly stated as being about an option: the option existed here too, and was not exercised.

Countermodel 6.4 (Benefit without inducement). A party has always held a condition and has never opened it. A participant develops a generative organization anyway, on a smaller scale, and the party’s control of the condition limits what the participant can reach; the party benefits.

This is the companion project’s configuration and not this one. It isolates the contribution of the sequence: the same holdings, the same asymmetry, the same benefit, and none of the structure Theses 4.1, 4.3, and 4.4 concern.

Countermodel 6.5 (Failure of the control condition). A party devises a language, releases it, and later attempts to prevent those who learned it from extending it. Extension proceeds through the practice of the speakers, and the party holds no condition whose restriction would foreclose it.

This is the case the source discussion rejected, and it is included as a countermodel because the rejection is a result. The mechanism requires a condition that is necessary, non-reproducible within the horizon, and policy-governed; where these fail, the sequence is available and the closure is not.

7 Open Questions

This section records what the project leaves unresolved, organized by register. Its objective is to state the questions in a form that could direct subsequent work rather than to gesture at difficulty.

7.1 Conceptual and Formal

Open Problem 7.1 (Complementarity between routes). Definition 5.1 separates the specialized and alternative routes additively, which excludes the case where specialization on one route raises or lowers what the other can deliver. Under complementarity the dependency gap depends on both holdings and Proposition 5.11’s bound does not follow as stated. What replaces it is unknown.

Open Problem 7.2 (Diversification). Assumption 5.4 excludes participants who deliberately reduce specialization while the condition remains open. Such participants pay a cost in current capacity for a bound on exposure, which is an optimization the model does not represent. Whether the resulting equilibrium features more or less specialization than is collectively desirable is open.

Open Problem 7.3 (Measuring the exit cost). Proposition 5.11 treats κ as given. Nothing here says what determines it, how it varies with the depth of specialization, or whether it is bounded at all for participants whose entire developmental history runs through one condition.

Open Problem 7.4 (Sharpening the contraction bounds). Proposition 5.8 inherits an ambiguity band from the underlying construction. Whether observations of the post-closure period can narrow the band — and whether they can do so without assuming the answer, given that the foreclosed trajectories generate no observations — is unresolved.

7.2 Political-Economic

Whether the option identified in Thesis 4.4 is priced in the provision decision is an empirical question with theoretical consequences. If providers systematically open resources because the option is valuable, the open period is an investment and the resulting configuration is a market outcome rather than an accident; if they do not, the option is a windfall and the policy problem is different.

Whether exit-capacity requirements reduce provision, and by how much, determines whether Thesis 4.6’s instrument is available at acceptable cost. Nothing in this paper bears on it.

Whether the mechanism concentrates or disperses — whether a few conditions become bottlenecks for many trajectories, or many conditions each serve few — determines whether the configuration is a structural feature of a sector or a recurring local event. Existing platform and rent analyses bear on this and were not marshalled here [23, 4, 13].

7.3 Normative

Whether Thesis 4.1’s constraint — that dependence induced may not be converted into terms — can be stated precisely enough to be actionable without collapsing into a duty to continue providing is the project’s central unresolved normative question.

Whether responsibility for the configuration is best understood on the forward-looking structural model [28] or admits liability in the ordinary sense depends on facts about intention and anticipation that the paper deliberately does not require. Wollner’s category of non-agential exploitation [27] is available and its application here is untested.

Whether the jurisprudential form of Thesis 4.5 is defensible — which interests are protected, against whom, and with what remedy — was set aside in the source discussion and is reserved. The harder cases it connects to, concerning authority over what one has originated once it has entered others’ lives, are noted and not pursued.

7.4 Empirical

No case is examined in this paper. What would be required is a configuration in which the opening, the reliance, and the closure are separately documented; in which at least one foreclosed trajectory can be exhibited as a witness under Proposition 5.8; and in which the closing party’s benefit can be established independently of the closure’s effect. The evidentiary demands are substantial and the paper does not claim they have been met anywhere.

