How Mises Goes Beyond Knight—and Why It Matters: Entrepreneurship, Calculation, and the Republic of Entrepreneurs

Heng-Fu Zou (IAS, Wuhan Universuty and World Bank)

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Abstract

Frank H. Knight's Risk, Uncertainty and Profit (1921) gave economics the canonical distinction between risk and uncertainty and explained profit as the residual return to the bearer of genuine (non-probabilistic) uncertainty. Ludwig von Mises's Human Action (1949) subsumes Knight's insight within a far more comprehensive architecture. Mises embeds entrepreneurship in a praxeological theory of action; shows that monetary calculation and market prices are the preconditions for entrepreneurial judgment; analytically separates entrepreneurial profit from interest, wages, and monopoly gains; locates entrepreneurial roles throughout firms and markets (not only in owner-insurers); frames competition as a dynamic selection process guided by profit and loss; links monetary–financial regimes to systematic entrepreneurial error (business cycles); and derives the institutional constitution—private property, open entry, freedom of contract—of what we call a republic of entrepreneurs. This paper reconstructs Mises's entrepreneur in depth, contrasts it with Knight's narrower uncertainty-bearing vantage, and develops measurable implications for growth, policy, and political economy.

Keywords: entrepreneurship; uncertainty; monetary calculation; profit and loss; market process; Austrian economics; republic of entrepreneurs.

JEL: B31, B53, D21, D52, D80, E32, L26, O31, O43

1 Introduction

Frank Knight's enduring contribution is to clarify why profit exists and who earns it. In a world pervaded by fundamentally non-measurable uncertainty—distinct from actuarially calculable risk—someone must commit resources ahead of certain knowledge; that party bears the residue of success or failure and, as residual claimant, earns profit or suffers loss (Knight 1921). Yet Knight's entrepreneur is framed largely as an owner-insurer who writes fixed contracts to others, centralizes uncertainty inside the firm, and pockets what remains. The conceptual distinction between risk and uncertainty is sharp and still valuable,

but the social mechanics by which conjectures are generated, tested, and diffused remain under-specified. Knight's environment is comparatively static; we learn why a profit margin can rationally exist, less about how the swarm of decentralized proposals that constitute a modern economy is produced, selected, and propagated across organizations and time.

Ludwig von Mises begins from a broader premise: all purposive action unfolds under uncertainty, so "entrepreneurship" is not an occupational rank but a pervasive role enacted whenever agents advance a plan and accept residual exposure. In Human Action, this role is made analytically precise: the entrepreneur is a promoter who appraises future prices of inputs and outputs and accepts the final verdict of profit and loss (Mises 1949, ch. XV §§8–10; ch. XVIII §5). Two moves give Mises's analysis its depth and reach. First, he identifies monetary calculation—possible only under private ownership of the means of production and freely formed prices—as the precondition for rational appraisement. Without market prices for capital goods, opportunity costs are incommensurable and the test of plans collapses; this is the kernel of the socialist-calculation argument (Mises 1935). Second, he distinguishes entrepreneurial profit from originary interest (time preference) and from the wage of managerial labor, preventing conflations that obscure both theory and measurement (Mises 1949). In Mises's rendering, profit is not an automatic return to ownership nor a reward for routine supervision; it is the differential between ex ante appraisement and ex post market verdict in a world that could have turned out otherwise.

Placed alongside F. A. Hayek's account of dispersed, tacit knowledge and the coordinating function of the price system, the Misesian entrepreneur becomes the society's principal mechanism of discovery. Prices summarize local knowledge that cannot be centrally collected; rivalry and reputation make markets into procedures for finding truth about costs and demands (Hayek 1945, 1978). Israel Kirzner then supplies the micro-mechanism—alertness—the episodic, widely distributed noticing of misalignments in prices, qualities, places, and times; entrepreneurial profit is the reward for noticing and acting before others do (Kirzner 1973, 1979, 1985). Taken together, these strands transform Knight's owner-insurer into a civic multitude. Founders, product managers, buyers, foremen, clinicians, and coders are entrepreneurial whenever they advance conjectures and stand ready to be proven right or wrong by voluntary uptake and the budget constraint.

The institutional ecology that makes such a multitude effective is not merely "the market" in an abstract sense; historically it is a braid of three open republics. A republic of letters—epistolary and associational networks—diffused methods, results, and puzzles across borders and strata (Goodman 1994; Grafton 2009; Waquet 2017). A republic of science—self-governed communities coordinated by priority, persuasion, and peer criticism—generated public procedures, instruments, and exemplars (Polanyi 1962). A republic of entrepreneurs—decentralized tinkerers, shops, and firms—translated conjectures into trial, iterated with market feedback, and scaled what survived. Where these republics overlapped, discovery flowed into experiment, experiment into technique, and technique into industry (Mokyr 2002, 2009, 2016). Britain's Industrial Enlight-

enment stitched philosophers to fabricators; America's liberal patent rules and associational life widened entry into "democratic invention" (Hounshell 1984; Khan 2005, 2020); Germany's lab–workshop fusions institutionalized science–shop feedback (Abbe 1899; Feldenkirchen 1994). This is the historical face of Mises's abstract claim: monetary calculation and open entry make profit-and-loss a social feedback loop that reallocates control over resources from less accurate to more accurate appraisers.

This perspective also reframes innovation itself. Joseph Schumpeter's heroic image of the entrepreneur and his metaphor of "creative destruction" rightly emphasize dynamism, but they overweight discontinuities and the temporary havens of monopoly. Much of modern growth is creative accumulation: general-purpose technologies yield social returns only after long tails of complementary investments in organization, standards, and skills—electrification required factory redesign; the computer demanded new routines; the container needed cranes and logistics (Rosenberg 1982; David 1985, 1990; Bresnahan and Trajtenberg 1995; Levinson 2006). Deirdre McCloskey's thesis that dignity and liberty for bourgeois callings multiplied small, imitable proposals ("trade-tested betterment") adds the cultural permission that made such accumulation common (McCloskey 2006, 2010, 2016). Edmund Phelps shows that the payoffs were not merely pecuniary but experiential: values of self-expression and initiative correlate with thicker rates of everyday innovation and job satisfaction (Phelps 2013; Phelps et al. 2020). A republican political economy puts these pieces together: prices and law supply the test; letters and science supply transparent methods; culture supplies permission; entrepreneurs supply conjectures; profit and loss supply selection.

