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The Collapse of Multilayer Predation and the Emergence of a Monolithic Leviathan

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Abstract

This paper constructs a multilayer recursive game model to demonstrate that in a rule vacuum environment, hierarchical predatory structures inevitably collapse into a monolithic political strongman system due to the conflict between exponentially growing rent dissipation and the rigidity of bottom-level survival constraints. We propose that the rise of a monolithic political strongman is essentially an "algorithmic entropy reduction" achieved through forceful means by the system to counteract the "informational entropy increase" generated by multilayer agency. However, the order gained at the expense of social complexity results in the stagnation of social evolutionary functions.

Keywords: *Game Theory; Multilayer Predation; Leviathan*

Introduction

In the narrative frameworks of classical institutional economics and political philosophy, the rise of the Leviathan is typically interpreted as a rational contractual decision made by social subjects to escape the Hobbesian Trap—the "war of all against all" (Hobbes, 1651). However, this traditional "Social Contract Theory" often presupposes a simplified model where predatory behavior occurs between atomized individuals on the same physical plane (Seabright, 2021).

This paper posits that when society is in an actual state of "rule vacuum," the initial predatory games are not planar, simple conflicts, but possess significant recursiveness and nesting. Under this structure, society rapidly differentiates into hierarchical power chains: a predator, while extracting value downwards, often becomes the target of a higher-level predator. This recursive chain, where "predators are also prey," constitutes what this paper defines as the "Multilayer Predatory Structure."

The core argument of this paper is that multilayer predatory structures are unstable in both mathematical and informational senses. First, according to Rent Dissipation Theory, multilayered nesting of predation leads to the rapid cancellation of total social surplus within complex hierarchical games (Tullock, 1967). Second, from the perspective of Information Theory, each level of the predatory hierarchy acts as a noisy communication channel. Since intermediate agents have a natural incentive to manipulate output data reported upwards and pressure signals transmitted downwards to maximize their own rents, the informational entropy within the system increases exponentially as the number of levels grows (Shannon, 1948).

When informational entropy reaches a critical point, the highest-level predator (the principal) completely loses the ability to observe the survival status of the bottom-level producers (the agents). This makes it highly probable for bottom-level participants to fall below the red line of their "survival constraint," triggering a chain-reaction collapse of the entire social production system.

Therefore, the rise of a monolithic political strongman is essentially an "algorithmic entropy reduction" process generated endogenously by a complex system to counteract the high-entropy chaos brought by "multilayer recursive predation." Through the use of force, the strongman suppresses the autonomy of intermediate levels, compressing high-dimensional chaotic games into unidirectional, low-entropy instructions to achieve a more "precise and sustainable" extraction of social resources (Acemoglu, 2013).

The Hobbesian Trap: Atomized Predation under Rule Vacuum

Before exploring complex recursive hierarchies, we assume an initial environment with zero legal constraints, where society consists of N atomized economic agents.

Payoff Matrix and the Paradox of Rational Choice

Each participant j in N faces a choice between Production (P) and Predation (G). Let α represent the baseline return on production, and β represent the surplus captured through predatory action.

In a rule vacuum, the payoff matrix of the game is as follows:

	P (Producer)	G (Predator)
P (Producer)	(α, α)	$(0, \alpha + \beta)$
G (Predator)	$(\alpha + \beta, 0)$	$(-C, -C)$

- The Vulnerability of (P, P): Although mutual production maximizes social welfare at 2α, under Tier 1 (L = 0) conditions, participants cannot make credible commitments to one another.
- The Inevitability of (G, G): For any party, if the opponent chooses P, selecting G yields a higher return (α + β > α). If the opponent chooses G, selecting P yields 0, while selecting G incurs a loss C. Since -C (conflict loss) is typically viewed as the cost of avoiding total enslavement or death, individuals fall into this "security trap" within the game.