8 Limits and Revisable Research Program

This section states what the paper contributes, what would defeat it, and what it has not done. Its objective is to leave the reader with an accurate account of the project’s standing rather than a favorable one.

8.1 Contributions

The conceptual contribution is the distinction between refusal, withdrawal, and induced withdrawal, together with the identification of the stranded object as a continuation rather than an asset — which is what separates the configuration from hold-up analysis, and what forces the concession that no magnitude is available.

The structural contribution is the dependency option: the observation that an open period accrues leverage to the opening party whether or not anyone intends it, which removes prior generosity and absence of plan as defenses without supplying any verdict in their place.

The formal contribution is three results: that exposure accumulates and orders participants by their reliance; that a repertoire contraction admits a witness but not a measure; and that exit capacity bounds exposure uniformly while an access guarantee defers a loss that grows while it is deferred.

The negative contribution is the scope condition recovered from the source discussion’s rejected example, which excludes from the mechanism every configuration in which no party holds a necessary, non-reproducible, policy-governed condition.

8.2 Defeat Conditions

The conceptual contribution loses support if the stranded object is adequately described as relation-specific investment, since the hold-up literature would then be complete for this case.

The temporal claim loses support if induced withdrawal cannot be distinguished from refusal in any way that survives the observation that the entitlements are identical across them.

The first formal result loses support if Assumption 5.3 fails — if, for instance, deep specialization makes participants more rather than less able to reconstruct an alternative route, which is not obviously false for sophisticated participants.

The third formal result loses support if exit costs are unbounded in the relevant range, in which case exit capacity is not an available instrument and the comparison with access guarantees is vacuous.

The whole project loses interest if the scope condition is rarely satisfied — if, in practice, necessary and non-reproducible policy-governed conditions are uncommon — since the mechanism would then be real and marginal.

8.3 Development Status

The portfolio records this project as a bounded mechanism paper requiring verification of the hold-up, platform, cloud, infrastructure, reliance, and switching-cost literatures together with an empirical case or a deliberately bounded formal example. The source pass has been performed and the corpus stands at thirty verified entries. The bounded formal example is supplied by Section 5 and the countermodels. The empirical case is absent, and the configuration is schematic throughout.

Deferred questions are assigned. The diagnostic — standing, admissible comparison, benefit-through — belongs to the capability framework. Downstream transmission belongs to the propagation project. The identification apparatus underlying Proposition 5.8 belongs to the latent-generativity project. Closed configurations belong to the cycles project. The commons object belongs to the commons project. Standing control of conditions without inducement belongs to the political-economic project. Restoration after foreclosure and the jurisprudential form of Thesis 4.5 belong to projects not yet developed.

8.4 The Conservative Position

Stated as conservatively as the arguments permit: a party may open a condition and may close it; the parties who built on the opening keep everything they built; what they lose is a region of what they could have done next, which no record contains and no measure recovers; the exposure that made the closure consequential was produced by their own uptake of the invitation, and is largest for those who took it most seriously; the leverage this created accrued to the opening party whether or not it was sought; and the instrument that addresses the configuration without freezing it is the capacity to leave rather than the right to stay.

Whether any actual case instantiates this, and whether any instance is exploitation, are questions this paper does not answer and has tried not to prejudge.