The payoff is analytical and practical. Analytically, Mises's treatment goes beyond Knight by embedding the entrepreneur in a general theory of market process. Profit is not a mysterious surplus; it is the measured residue of successful judgment under institutional conditions that make measurement meaningful. Competition is not a state of many firms but a procedure for discovery. Consumer sovereignty is not a slogan but the rule that final profitability depends on voluntary uptake by those served (Mises 1949; Hayek 1960). Practically, this framework yields testable predictions about proposal density, feedback speed, and diffusion breadth. It also warns that interventions that dull prices, privilege incumbents, or restrict lawful imitation will mutate entrepreneurship into rent-seeking and slow the compounding of useful knowledge (Polanyi 1962; Khan 2020). The lesson from historical case studies is consistent: when publication channels are open, entry is contestable, and standards interoperate, private discovery becomes public productivity at scale (Jacob 1997; Uglow 2002; Thomson 2009; Allen 2009).

The present paper develops these claims in detail. We contrast Knight's uncertainty-bearing owner with Mises's entrepreneur-as-appraiser, highlighting how monetary calculation grounds rational judgment. We show how this foundation powers the socialist-calculation critique and clarifies the distinct remunerations to profit, interest, and managerial wages. We then trace the civic scaling of entrepreneurship inside large organizations, where promoters, capital-

ists, managers, and technicians can be analytically distinguished but practically intertwined. Next we elaborate competition as a process, consumer sovereignty, and the normative meaning of profit in a liberal order. We integrate Hayek's account of dispersed knowledge and Kirzner's alertness to make the republican ecology explicit, and we link the whole to the historical scholarship on "useful knowledge" from the Industrial Enlightenment to modern biomedicine (Bliss 1982; Bud 2007; Jeffrey 2001; Weissman and Karikó 2005). Finally, we draw implications for measurement and policy: how to observe the "invisible half" of growth—process and organization—and how to protect the commons of discovery with general rules, interoperable standards, contestable procurement, and intellectual property that teaches and expires.

In short, Knight taught us why profit must exist; Mises shows how a constitutional order—the republics of letters, science, and entrepreneurs braided with private property, open entry, and impersonal law—makes profit socially meaningful and cumulatively productive. The stakes are not semantic. They concern whether prosperity is explained by a court of heroes or by a civic process; whether innovation is an occasional leap or a continuous portfolio; and whether policy should buy progress with privilege or multiply progress by keeping proposal costs low and feedback honest.

2 From Knight's Uncertainty-Bearer to Mises's Entrepreneur-as-Appraiser

Knight's classic contribution is diagnostic: profit is the quid pro quo for bearing uncertainty—not actuarial risk—in a world where the probability distribution of future states is unknown or unknowable (Knight 1921). Because employees and suppliers can be hired on fixed contracts, they are (in Knight's schema) largely insulated from this non-measurable uncertainty. The party that cannot offload it—the owner who commits resources ahead of certain knowledge—becomes the residual claimant on the firm's net outcome. Profit, on this view, is the realized remainder once contractual incomes have been paid. It follows that the entrepreneur is, paradigmatically, the owner-insurer: the person who centralizes uncertainty inside the firm, offers certainty to others by writing fixed-price contracts, and then earns the residual if events are kind (or suffers loss if they are not).

This is powerful and enduring. It explains why, even in competitive settings without obvious frictions, a positive profit margin can be rational. It also clarifies why profit is not a mere return to capital as such: it is a return to bearing what cannot be insured. Yet the very elegance of the diagnosis leaves several operative questions thinly specified. First, what exactly is the entrepreneur doing between commitment and outcome besides "bearing uncertainty"? Second, by what test are rival conjectures validated or falsified? Third, who counts as an entrepreneur in a large, modern enterprise where ownership is dispersed, managers are hired, and product teams make day-to-day calls far from the boardroom?

Knight's treatment is comparatively static—it tells us why a wedge exists but less about the process that generates, selects, and diffuses conjectures across a swarm of agents and organizations.

Mises answers by moving from diagnosis to mechanism. In Human Action, entrepreneurship is not a social rank but a role that attaches to any agent who advances a plan under uncertainty, appraises future input and output prices, and accepts the verdict of profit and loss (Mises 1949, ch. XV §§8–10; ch. XVIII §5). The entrepreneur is thus a promoter-appraiser: someone who forms a view about future market conditions, commits resources accordingly, and then learns—sometimes brutally—whether that appraisal was accurate. Crucially, this mechanism is not merely psychological; it is institutional. Mises insists that rational appraisal requires monetary calculation, which in turn presupposes private ownership of producer goods and freely formed market prices. Only when capital goods are bought and sold for money can heterogeneous possibilities be made commensurable; only then can prospective costs be compared with prospective proceeds and alternative plans be ranked. In the absence of market prices for capital (as in socialism), opportunity costs are inarticulate and entrepreneurial judgment is untestable—Mises's well-known "calculation argument" (Mises 1935, 1949).

This move changes the center of gravity. Knight explained why the residual exists; Mises explains how the residual is discovered and allocated. Profit is no longer a black box labeled "uncertainty": it is the measured residue between ex ante appraisement and ex post realization in a system that makes such measurement meaningful. Loss is the mirror image: a public certificate that a particular pattern of appraisement was less accurate than rival patterns. Because profit/loss reallocate control over resources—losses deplete the command of mistaken appraisers, profits enlarge the command of accurate ones—the market becomes a learning device that tends, over time, to shift resources toward superior judgments. Hayek's account of prices as signals that compress dispersed, tacit knowledge (Hayek 1945, 1978) nests neatly here: without the signals, appraisal is blind; without appraisal, signals have no agent to act on them.

A second Misesian refinement is analytic disentanglement. Knight's owner-insurer bundles several roles together: capitalist, manager, and entrepreneur. Mises pulls them apart. The capitalist supplies present goods (savings) and earns originary interest for time preference, whether or not any entrepreneurial judgment has been exercised. The manager supplies the labor of coordination and supervision and earns a wage of management. The entrepreneur performs the judgment of appraisement and bears the residual of that judgment in profit or loss (Mises 1949). Conflating these, Mises warns, obscures both theory and measurement. A salaried CEO can perform entrepreneurial functions (and be rewarded contingently) even without owning equity; a small proprietor can be a pure capitalist (living off interest) without doing much entrepreneurial appraisement; and a venture capitalist can straddle roles by both supplying savings and underwriting promoters' judgment. The separation clarifies why entrepreneurship is ubiquitous in complex organizations: it appears wherever real authority

over plans is coupled to exposure to results, even many layers below the apex of ownership.