Given that α + β > α, predation (G) is the strictly dominant strategy for the individual. The system inevitably converges toward the Nash equilibrium (G, G) (Miller, 2003). At this equilibrium point, total

social output plummets from 2α to -2C. This explains why prosperity cannot spontaneously emerge under a rule vacuum. This state represents the classic Hobbesian Trap (Hobbes, 1651).

Rent Dissipation and the Maximization of Informational Entropy

Under the Nash equilibrium of (G, G) (Nash, 1950), society collapses into total "Rent Dissipation" (Tullock, 1967). The value -C represents the unproductive exhaustion of social resources, which includes:

- Defensive Expenditures: Construction of walls and procurement of weaponry.
- Destruction of Life and Capital: The ruin of means of production caused by violent conflict.
- Opportunity Costs: Labor that could have been utilized for R&D and production is instead absorbed into non-productive predatory activities.

Information Theory Perspective: Signal Disappearance and Entropy Increase

From the perspective of Information Theory (Shannon, 1948), this state represents the maximization of the system's informational entropy (H):

- High-Noise Environment: When everyone is engaged in predation and deception, the system is flooded with false signals (e.g., faking productive capacity or faking violent capability).
- Zeroing of Mutual Information: The Mutual Information between participants is extremely low, making it impossible to achieve any coordinated game strategies.
- Systemic Heat Death: Internal energy is converted into disordered internal friction. In the absence of stable distribution rules, society cannot accumulate negative entropy (negentropy) to form higher-order organizational structures.

Evolutionary Dynamics: Why (G, G) Leads to Hierarchization

Large-scale (G, G) conflict is unsustainable because it leads to the physical extinction of the weak. To escape the negative-payoff state of -C, the game begins to evolve:

1. Breakthrough of Scale Effects: Once a group of individuals forms a "violence coalition," they can suppress atomized P players with a lower average C, thereby capturing $\alpha + \beta$.
2. Voluntary Servitude: Not all individuals share the same -C or output α. For some, -C is unacceptable. To avoid the total destruction brought by -C, the weak are willing to accept the condition of being deprived of most of their output in exchange for survival (Carneiro, 1970).

This transition from "Atomized Conflict" to "Hierarchical Predation" marks the starting point of the multilayer recursive hierarchy discussed in this paper—the rise of the Leviathan.

Model Setting for Multilayer Predation

To quantify the systemic evolution under a rule vacuum, we construct a multilayer information-value exchange model based on recursive games.

Recursive Extraction Structure

Assume the social system consists of k nested Power Hierarchies. In this structure, value flows aggregate from the bottom up, while command flows transmit from the top down:

- Bottom-level Producers (L_0): The sole suppliers of systemic energy, with an initial output of α. Under a rule vacuum, L_0 lacks organized bargaining power; thus, its output is treated as a "Common-pool Resource" that can be extracted without compensation (Ostrom, 1990).

- Intermediate Layers (L_1 ... L_{k-1}): These layers possess the attributes of "Double Agency." Based on the study of hierarchical bureaucratic games, intermediate layers are not mere megaphones but "Stationary Bandits" described by Olson (1993) with independent objective functions. They face extraction pressure from the upper layer L_{i+1} while exercising discretionary extraction rights over the lower layer L_{i-1}.
- Top-level Strongman (L_k): The residual claimant of the system. In a chaotic state where $k > 1$, L_k is merely a nominal ruler; the real rent extraction rate is severely limited by the "Informational Fragmentation" caused by the intermediate layers.

Informational Entropy and Survival Friction

Between every pair of adjacent layers (L_i, L_{i-1}), there exists irreducible information asymmetry. Due to the absence of market price signals and rule-of-law auditing mechanisms, predators must pay monitoring costs $C_{m\_}$ to mitigate agency risks (Jensen and Meckling, 1976).