References

- [1] Elizabeth S. Anderson. What is the point of equality? *Ethics*, 109(2):287–337, 1999.
- [2] Annette Baier. Trust and antitrust. *Ethics*, 96(2):231–260, 1986.
- [3] Yochai Benkler. *The Wealth of Networks: How Social Production Transforms Markets and Freedom*. Yale University Press, New Haven, CT, 2006.
- [4] Kean Birch. Technoscience rent: Toward a theory of rentiership for technoscientific capitalism. *Science, Technology, & Human Values*, 45(1):3–33, 2020.
- [5] James Boyle. The second enclosure movement and the construction of the public domain. *Law and Contemporary Problems*, 66(1–2):33–74, 2003.
- [6] Joseph Farrell and Paul Klemperer. Coordination and lock-in: Competition with switching costs and network effects. In *Handbook of Industrial Organization*, volume 3, chapter 31, pages 1967–2072. Elsevier, Amsterdam, 2007.
- [7] Brett M. Frischmann. *Infrastructure: The Social Value of Shared Resources*. Oxford University Press, New York, 2012.
- [8] L. L. Fuller and William R. Perdue. The reliance interest in contract damages: 1. *The Yale Law Journal*, 46(1):52–96, 1936.
- [9] Alvin W. Gouldner. The norm of reciprocity: A preliminary statement. *American Sociological Review*, 25(2):161–178, 1960.
- [10] Oliver Hart and John Moore. Property rights and the nature of the firm. *Journal of Political Economy*, 98(6):1119–1158, 1990.
- [11] Charlotte Hess and Elinor Ostrom, editors. *Understanding Knowledge as a Commons: From Theory to Practice*. MIT Press, Cambridge, MA, 2007.
- [12] Michael L. Katz and Carl Shapiro. Systems competition and network effects. *Journal of Economic Perspectives*, 8(2):93–115, 1994.
- [13] Lina M. Khan. Amazon’s antitrust paradox. *The Yale Law Journal*, 126:710–805, 2017.
- [14] Benjamin Klein, Robert G. Crawford, and Armen A. Alchian. Vertical integration, appropriable rents, and the competitive contracting process. *The Journal of Law and Economics*, 21(2):297–326, 1978.
- [15] Charles F. Manski. Nonparametric bounds on treatment effects. *The American Economic Review*, 80(2):319–323, May 1990. Papers and Proceedings.
- [16] Elinor Ostrom. *Governing the Commons: The Evolution of Institutions for Collective Action*. Canto Classics. Cambridge University Press, Cambridge, 2015. Canto Classics reissue; originally published in 1990.
- [17] Ingrid Robeyns. The capability approach: A theoretical survey. *Journal of Human Development*, 6(1):93–117, 2005.

- [18] Jean-Charles Rochet and Jean Tirole. Platform competition in two-sided markets. *Journal of the European Economic Association*, 1(4):990–1029, 2003.
- [19] John E. Roemer. *A General Theory of Exploitation and Class*. Harvard University Press, Cambridge, MA, 1982.
- [20] Paul M. Romer. Endogenous technological change. *Journal of Political Economy*, 98(5, Part 2):S71–S102, 1990.
- [21] Ruth J. Sample. *Exploitation: What It Is and Why It's Wrong*. Rowman & Littlefield, Lanham, MD, 2003.
- [22] Amartya Sen. Capability and well-being. In Martha C. Nussbaum and Amartya Sen, editors, *The Quality of Life*, pages 30–53. Oxford University Press, Oxford, 1993.
- [23] Nick Srnicek. *Platform Capitalism*. Theory Redux. Polity Press, Cambridge, 2017.
- [24] Tiziana Terranova. Free labor: Producing culture for the digital economy. *Social Text*, 18(2 (63)):33–58, 2000.
- [25] Nicholas Vrousalis. Exploitation, vulnerability, and social domination. *Philosophy & Public Affairs*, 41(2):131–157, 2013.
- [26] Alan Wertheimer. *Exploitation*. Princeton University Press, Princeton, NJ, 1996.
- [27] Gabriel Wollner. Anonymous exploitation: Non-individual, non-agential and structural. *Review of Social Economy*, 77(2):143–162, 2019.
- [28] Iris Marion Young. Responsibility and global justice: A social connection model. *Social Philosophy and Policy*, 23(1):102–130, 2006.
- [29] Jonathan Zittrain. *The Future of the Internet—And How to Stop It*. Yale University Press, New Haven, CT, 2008. The Yale University Press catalogue record consulted is the paperback reissue, ISBN 9780300151244.
- [30] Matt Zwolinski. Structural exploitation. *Social Philosophy and Policy*, 29(1):154–179, 2012.