A third refinement is scope. Where Knight's entrepreneur is paradigmatically the proprietor who insures others by writing fixed contracts, Mises's entrepreneur includes the product manager who green-lights a pilot, the buyer who re-specifies a component, the clinician who redesigns a handoff, the engineer who rebundles open-source modules—anyone who proposes a course of action whose payoffs cannot be insured in advance and who is residually exposed to the verdict. Israel Kirzner's notion of alertness—the episodic, distributed noticing of previously unseen price or quality gaps—makes this concrete: entrepreneurial profit is the reward for noticing and acting before rivals do (Kirzner 1973, 1979, 1985). In this view, the proliferation of small, testable proposals is not noise; it is the metabolism of a modern economy. Profit/loss is the feedback that sifts those proposals continuously rather than only at dramatic "disruptions."

Against this background, Mises's insistence on monetary calculation does more than underwrite the socialist-calculation critique; it grounds an account of diffusion. Because prices for inputs, outputs, and intermediate claims (equity, credit) are public, successful appraisements can be copied and scaled by outsiders; because losses are equally public, mistakes are contained and their lessons broadly learned. This is why the historical ecology of open letters, self-governed science, and contestable enterprise mattered so much to the Industrial Enlightenment (Polanyi 1962; Jacob 1997; Mokyr 2002, 2009, 2016). The republic of entrepreneurs is not a metaphor; it names the institutional braid that makes entrepreneurial judgment a civic function. Learned societies, technical periodicals, and liberal patent systems lower the cost of proposing; competitive markets and interoperable standards lower the cost of imitating; profits and losses discipline both. Knight's owner-insurer can exist in many constitutional settings; Mises's appraiser-promoter requires a republican one.

Two further contrasts sharpen the difference. First, temporality. Knightian profit is often presented as a premium for a once-and-for-all assumption of uncertainty. Mises emphasizes an ongoing process in which entrepreneurs constantly revise appraisals as new prices and reputations arrive. Profit is not a fixed premium but a score in a repeated game whose rules reward accurate anticipation and penalize error, with the scoreboard visible to all through monetary accounts. Second, normative content. Knight's story is morally neutral: profit is what remains. Mises's is evaluative: profit is the public certificate that an agent correctly anticipated others' preferences and constraints under uncertainty and thereby served consumers—because only voluntary uptake can generate sustained net revenues (Mises 1949; Hayek 1960). In this sense, "consumer sovereignty" is not a slogan but the rule that ultimately determines which appraisals will be capitalized and which liquidated.

This shift from bearing to appraising has implications for both measurement and policy. On measurement, it implies we should expect to observe wide dispersion in realized profit/loss across many nodes of decision—divisions, product lines, projects—not just across legal owners; that proposal density and feedback speed will covary with productivity growth; and that diffusion metrics

(adoption curves, standard uptake) are central indicators, not afterthoughts (Rosenberg 1982; David 1990; Bresnahan and Trajtenberg 1995). On policy, it counsels protecting the commons of discovery—general rules, open standards, contestable procurement, IP that teaches and expires—over discretionary privilege in the name of "encouraging entrepreneurship." A regime that dulls price signals, freezes interfaces, or criminalizes lawful imitation does not reduce uncertainty; it blinds appraisers and shifts energy from discovery to rent-seeking (Polanyi 1962; Khan 2020).

Hence, Knight told us why a residual exists in a world of uninsurable uncertainty; Mises shows how, in a constitutional order of private property and open markets, that residual becomes a social learning device. The entrepreneur is not primarily the owner who insures others; he or she is the agent of appraisal whose conjectures are rendered commensurable by money prices and whose accuracy is audited by profit and loss. That is the conceptual bridge from a narrow, owner-centric picture to a republic of entrepreneurs—a civic order in which the work of judgment is widely distributed and continuously disciplined by transparent tests.

3 Monetary Calculation as the Precondition for Entrepreneurship—and the Foundation of the Calculation Critique

If entrepreneurship is judgment under uncertainty, then judgment must be made commensurable—alternative plans must be ranked on a single scale so that scarce resources can be placed under the control of the most convincing conjectures. For Mises, that commensuration is not a psychological act but an institutional achievement: it is the work of monetary calculation, which exists only where producer goods are privately owned and exchanged for money so that their opportunity costs are expressed in prices (Mises 1935, 1949). Without money prices for land, machines, intermediate inputs, and labor of different kinds, comparisons among heterogeneous projects dissolve into incommensurable lists. In a world of novel combinations and uncertain futures, the entrepreneur requires a calculus that can translate disparate bets—on a new dye process, on a different supply chain topology, on reorganizing a clinic's patient flow—into expected money magnitudes arrayed against expected money outlays, so that loss can be recognized, capital recuperated, and learning compounded.

This insistence is sometimes caricatured as a rediscovery of double-entry bookkeeping. It is something deeper. Monetary calculation embodies three logical functions. First, it is a language of opportunity cost: the price paid for a machine is not merely an expenditure but the best alternative foregone, crystallized by the competitive bids of others. Second, it is a forecasting device: forward prices (or expectations of them) enable discounting of prospective revenues against present outlays, making alternative time profiles comparable through present value. Third, it is a public test: ex post profits and losses,

recorded in money accounts, render the entrepreneur's appraisement visible to outsiders and therefore copyable or avoidable. In this way prices and profit/loss serve as a social memory for distributed judgment. Hayek's celebrated analysis of prices as carriers of dispersed, tacit knowledge nests here: the information relevant to appraising a plan—local scarcities, rival bids for inputs, evolving consumer tastes—cannot be centralized; it is aggregated and conveyed through the price system, which allows each agent to calculate without knowing what everyone else knows (Hayek 1945, 1978).

Mises's socialist-calculation argument follows immediately. If producer goods are collectively owned and not exchanged, there can be no market prices for the very objects that must be compared. A planning authority may possess statistics of physical inputs and outputs; it cannot, in the absence of market trading in capital goods, compute opportunity costs in a way that allows rational selection among feasible but mutually exclusive combinations. It can simulate prices, or ask engineers for minimal material balances, or deploy trial budgets—but such numbers float free of the decentralized bids that give prices their meaning. Attempts to repair the deficit with "shadow prices" reproduce the problem: where do the shadows come from if not from counterfactual market trades? A planner can only borrow meaningful shadows from a surrounding market system or invent numbers that lack the informational content of competitive bids (Mises 1935, 1949). Lange's and Lerner's responses—trial-and-error pricing by a planning board, marginal-cost rules implemented administratively—grant the necessity of prices while displacing the mechanism that produces them; they therefore lean on informational premises that, in practice, only rivalry among owners with residual exposure routinely supplies (Lange 1936–37; Lerner 1937).