1. Accumulation of Agency Entropy

We define the behavior of intermediate layers as "Agency Entropy Increase." Under a rule vacuum, where oversight contracts fail, the intermediate layer L_i adopts a symmetrical misreporting strategy to maximize its own surplus:

1. Upward: By increasing observational noise, they conceal the true production potential of the bottom layer to reduce their upward quotas.
2. Downward: Compensatory extortion. Because L_i's own rents are extracted by L_{i+1}, it over-utilizes its violent monopoly over the lower layers to push extraction intensity to the limit to maintain its own survival constraints.

From the perspective of Information Theory, this double-sided rent-seeking leads to a drastic contraction of Channel Capacity (Cover and Thomas, 1999). As the number of levels k increases, the system's Signal-to-Noise Ratio (SNR) decreases exponentially.

2. Survival Friction and Hard Constraints

The extraction behavior of each layer is limited by the physical limits of the bottom layer. Under multilayer recursion, because intermediate layers do not communicate, their detection of the bottom layer manifests as "Uncoordinated Blind Probing." Each extraction attempt touches the bottom layer's physical red line. When signal distortion caused by agency entropy leads the top layer L_k to mistakenly believe the bottom still has a surplus, the final predatory instruction becomes the "last straw" that pierces.

The Collapse Logic of Multilayer Predation

The structural contradiction of a multilayer predatory system lies in the fact that while the predators' greed for rent is linear, the internal friction generated by hierarchical nesting is exponential. This asymmetry determines a physical survival boundary for the structure.

Rent Dissipation and the Cascade Effect of "Recursive Output"

In a recursive game, the survival space of the bottom layer is squeezed by the chained predatory rates r_i of each level. The effective resources Ynet that the bottom-level producer L_o can ultimately retain follow a law of cascading decay:

$$Y_{net} = \alpha \cdot \prod_{i=1}^{k} (1 - r_i)$$

This multiplicative effect implies that even if the predatory rate r_i at each level remains within a moderate range, Ynet will rapidly converge toward zero as the number of levels k increases.

1. Vulnerability of Survival Constraints and Noise Amplification

In a rule vacuum, predators at each level exist in a "non-cooperative game," lacking any unified tax coordination mechanism (Ostrom, 1990).

- Stochastic Interference Factor: Each r_i actually contains a random fluctuation term ε_i, representing the temporary greed of intermediate layers or the misinterpretation of I_{ext}.
- Due to the absence of the Rule of Law and constraints on the sum of r_i, a higher k leads to a greater variance in the deviation of the total extraction rate from the bottom layer's carrying capacity. This "uncoordinated predation" causes net returns to frequently and unpredictably penetrate the physical survival line $\Phi_j(t)$.

Systemic Self-Destruction via Entropy Explosion

According to the theory of Rent Dissipation (Tullock, 1967), dissipation includes not only the direct transfer of value but also the social resources expended to maintain such transfers. In multilayer structures, this dissipation is further amplified.

1. Convex Growth of Agency Costs

The agency cost between levels, $C(r_i, \Delta H)$, depends on the informational entropy ΔH of that level. To prevent misreporting from below, each level must establish independent violent monitoring apparatuses. According to the "Span of Control" principle in cybernetics, monitoring costs grow as a typical convex function as the level k increases (Williamson, 1967):

$C_{total}(k) = \sum_{i=1}^{k} \exp(\theta \cdot i)$

where θ represents the information loss coefficient.

2. The Law of Zero Returns

When the system's hierarchy expands to the critical point k*, the total monitoring costs required to maintain the stability of the pyramid will exceed the total rent the system can extract. At this point, the marginal return of the system becomes negative:

$$\lim_{k \to \infty} R_{total} = (\alpha - Y_{net}) - \sum_{i=1}^{k} C(r_i, \Delta H) \leq 0$$

This state is referred to as "Informational Heat Death" in information theory, and manifests as the physical collapse of the system in institutional economics. At this juncture, intermediate layers may defect due to insufficient "dividends," or bottom-level producers may perish collectively due to the interruption of physiological reproduction, forcing the system to undergo a violent "entropy-reducing reorganization."