The point is most vivid where novelty, not repetition, is the margin—precisely the entrepreneurial domain. Novel combinations of inputs have no established engineering coefficients; novel products lack stable demand schedules; novel organizational forms change the mapping from inputs to outputs. In such environments, calculation is not a matter of solving a known system; it is a matter of specifying one by bidding for inputs and offering outputs, with the discipline of loss when conjectures are wrong. That is why the republic of entrepreneurs requires not merely accounting conventions but a constitutional order: private property in producer goods, open entry, freedom of contract and association, and a rule-bound judiciary. Those rules ensure that (i) prices emerge from rival bids and offers rather than administrative fiat; (ii) contracts allocate residual exposure so that appraisers are answerable for their judgments; and (iii) bankruptcy and asset markets allow reallocation from chronic loss-makers to superior appraisers. Polanyi's "republic of science" is an instructive parallel: priority rules, peer criticism, and public methods allow discovery to proceed without central direction; analogously, property, prices, and profit/loss allow economic discovery to proceed in the absence of a central calculator (Polanyi 1962).

Monetary calculation also explains the internal organization of entrepreneurship. Modern firms do not abolish markets; they import them through transfer prices, divisional profit centers, hurdle rates, and internal venture budgets.

These are not accounting niceties; they are the instruments by which appraisement is decentralized inside large organizations, allowing many nodes to propose and be tested. The same logic governs capital markets: venture capitalists, banks, and public equity holders extend the reach of entrepreneurial judgment by leveraging outsiders' appraisements—interest rates and required returns—that convey the scarcity of present goods relative to future prospects. Mises's analytical separation of originary interest (time preference) from entrepreneurial profit clarifies the interface: discounting provides the yardstick; profit/loss provides the score; both require money prices to be meaningful (Mises 1949).

The calculation argument is not merely a critique of fully socialist schemes; it disciplines mixed and interventionist regimes as well. Price controls, administered credit, and politicized procurement decalibrate monetary calculation by suppressing the very signals entrepreneurial appraisement needs. Cheap credit generated by policy can produce the appearance of profitable projects, only to reveal, when rates normalize, that many were malinvestments—assets whose revenues do not cover the costs of the specific capital combination chosen. This is the bridge to the theory of business cycles: if the interest rate is a coordinating signal linking intertemporal plans of savers and investors, then its manipulation (or expectations thereof) can synchronize widespread errors of appraisement, generating booms and busts without any change in the underlying stock of technological possibilities (Mises 1949; Hayek 1976; Friedman 1968). What distinguishes this view from Schumpeter's impulse-cluster theory is not a denial that technology matters, but a claim about mechanism: macro amplitude is often the result of distorted monetary calculation, not clustered inspiration.

Finally, monetary calculation clarifies why diffusion is the main highway from private novelty to public wealth. Because prices, costs, and profit/loss are observable (or inferable) across firms and sectors, successful appraisements are imitable. Interfaces and standards lower the transaction costs of imitation; liberal intellectual property that teaches and expires spreads methods while rewarding first movers; contestable markets ensure that the rents from correct conjectures are eroded by entry, pushing consumer surplus up. In historical episodes where prosperity compounded—Britain's Industrial Enlightenment, the American "market for technology," Germany's science–shop fusion, and modern biomedicine—the braid of letters, science, and enterprise worked because monetary calculation, anchored in general rules, let thousands of decentralized appraisers see where they erred and copy where others were right (Jacob 1997; Hounshell 1984; Feldenkirchen 1994; Bliss 1982; Bud 2007; Mokyr 2002, 2009, 2016).

Thus the argument from calculation is not a narrow thesis about accounting; it is a general claim about the epistemic constitution of a modern economy. To have entrepreneurs in Mises's sense—agents whose conjectures can be formed, compared, tested, corrected, and diffused—we must have a public language that makes heterogeneous plans comparable and auditable. That language is monetary calculation, which presupposes the republican institutions that generate genuine prices. Where those institutions are absent or muted, judgment is blinded and discovery stalls; where they are robust, a republic of entrepreneurs

converts dispersed insight into organized prosperity.

4 Promoters, Capitalists, Managers, and Technicians—And Why Entrepreneurship Scales Inside Large Organizations

Mises's most clarifying move after grounding entrepreneurship in judgment and monetary calculation is to disaggregate roles that textbook language often blurs. In Human Action, the entrepreneur in the strict sense is the promoter—the agent who appraises uncertain future prices, advances a plan, and accepts the residual validated by profit and loss (Ch. XV §§8–10; Ch. XVIII §5). The capitalist furnishes present goods against future goods and earns originary interest because of time preference; the manager supplies labor of organization and coordination and earns a wage of management; the technician (or engineer/scientist) supplies causal knowledge of means–ends relations. In practice one person may wear multiple hats, but the analytic separation matters. It prevents the conflation—common since Knight—of uncertainty-bearing with capital ownership, and it illuminates how an economy can scale entrepreneurship by recombining these roles in markets and inside firms.

Consider first the promoter versus the capitalist. In Knight's canonical story the entrepreneur is the owner-insurer who offers fixed contracts to others and pockets residuals; uncertainty-bearing is tied to proprietary control. Mises loosens the knot. The decisive function is not to "insure" others, but to judge—to appraise the pattern of future prices better than rivals—and to be answerable for that appraisement. Capital ownership helps because it supplies collateral and control rights, but it is not essential to the function. A non-owner can be entrepreneurial if she advances a conjecture, assembles resources under contract, and is residually exposed through equity, bonus, options, or reputation. Conversely, a mere owner who passively holds claims without directing plans is not entrepreneurial; he earns interest, not profit. History bears out the separation: nineteenth-century America nurtured a thick market for technology in which independent inventors and shop-floor tinkerers (promoters) sold and licensed methods to operating capitalists, who then supplied scale and working capital (Lamoreaux & Sokoloff 1999; Khan 2005, 2020). The republic works because law and markets let promoters trade plans and claims flexibly, aligning exposure with judgment.

Managers and technicians likewise differ from entrepreneurs in Mises's scheme. The manager's craft is indispensable—selecting people, structuring workflows, enforcing schedules, mediating conflicts—but it is still labor sold at a wage unless paired with residual exposure. The technician's craft is causal knowledge—how to build a stable dye vat, how to instrument a boiler, how to code a kernel module—but technical correctness alone cannot decide whether to attempt a plan at a particular time and scale; that requires appraisement in money terms. Engineering tables cannot substitute for opportunity costs expressed in prices;

only entrepreneurial judgment, disciplined by calculation, can do that. This is why brilliant laboratories in the absence of enterprise seldom yield broad enrichment and why, conversely, modest shops with sharp appraisers repeatedly transform off-the-shelf science into profitable routines (Mokyr 2002, 2009; Rosenberg 1982).

Once roles are separated, the scalability of entrepreneurship comes into view. Modern enterprise does not extinguish the market process; it internalizes it. Multi-unit firms import monetary calculation through divisional profit centers, transfer prices, hurdle rates, and internal venture budgets; they allocate residual exposure with equity, options, and bonus banks; they decentralize appraisement by letting many teams propose and by recording their success or failure in money accounts. This "republic within the firm" is visible in the classic M-form transformations of the twentieth century—DuPont, General Motors, and their heirs—where top management ceased to micromanage plants and instead governed by capital budgeting and performance metrics, freeing divisional promoters to make and own bets (Chandler 1977; Hilt 2007). It is equally visible on the shop floor where high-frequency, low-stakes proposals—kaizen—invite frontline workers to redesign tools, fixtures, and flows and to claim a share of the gains. The Toyota system is often taught as a bundle of techniques; at its core it is a constitutional device that lowers the cost of proposing and raises the speed of feedback, turning thousands of managers and technicians into episodic entrepreneurs without waiting for a great man at the top (Ohno 1988; Liker 2004; Womack, Jones & Roos 1990). A similar logic organizes contemporary software: open-source forges and platform ecosystems reduce the fixed cost of experimentation and make results legible to outsiders, creating markets for modules and reputations in which non-owners can be entrepreneurial by bundling and recombining others' code under residual exposure (Raymond 1999; Benkler 2006).

The Zeiss–Abbe–Schott triangle offers a historical template for aligning roles without privilege. Ernst Abbe wrote a foundation statute that bound the firm to research, worker participation, and the university; Carl Zeiss's precision shop and Otto Schott's glass chemistry tied technique to bench science; governance rules institutionalized the loop from laboratory to market and back (Abbe 1899; Feldenkirchen 1994). The scheme did not purchase discovery with monopoly shelter; it purchased it with rules—priority, disclosure, shared gains—that made promoters legible, technicians collaborative, and managers fiduciaries. The same braid reappears in American mass production, where standardized gauges, interchangeability, and cost accounting rendered proposals auditable and portable across plants, multiplying local entrepreneurial acts (Hounshell 1984; David 1990; Levinson 2006). The republic of letters and the republic of science supply the public methods, instruments, and priority rules; the republic of entrepreneurs inside firms supplies residual exposure and monetary tests.

Seen this way, corporate size per se is not the enemy of entrepreneurship; discretionary privilege is. Large organizations can stifle discovery when they suppress internal prices, mute residual exposure, or politicize capital allocation; they can magnify discovery when they sharpen internal markets and keep pro-

posal costs low. Mises's dichotomy between profit management and bureaucratic management makes the point: where outputs can be priced and compared, profit management aligns roles with market tests; where outputs cannot be priced (as in a ministry or a protected monopoly), procedures and compliance displace appraisement (Mises 1949). The pathology is not scale but the eclipse of calculation. Hence the policy moral runs through corporate governance as much as through antitrust: insider protection, opaque procurement, and politicized credit convert managers into rent-seekers and technicians into compliance officers; open standards, contestable tenders, and clean exit through bankruptcy convert them back into promoters.

Finally, the separation of roles clarifies distribution. Profit is not a permanent "return to a factor" but a transient differential earned by superior appraisement until rivals copy; interest is the price of present goods; wages—managerial or technical—remunerate labor services; rents reward durable advantages in resources or positions. In a thriving republic of entrepreneurs these flows display characteristic signatures: wide dispersion of temporary profits across teams and time; rapid erosion of abnormal margins through entry and imitation; and high velocity of internal mobility as workers traverse roles—technicians become promoters, managers take capital stakes, capitalists delegate appraisement to internal venture arms. Empirically, one would expect to observe not merely patents or lab headcounts, but dense metrics of proposal density and diffusion speed—adoption of interfaces, throughput of A/B tests, divisional birth and death, option exercise tied to project P&Ls. Where those metrics are thick, the firm has operationalized Mises's distinction; where thin, speech about "innovation" is likely rhetorical cover for hierarchy without entrepreneurship.

Mises's partitions thus do more than tidy language. They explain how a society multiplies entrepreneurs by recombining judgment, capital, managerial craft, and technical insight under rules that keep calculation sharp and feedback honest. They also explain why the romance of the heroic founder misleads. What sustains enrichment is not a court of champions but a constitution that lets many citizens become promoters episodically—inside firms and across them—and that records their appraisements in a public ledger of money profits and losses. In such an order, technicians do not await orders from visionaries; managers do not merely administer; capitalists do not merely clip coupons. All three can be drawn into the entrepreneurial role whenever they shoulder residual exposure under calculative tests. That is the civic mechanics by which the republic of letters and the republic of science are translated into the republic of entrepreneurs.

5 Competition as Discovery, Consumer Sovereignty, and the Civic Meaning of Profit

Mises and Hayek relocate "competition" from the geometry of equilibrium to the logic of discovery. In the graduate textbook picture, perfect competition

is a static configuration: many price-taking firms, no rents, complete information. That picture omits the very phenomena that make modern prosperity possible—ignorance, conjecture, surprise. Hayek's core claim is that prices are signals and inducements through which dispersed and often tacit knowledge is coordinated, not mere ratios of known magnitudes (Hayek 1945). Competition, in this view, is the institutionalized procedure by which rival plans contend, information is generated, and error is revealed—what he later called a discovery procedure (Hayek 1978). Mises supplies the complementary mechanism: because producer goods are privately owned, money prices emerge for capital combinations; because those prices are commensurable, entrepreneurs can appraise alternative plans; because appraisements are fallible, profit and loss provide the social feedback that reallocates control from less accurate to more accurate judges (Mises 1949). Remove private ownership and free entry, and you extinguish the very tests that make learning possible.