Furthermore, this process is accelerating due to the continuous dissemination of predatory methods and the advancement of technological productivity. In the early stages of human history, this cycle might have spanned several centuries; over the last two millennia, it has typically shortened to less than a hundred years. Since the Industrial Revolution, it has been further compressed to approximately thirty years (Tainter, 1988).

Endogeneity of the Monolithic Strongman and the Entropy Reduction Process

The entropy increase triggered by multilayer recursive predation will eventually reach the critical point of systemic collapse. To prevent the system from entering a physical "heat death," the evolutionary logic of the game drives a violent phase transition in the power structure: a contraction toward a Monolithic Strongman system.

Efficiency Necessity of Vertical Integration and Information Compression

The rise of a monolithic strongman is not a simple violent seizure of power, but a vertical integration performed by the system to eliminate "multilayer agency costs." According to industrial organization theory, vertical integration can effectively eliminate the welfare losses caused by "Double Marginalization" (Williamson, 1985).

1. "Functional Emasculation" and Disintermediation of Intermediate Layers

In a multilayer structure where $k > 1$, every intermediate layer acts as an independent “rent center.” The entropy reduction achieved by a strongman through violent means centers on the functional emasculation of these intermediate layers:

- Deprivation of Power: Reducing "minor strongmen," who originally possessed independent predatory rights, into pure agents with strictly executive functions.
- Information Compression: The strongman establishes vertical command channels that bypass the hierarchical barriers of intermediate layers. This "disintermediation" significantly reduces the informational transmission entropy of the system.

2. Precision Extraction Model Targeting Iext

As the hierarchy contracts to $k = 1$, the strongman monopolizes the rights to probe and interpret exogenous information Iext. This monopoly transforms predation from random strikes into algorithmic, precision extraction. The strongman’s optimal strategy becomes solving the following constrained optimization problem:

$$\text{Maximize: } \Pi = r \cdot \alpha(r) - C(r, H)$$

$$\text{Subject to: } (1 - r)\alpha \geqslant \Phi_j(t) + \varepsilon$$

Where H represents the compressed systemic entropy. Unlike multilayer predation, the monolithic strongman has an inherent incentive to protect the production floor $\Phi_j(t)$, because as a “Stationary Bandit,” he must protect the base that carries his long-term rent stream (Olson, 1993).

The Strongman as a Schelling Point under Desperate Consensus

In the $-C$ conflicts generated by a rule vacuum (i.e., the warlordism triggered by polycentric predation), the expectations of all social strata are extremely disordered. At this juncture, the existence of a monolithic strongman becomes a Schelling Point in the game-theoretic sense (Schelling, 1980).

1.Coordination Function of Low-Entropy Instructions

Compared to the incompatible and frequently shifting predatory standards under multilayer predation, the strongman’s instructions, though harsh, possess determinacy. From the perspective of the players, accepting a known, singular predatory standard incurs an expected loss far lower than the total loss of dealing with multiple unknown, unpredictable predators.

2.The Desperate Consensus

This gravitation toward a strongman is not born of a cult of power, but of an extreme fear of high-entropy chaos. Various social strata (including parts of the intermediate predatory layers), seeking protection and stable production expectations, reach a "Desperate Consensus" to voluntarily cede their autonomy to a monolithic strongman. While this entropy reduction process strips society of its evolutionary space, it repairs the risk of penetrating the survival line in the short term.

Periodic Purges: The Dynamic De-entropy and Atomization Calibration of the Leviathan

Although the Strongman's rule appears as a monolithic center in structure, in practical operation the Leviathan remains dependent on an intermediate class (bureaucracy, intelligence apparatus, or agent clusters) to execute its will and extract rents. However, this dependency creates a thermodynamic paradox for the Strongman: in the process of performing their functions, the intermediate class inevitably exploits information asymmetry and administrative power to engage in localized energy accretion, forming new, informal secondary power clusters.