This processual view restores the time dimension to competition. A competitive economy is not a resting point; it is a high-frequency sequence of proposals and corrections. Firms compete by discovering lower-cost combinations, better product–market fits, and faster means of diffusion, not by meeting a textbook first-order condition once. The relevant comparative static is therefore not "price equals marginal cost," but the rate at which marginal costs are found and lowered—a rate governed by proposal density, feedback speed, and imitation frictions. The history of general-purpose technologies (GPTs) underscores the point. Steam, electricity, and the shipping container did not raise productivity upon invention; they did so as thousands of organizations discovered and diffused complements—gauges, boiler practice, plant layouts, standards, cranes, and port logistics—that unlocked the new technique's generality (Rosenberg 1982; David 1990; Bresnahan & Trajtenberg 1995; Levinson 2006). Static models that crown a single innovator miss the social metabolism through which innumerable small improvements cumulate. In that metabolism, competition is not an impediment to innovation; it is the means by which local novelties are tested and spread.

Within this process, consumer sovereignty is not a slogan but a constitutional principle. For Mises, consumers "vote" with expenditures; their choices validate or extinguish producers' appraisements. Entrepreneurial profit is thus not an arbitrary surplus; it is the residual certificate that a conjecture aligned real resources with the strongest, presently revealed wants. Loss is the certificate that a plan wasted scarce means relative to feasible alternatives. The rhetoric matters. If profit is interpreted as a rake-off from a fixed pie, the polity will tax and prohibit it with a free hand. If profit is understood as a signal of discovered value under rivalry and entry, the polity will design rules that keep the signal meaningful—by protecting entry, reputation, and exit, and by refusing to stabilize incumbents against honest loss (Mises 1949; Hayek 1960). Consumer sovereignty also explains why monopoly privilege corrodes discovery. Shield an incumbent from contestability and you mute the very down-side that concentrates managerial attention on serving buyers; subsidize demand for a designated "champion" and you drown the noise-filtered data by which the

polity learns what to scale and what to shut down.

The republic of letters and the republic of science supply instructive analogies and institutional complements. In science, priority rules, peer criticism, and the norm of disclosure make claims contestable; journals and conferences lower the cost of refutation and replication; reputations are staked and revised in public (Polanyi 1962). The result is a competitive order in which "sovereign" readers decide which methods and findings survive, and in which temporary reputation rents induce costly search and careful reporting. Mokyr shows that this scientific republic braided with a market for ideas in the Industrial Enlightenment: manuals, prize essays, and instrument markets linked propositional claims to prescriptive shop practice (Mokyr 2002, 2009, 2016). The modern economy scales the same braid. Open standards and interfaces make results legible to outsiders and compress the distance to imitation; priority and IP rules pay for disclosure while ensuring expiry; trade journals, code forges, and industrial societies carry criticism across firm boundaries. When these devices are in place, consumer sovereignty and priority pressure converge: producers anticipate a critical audience that can defect when quality falls, and proposers anticipate peers who can overturn weak claims. Competition and criticism co-produce the public good of reliable knowledge.

Because discovery is costly and attention is scarce, measurement infrastructures are pivotal to keep consumer sovereignty meaningful. Competitive orders thrive when buyers can cheaply observe and compare quality and when insiders cannot easily mask deterioration. Mass production rose with the diffusion of gauging systems, statistical quality control, and cost accounting that made local proposals auditable and portable across plants (Hounshell 1984; David 1990). Lean systems multiplied proposals by pushing measurement to the front line—scrap, rework, lead time, and first-pass yield became shared currencies of improvement that workers could influence and managers could not easily obfuscate (Ohno 1988; Liker 2004; Womack, Jones & Roos 1990). In software, version control, issue trackers, and continuous integration make defects public and time-stamped, compressing feedback loops and letting outsiders verify claims (Raymond 1999; Benkler 2006). In each case, competition is sharpened not only by entry on the supply side but by legibility on the demand side; consumer votes carry signal when alternatives can be seen, tested, and compared at low cost.

This reframing also clarifies the moral meaning of profit and loss. McCloskey urges us to recover the ethical grammar of commerce: prudence as foresight, justice as promise-keeping, temperance as self-discipline, courage as bearing uncertainty (McCloskey 2006, 2010, 2016). In a discovery process under consumer sovereignty, profit is neither shameful nor glorious in itself; it is evidence of service under rivalry. Loss, likewise, is not stigma but social information—an indispensable component of learning. A polity that praises "having a go," tolerates honest failure, and honors lawful imitation creates the cultural permission that Phelps identifies with high proposal density and satisfying work; people step forward with ideas because they expect fair tests and recognizable rewards (Phelps 2013; Phelps et al. 2020). A polity that disparages profit and criminal-

izes imitation fosters caution, secrecy, and low variance in proposals; it reduces the very experimentation that long-run prosperity requires.

The upshot is practical. To preserve competition as discovery and consumer sovereignty as the arbiter, rules must target contestability and interoperability rather than the snapshot structure of market shares. Antitrust should be suspicious not only of price-fixing but of interface foreclosure and contractual arrangements that raise the cost of switching for consumers and complementors. Procurement should resist the national-champion temptation and prefer open specifications that let multiple proposers vie to meet them. Intellectual property should be calibrated to teach and expire—scope and term that induce disclosure and investment while avoiding the fencing-off of complements that stifles downstream discovery (Khan 2020). Regulators should invest in metrology—the shared measures by which buyers can assess quality and by which outsiders can audit claims—because legibility is the demand-side twin of entry on the supply side. And the state should recognize the reputational commons—journals, testing labs, code repositories, clinical registries—as part of the civic infrastructure that renders consumer sovereignty informative and competition educative (Polanyi 1962; Mokyr 2002).

Empirically, this perspective suggests what to look for beyond patents and R&D headcounts. In a healthy competitive order one observes thick diffusion metrics (adoption of standards and interfaces), fast feedback cadence (A/B cycles, design-to-production lead times), and wide dispersion in project-level profit and loss that mean-reverts as imitation erodes rents. One also sees porous markets for ideas—licensing, spinoffs, open-source modules—through which non-elite actors can be entrepreneurial by recombination (Lamoreaux & Sokoloff 1999; Khan 2005, 2020; Raymond 1999; Benkler 2006). These are signatures of a republic in which competition is a standing invitation to propose and consumer sovereignty a standing discipline that keeps proposals honest.

Therefore, when competition is understood as discovery and consumers as the sovereign adjudicators of value, profit and loss acquire their civic meaning: they are the economy's public exams. The republic of letters and the republic of science provide the culture and rules—priority, publicity, criticism—that make claims legible and contestable; the republic of entrepreneurs translates those claims into rival plans exposed to gain and loss. Where this braid is strong, prosperity compounds because many can try and the tests are fair; where it frays, even strong talents and deep treasuries yield less, because the society has forgotten how to learn.

6 Profit, Interest, and Wages: Untangling the Residual and Its Civic Meaning

Classical and modern discourse frequently muddles three analytically distinct magnitudes—entrepreneurial profit, interest, and wages of management—thereby obscuring how markets coordinate intertemporal choices, appraise conjectures,

and remunerate effort. The conflation is not harmless. It distorts policy toward finance and competition, weakens the constitutional case for open entry and lawful imitation, and invites suspicion that profit is a mere rake-off rather than a social signal of discovered value. A republican political economy—one that treats discovery as a civic process disciplined by consumer sovereignty—requires sharper categories.

The first separation is between profit and interest. Following Böhm-Bawerk's time preference tradition and Mises's refinement, interest is a universal agio reflecting the discount of future goods to present goods, independent of uncertainty and entrepreneurship (Böhm-Bawerk 1889; Mises 1949). It is immanent to intertemporal choice as such. Market gross interest observed on loans and securities folds in originary interest, plus price premia, risk premia, and institutional frictions; but the category does not depend on the presence of novelty or error. By contrast, entrepreneurial profit (and loss) arises only where plans are fallible and judged ex post by consumers' choices through prices and quantities. It is the residual that remains after imputing to all factors, including the capitalist for time preference and the manager for labor services, their competitive opportunity costs. Profit is thus not the return to waiting, nor a wage for diligence; it is the premium (or penalty) on superior appraisement under uncertainty—the difference between the world imagined in a promoter's plan and the world revealed by adoption and imitation (Mises 1949; Knight 1921; Kirzner 1973). This distinction preserves the logic of both categories: interest explains why positive discount rates persist even in stationary states; profit explains why, off the path of certainty, resources shift to those who guess better about future prices and complementary adjustments.

A second separation is between profit and wages of management. In modern firms, salaried executives supply scarce labor—attention, judgment, and coordination—whose price is formed on external markets for managerial talent. Those wages are ex ante contracts and do not vanish when the venture fails. Entrepreneurial profit is ex post and residual; it attaches to whoever bears the plan's final uncertainty. The same person may wear both hats—a founder-CEO who works for a salary and holds residual equity—but the categories do not collapse. Keeping them distinct prevents two errors: imputing all residuals to "management skill," which erases the social test of loss, and treating all high managerial pay as "profit," which confuses labor scarcity rents with discovery rents. At the level of political philosophy, the distinction carries a civic message: wages remunerate promised effort; profit certifies usefulness under rivalry.

The third separation is between competitive profit and privilege rents. In a republic of entrepreneurs, entry is open, interfaces interoperable, and imitation lawful within calibrated IP. Discovery rents therefore erode as rivals copy what works and improve what does not; what Mises calls the "tendency toward the disappearance of profits" is the long-run signature of a healthy order (Mises 1949). Persistently high margins often signal foreclosure—legal privilege, interface lock-in, or regulatory barriers—rather than superior appraisement. Policy must therefore defend the conditions under which profit functions as a signal (contestability, legibility, expiry of exclusivity) and be suspicious of claims that

monopoly "havens" are necessary for discovery. The historical record—from Britain's standards and voluntary associations to the United States' liberal patents and thick markets for technology—shows that teaching IP and open diffusion generate more proposals and faster complement discovery than discretionary shelter (Lamoreaux & Sokoloff 1999; Khan 2005, 2020; Mokyr 2002). Where privilege dominates, "profit" shades into rent seeking and loses its justificatory force.

Seen through this lens, the trajectory of a successful general-purpose innovation is not a single burst of Schumpeterian surplus but a cascade of quasi-rents that are continually arbitraged away by diffusion and recombination. The steam engine's private returns depended on micro-inventions in fuels, gauges, lubricants, and precision boring that others could learn and adapt (Rosenberg 1982; David 1990). Electrification required factory redesigns whose returns were shared and imitated (David 1990). Containers paid only after ports, cranes, and customs regimes were standardized (Levinson 2006). In each case, entrepreneurial profit marks phase points along a diffusion curve; competitive erosion is the civic multiplier that turns private insight into public productivity (Bresnahan & Trajtenberg 1995). This dynamic is not a lament; it is the point. Lawful imitation is how the republic pays innovators in the short run and pays everyone thereafter.

Clarifying the categories also illuminates the distributional ethics of markets. Profit's volatility and skewness—few large gains, many small losses—are not bugs but features. They are the statistical signature of a portfolio of conjectures subjected to sharp feedback. A society that insures away loss through privilege or bailouts disables the test; a society that criminalizes profit under rivalry chills proposals. The republican stance is neither romantic about founders nor indifferent to inequality; it is constitutional about the process. By insisting that residuals be earned under open entry and legible quality, it channels ambition toward discovery rather than political extraction (Hayek 1960; Polanyi 1962). McCloskey's rhetoric gives this stance moral color: when profit is understood as the receipt for having served strangers under the discipline of exit, it is deserving in a civic sense; when it is protected by exclusions that preclude exit, it is suspect (McCloskey 2006, 2010, 2016).

The monetary–financial superstructure complicates measurement but not the logic. In practice, national accounts blend profits with quasi-rents, accounting adjustments, and returns to monopoly; financial statements blur interest and profit through capital gains and valuation effects. Yet even in a world of intangible capital and platform complementarities, the conceptual lines hold. Interest compensates for time; profit certifies plan validity; wages remunerate promised effort. Venture finance and equity tranche these claims: creditors are paid first (interest), managers next (wages), and residual claimants last (profit or loss), with staged financing and vesting schemes designed to align appraisement with exposure. The more contestable the product and capital markets, the more meaningfully that residual maps to consumer sovereignty rather than political favor.

Two policy corollaries follow. First, if profit is a civic exam in which con-

sumers grade plans, the polity should invest in measurement infrastructures—metrology, certification, transparency of service quality—that keep the exam informative, especially where credence qualities are high (Hounshell 1984; Liker 2004; Womack, Jones & Roos 1990). Legibility on the demand side is the twin of entry on the supply side. Second, if interest is a universal category while profit is the reward for superior appraisement, then monetary and regulatory regimes that flatten price signals or socialize downside risk will predictably degrade entrepreneurial judgment and misallocate capital. Mises's and Hayek's warnings on administered interest rates and credit expansions were not merely about inflation; they were about the epistemic damage inflicted when the relative prices that orient plans are blurred (Mises 1949; Hayek 1976, 1978). In a republic of entrepreneurs, guarding the clarity of those signals is part of the constitution of liberty.