To prevent these secondary clusters from evolving into a multitiered structure capable of challenging the center, the Strongman must introduce a mechanism of periodic purges.

1. Suppressing the Positive Feedback of Localized Accretion

In evolutionary game theory, agents within the intermediate class tend to mitigate their game-theoretic risks through alliances and rent-seeking (Olson, 2022). Left unchecked, these local links strengthen rapidly, generating "localized negative entropy" and forming semi-autonomous power strongholds. Periodic purges interrupt the construction of trust and the evolution of contracts among agents by artificially creating extreme uncertainty, forcibly resetting the system to a state of low connectivity.

2. Forced Atomization as a "De-entropy" Calibration

Through physical elimination or deprivation of authority, purges ensure that the "cells" (individual agents) holding intermediate power remain in a state of extreme atomization and terror (Arendt, 1973). In this condition, individual cells lose the capacity for long-range collaboration; their sole survival strategy is to demonstrate absolute fealty to the center.

3. The Cyclic Regeneration of "Functional Death"

Periodic purges resolve the center's immediate anxiety, but their long-term costs are immense:1. Each purge erases accumulated professional experience and governance information.2. The system ultimately retains only the most passive and mediocre executors, further accelerating society's descent toward "heat death."

Order maintained through purges is a classic negentropy trap, achieved at the expense of the system's evolutionary potential. When external shocks occur, this highly atomized intermediate class—lacking self-organizing resilience—will rapidly collapse, leading to the systemic disintegration of the Leviathan.

The development of science and technology has consistently reinforced this pattern. In the late nineteenth and early twentieth centuries, the invention of the Maxim gun enabled a single soldier to subjugate thousands of civilians, driving colonial rule to its historical peak (Headrick, 1981). In the modern era, the rise of deep automation (artificial intelligence, the Internet, and robotics) has pushed this dynamic to its extreme.

Leveraging these technologies, the efficiency of top-down management has reached its zenith. However, because the Leviathan's management logic remains inherently crude and extractive, it employs these tools to drastically streamline administrative layers, producing a completely flattened and atomized governance architecture. Under such conditions, the traditional bureaucratic class faces the prospect of permanent obsolescence, as the Leviathan achieves direct, unmediated control over an atomized population.

Institutional Deadlock and Transition Dilemmas

Although the monolithic strongman compresses systemic entropy to a local minimum through vertical integration, this order is not based on endogenous coordination but on external suppression. This "static entropy reduction" fundamentally alters the topological structure of society, causing irreversible institutional damage.

The Cost of Entropy Reduction: Stagnation of Dissipative Structures

In non-equilibrium thermodynamics, a healthy social system should manifest as a Dissipative Structure, achieving higher-dimensional self-organized order through the continuous introduction of "Fluctuations" (Prigogine and Nicolis, 1977).

According to the theory of dissipative structures (Prigogine, 1977), a system must absorb "negative entropy" from the environment and discharge "entropy increases" to maintain a state of low entropy (order). The monolithic Leviathan established by a strongman appears highly ordered; however, this order is achieved through the forced suppression of spontaneous games at the L_0 level. To sustain the absolute order of this single center, the system must consume immense energy for surveillance, repression, and information filtering. This energy, which should have been directed toward social production, is instead dissipated in maintaining structural rigidity. Consequently, the system enters a pre-state of "heat death."

In essence, through "institutional freezing," the dynamic disorder of society is transformed into static ossification. This form of "order" resembles the order of death—a negentropy trap paid for by total developmental stagnation. Genuine low-entropy order (such as a healthy democracy or a complex ecosystem) is sustained by high-efficiency information flow, whereas the low entropy of a strongman is maintained by the absolute cessation of that flow.

When this social structure reaches its extreme, it manifests as widespread somatic mutilation—the deliberate damaging of the human body. Practices such as eunuchism (castration) and foot-binding in historical China were, in essence, mechanisms for exchanging vital potential for static order (Chan, 1970). By rendering specific body parts functionally "dead" or immobile, the system artificially enforced a low-entropy equilibrium.

Significantly, the periods during which these practices flourished largely coincided with phases of imperial power consolidation. This was a process of "institutional freezing" through physical sacrifice. In this context, bodily mutilation became a macro-political metaphor for the entropy trap: the cessation of local movement and agency (functional death) as a prerequisite for the monolithic stability of the Leviathan (Foucault, 2012).

Loss of Self-Organization and Topological Dimensionality Reduction

The "functional emasculation" of the intermediate layers by the strongman serves not only to aggregate rents but also to eliminate any potential nodes of horizontal coordination. This governance logic produces a fundamental shift in social topology.

1. Dimensionality Reduction from "Complex Network" to "Star Topology"

Although the original multilayer recursive structure was inefficient and high-entropy, it still retained the “residual muscles” of inter-layer gaming. Through disintermediation, the monolithic strongman forcibly reduces the dimensionality of society into a star topology centered on himself. Under this structure, all nodes (individuals) are isolated as islands of mutual distrust; the only remaining connection is the vertical command flow linked to the strongman.

2. Transition Cost

According to Acemoglu and Robinson (2006), successful institutional transition hinges on society’s bargaining capacity to resolve conflicts. However:

- Atrophy of Self-Organizational Muscle: A society long accustomed to "receiving instructions from a political strongman" completely loses the memory of autonomous gaming at the grassroots level. The total collapse of the intermediate layers causes decentralized self-organization to lose its organizers.
- Path Dependency and Fear: Once the strongman’s power wavers, the lack of intermediate-layer buffers and horizontal contractual guarantees leads atomized individuals—based on rational game-theoretic expectations—to infer that the system will inevitably return to the chaos of "polycentric predation" (−C).

This extreme fear of disorder results in an exceedingly high transition threshold T. Because society cannot endure the short-term entropy surge caused by the absence of self-organizing algorithms, it is compelled to return to the embrace of the Leviathan. As North (2009) notes, this oscillation between the “disordered jungle” and the “static Leviathan” constitutes the common tragedy of societies lacking an open access order (North, Wallis, and Weingast, 2009).

From Symmetric Conflict to Hierarchical Intermediacy: Heterogeneity and Local Equilibrium

A critical question arises: given that a monolithic strongman is most efficient in information processing and rent extraction, why does society not transition directly from atomized chaos to a singular Leviathan, but instead inevitably undergoes a painful stage of "Multilayer Predation"?

This paper contends that this trajectory is determined by the following three logical drivers:

1. Probing Costs of Power and Physical Thresholds

In the initial state, there is a total absence of pre-existing informational infrastructure. For a potential strongman to rule N atomized individuals directly, he must pay a monitoring cost of $N \times C_m$. Since N is typically vast and the projection radius of early violent tools is limited, no single individual can achieve global coverage initially. Consequently, power first collapses locally. Local violent leaders form small governance units by suppressing surrounding producers. This collection of local equilibria objectively constitutes society’s first predatory network (L_1).

2. Social Heterogeneity and the Endogenization of "Agents"

Social members are highly heterogeneous in their violent potential (C) and productive efficiency (α). Upon the emergence of a top-tier strongman, secondary-level violence owners face a dilemma: engage in a decisive (G, G) battle with the top strongman—incurring a loss of −C—or accept “incorporation” as an intermediate layer (L_{k-1})? For the top strongman, the cost of managing the grassroots directly is prohibitive. Retaining some vested interests of intermediate predators and allowing them to act as “contractors” is an expedient measure to reduce initial administrative entropy. This logic of

an “Administrative Contracting System”—while introducing agency entropy—is the only viable path during the phase of physical expansion.

3. The Illusion of Stability in Recursive Structures

In the early stages of evolution, the multilayer structure exhibits a pseudo-steady state due to the local alignment of power. Predators at each level believe they have secured a “franchise” for downward predation by paying tribute upward, thereby locally escaping the Hobbesian Trap. This allure of “hierarchical enfeoffment” drives the system to evolve vertically (increasing the value of k) rather than horizontally. It is only when this recursive structure extends to the critical point of “entropy explosion” —where the rent-seeking dissipation of the intermediate layers cancels out all productive surplus—that the system triggers the “entropy-reducing contraction” toward a monolithic strongman.

Furthermore, according to Elinor Ostrom (1990), communities living together over long periods typically establish complex "internal game rules" to prevent predation. This leads to the spontaneous formation of multiple power centers that both compete and cooperate, which objectively facilitates the emergence of hierarchization.

Conclusion: The Cul-de-sac of Institutional Evolution

By constructing a multilayer recursive predation model, this paper systematically demonstrates the evolutionary logic of power structures within a rule vacuum. This evolution is not a result of accidental violent struggles, but is governed by profound laws of information theory and game theory.

Systematic Summary of Research Findings

Based on the preceding derivations, we arrive at three core scientific conclusions:

1. Necessity of Structural Contraction: Recursive predatory structures are inherently unstable due to “Double Marginalization” and “Informational Entropy Explosion.” The contraction of power toward a singular monolithic point is effectively a spontaneous entropy-reduction behavior of the system to counteract hierarchical rent dissipation (Williamson, 1967). In the absence of the Rule of Law, a monolithic strongman is the only endogenous solution to prevent total systemic disintegration.
2. Precision Anchoring of Survival Constraints: The long-term steady state of a strongman regime (the Stationary Bandit) is not maintained by violence alone, but stems from its “precise tolerance” toward the bottom-level survival constraint $\Phi j(t)$ (Olson, 1993). By eliminating the stochastic noise of intermediate agents, the strongman can precisely maintain social extraction just above the threshold that would trigger a systemic collapse or conflict.
3. The Cost of Evolutionary Stagnation: Enforced entropy reduction deprives society of its space for "fluctuations" and "mutations" as a Complex Adaptive System (CAS). This Command Order comes at the expense of civilizational diversity and long-term innovative momentum, plunging society into a state of static heat death under high pressure (Prigogine and Nicolis, 1977).

It must be noted that the aforementioned models are predicated on the existence of a “rule vacuum.” Within this vacuum, so-called “predatory rules” are merely the “algorithmic optimizations” of the strongman, aimed solely at rent maximization.

The true breakthrough lies in defining predation itself as illegal and establishing the Rule of Law across the entire social fabric, thereby completely overturning the evolutionary models described above. The monolithic strongman is merely a local optimum within the “rule vacuum,” whereas the Rule of Law serves as the sole springboard to a global optimum. When a society accepts the Rule of Law, it transforms

from a “closed predatory system” into an “open evolutionary system.” This transition completes the dimensional leap from the jungle to civilization.

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Multitiered Structures as “Power Friction” and the Incubator of the Rule of Law

From the perspective of evolutionary institutionalism, a society governed by the Rule of Law is not composed of homogeneous, atomic individuals, but is rather interwoven by a vast number of decentralized, self-organizing units following unified rules. Notably, these self-organized units are structurally isomorphic to the predatory clusters in the “Multilayer Predation” phase: both possess internal hierarchies, leadership cores, and distinct mobilization capabilities.

The existence of a multitiered predatory structure essentially generates a form of “power friction” between the Monolithic Leviathan and the atomized base. During the multilayered predation stage, various predatory clusters must define their respective “spheres of influence” in order to maximize rent extraction. This game-theoretic equilibrium does not stem from a pursuit of justice, but is instead the product of coordination games as defined by Schelling (1980). Such rules based on power boundaries are, in essence, “ceasefire agreements.”

According to Williamson’s transaction cost theory, when multiple power centers coexist, interactions relying solely on randomized violence result in exorbitant measurement and enforcement costs, causing rents to be dissipated through the friction of the game (Williamson, 1985). To mitigate this cross-tier internal exhaustion, the system spontaneously generates universal rules that transcend individual wills. As North observed in his analysis of the Glorious Revolution, the initial form of the Rule of Law often emerges as a credible commitment among elite groups to protect their respective rents from arbitrary expropriation by the Crown (North, 2009).

If, at this delicate tipping point, society begins to universally accept the Rule of Law due to endogenous or exogenous variables—such as the penetration of commercial ethics or a shared consensus on long-term expectations—a leap toward modern society becomes possible. Along this trajectory, former “predatory clusters” are directly transformed into “self-organized units” operating within a legal framework, while their leaders evolve into the elites of civil society. This transition path has been fully validated by historical cases, including the transformation of the Barons’ Parliament in England and the evolution of feudal lords in Japan into modern elites.

The core principles of the Rule of Law are not merely empirical products; rather, they are derived from philosophical tenets of human cooperative games or from scientific principles, and thus possess both rigor and an exceptionally high degree of generality. From a systems-theoretic perspective, the Rule of Law provides a set of low-information-entropy meta-rules. The certainty of its overarching direction enables diverse stakeholders to form long-term and stable expectations.

While implementation details may vary across regions due to local conditions, the underlying logic remains unified. This universality ensures internal “compatibility” within the social system.

Conversely, if predatory actors at this critical juncture consistently refuse the universalization of rules—mistakenly believing that a rule vacuum or so-called “differentiated rules” based on status or asymmetric agreements can sustain stability—the system descends into extreme uncertainty.

According to Hayek, the universality of law constitutes the foundation of liberty and order, whereas particularistic rules fall within the category of "commands" (Hayek, 2020). When examined through the lens of game theory, such a particularistic rule system exhibits two fatal systemic flaws:

1. Infinite Rent-Seeking of Interpretive Power

Due to the absence of a unified philosophical or scientific anchor, the right to interpret rules degenerates into a direct contest of power. This causes the "focal point," in the Schellingian sense, to drift continuously, preventing the system from ever reaching a stable Nash equilibrium (Schelling, 1980).

2. The Internal Attrition Trap of Gang Logic

Particularistic rules are founded on personal dependency rather than contractual relationships. Much like gang rules that rely on a leader's personal prestige or immediate violent intimidation, such rules collapse instantaneously upon even minor fluctuations in the center of power.

When rules lose their unity, every interaction degenerates into an ad hoc contest of power. Transaction costs rise exponentially: predators must not only extract rents through violence but also expend vast resources defending their interpretation of rules against challengers. In terms of non-equilibrium thermodynamics, this condition manifests as a sharp increase in the system's information entropy. The short-term stability obtained by sacrificing universality is, in fact, another manifestation of the previously discussed "negentropy trap."

In this prolonged state of high-entropy turbulence, the absence of anchoring by universal rules allows even minimal power imbalances to trigger positive feedback loops. Actors break fragile "ceasefire agreements" and consume neighboring competitors in pursuit of absolute certainty. Without a constitutional commitment (North, 2009), the system inevitably crosses a phase-transition threshold and collapses into a Monolithic Leviathan.

This collapse represents a form of "regressive order." It suppresses uncertainty by forcibly reducing the system's degrees of freedom, at the cost of erasing all local rules embedded in the multilayered structure. Ultimately, society enters the aforementioned negentropy trap: while eliminating game-theoretic friction, it simultaneously extinguishes the dynamic evolutionary space required for the incubation of the Rule of Law. The "de-entropy" operation of power results in a total loss of local agency. This "functional death" produces extreme atomization of individuals, stripping them of the biological instinct for spontaneous association. Under such conditions, even if the Monolithic Leviathan disappears due to external shocks, a system that has lost the capacity for intermediate-layer development cannot self-heal and is prone to becoming a dependent vassal of advanced foreign societies (Tainter, 1988).

Data Availability

There is a simulation about Leviathan Logic online. https://lituobang.github.io/Leviathan_Logics.html.

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