Finally, the distinction clarifies how prosperity scales in modern, science-dense economies. Priority rules and disclosure norms in the republic of science award reputational rents that expire as knowledge becomes public (Polanyi 1962). In the republic of letters, low-cost publication and association spread methods across borders (Goodman 1994; Grafton 2009; Mokyr 2016). In the republic of entrepreneurs, temporary profits induce costly scaling and reveal complements, after which imitation and entry compress margins. The braid is coherent only if we keep our prices straight: interest for waiting, wages for effort, profit for being right under rivalry. With that grammar in place, distribution ceases to be a puzzle of arbitrary shares and becomes a record of how a free people coordinate across time, learn from error, and turn private conjecture into public wealth.

7 Institutions and Policy: How Rules Make (and Discretion Unmakes) a Republic of Entrepreneurs

If entrepreneurship is a role widely available whenever people advance conjectures and accept residual exposure, the decisive public question is not "who should innovate?" but "under what rules do many people find it cheap to propose, swift to learn, and lawful to be copied when right?" A republican political economy answers with a constitutional agenda rather than a roster of champions. Its core proposition is negative and simple: progress does not have to be bought with privilege. The historical record suggests the opposite—progress is multiplied when the polity supplies general, impersonal rules that keep proposal costs low and feedback honest, while resisting discretionary arrangements that mutate discovery into rent seeking (Hayek 1960; Mises 1949; Polanyi 1962; Mokyr 2002, 2016; McCloskey 2010, 2016; Phelps 2013, 2020).

Begin with the legal–informational bedrock. Secure and alienable property, credible contract enforcement, freedom of entry and association, and freedom of publication make prices and reputations legible enough to guide judgment (Hayek 1945, 1960). These are not platitudes; they are the preconditions for

monetary calculation, the very grammar of entrepreneurial appraisal in which heterogeneous capital goods are commensurated and plans are tested (Mises 1949). Without the ability to contract and publish, residual claimants cannot align complements, recruit partners, or disclose methods for priority and replication. History's thick episodes of discovery—Britain's Industrial Enlightenment, the American "market for technology," Germany's lab–workshop fusions—are all instances of a legal infrastructure that lowered the cost of proposing and made quality visible to outsiders (Hounshell 1984; Lamoreaux & Sokoloff 1999; Khan 2005, 2020; Mokyr 2002; Feldenkirchen 1994). The "republic of letters" and the "republic of science" contribute here by institutionalizing priority and persuasion as reputational currencies—prizes, journals, standards bodies—that reward disclosure and error correction (Polanyi 1962; Goodman 1994; Grafton 2009; Mokyr 2016).

Next is the monetary–financial constitution. Interest rates and relative prices are discovery devices, not mere bookkeeping. Regimes that blur them—through administered credit, soft budget constraints, or anticipated bailouts—degrade entrepreneurial judgment and amplify systematic error. Mises and Hayek's monetary critique is, at bottom, epistemic: when the money and credit order falsifies intertemporal signals, plans that should fail look profitable ex ante, and the profit–loss exam ceases to allocate control toward better appraisers (Mises 1949; Hayek 1976, 1978). A republican stance therefore favors hard budget constraints, contestable capital markets, transparent failure resolution, and prudential rules that protect clarity of signals—not state curation of outcomes. Where financial policy socializes downside while privatizing upside, the entrepreneurial function is displaced by balance-sheet arbitrage.

The architecture of intellectual property is the third pillar. Republican IP teaches and expires. It is calibrated to reveal methods (so that others can learn), to grant a finite window for first movers to recoup scaling costs, and to leave room for lawful imitation and recombination at expiry. Overbroad or evergreen exclusivity converts discovery rents into privilege; under-disclosure suppresses diffusion. The nineteenth-century United States achieved extraordinary "democratic invention" with cheap, examination-based patents, rich defensive publication, and thick markets for licenses (Khan 2005, 2020; Lamoreaux & Sokoloff 1999). Contemporary policy analogues include FRAND commitments for standards-essential patents; narrow, well-examined claims; robust prior-art search; strong enablement; prize and advance-market mechanisms where exclusion is socially costly; and clear safe harbors for reverse engineering and interoperability. The guiding test is republican: does the regime increase proposal density and complement discovery, or does it fence off interfaces and channel ambition into rent defense?

Competition policy, too, must be re-anchored in contestability and interface openness. A discovery view of markets regards rivalry as an information process (Hayek 1978; Kirzner 1973). The aim of policy is not to freeze market structure but to keep avenues of entry open and switching costs low, especially where network effects are strong. That often means targeting chokepoints rather than size: interoperability mandates, data portability, non-discrimination at essen-

tial interfaces, and procurement rules that forbid technical tying. It sometimes means structural or conduct remedies where platform operators can entrench by self-preferencing or foreclosing complements. What it does not require is tolerating durable market power on the claim that "havens" are necessary to innovate. The historical counterpoint is instructive: Zeiss–Abbe–Schott institutionalized the science–shop loop by statute without discretionary shelter; British and U.S. standards consortia multiplied complements by keeping interfaces open and published (Abbe 1899; Feldenkirchen 1994; Hounshell 1984; Levinson 2006). When rents persist, the presumption should be that something about the rules of the game is suppressing the very imitation that turns private insight into public productivity.

What of "industrial policy"? A republican filter distinguishes horizontal from discretionary instruments. Horizontal policies—metrology and certification capacity, broadband and logistics infrastructure, open testing facilities, generic platform standards, and mission-style prize competitions with public disclosure—fortify the commons upon which voluntary exchange in ideas and artifacts depends (David 1990; Bresnahan & Trajtenberg 1995). Discretionary policies—picking champions, bespoke subsidies, exclusive concessions—invite adverse selection (incumbent capture), dull feedback (politicized success metrics), and choke diffusion (closed interfaces). The same lesson emerges from biomedicine: bench breakthroughs mattered, but insulin, penicillin, dialysis, and mRNA only scaled when open science braided with entrepreneurial process engineering and quality systems, with priority and publication protecting disclosure and competition ripening the supply chain (Bliss 1982; Bud 2007; Jeffrey 2001; Nalin & Cash 1970; Weissman & Karikó 2005). Where procurement was contestable and standards were shared, costs fell and access widened; where discretion ossified supplier lists, learning plateaued.

Regulatory design can either amplify or stifle everyday innovation. Occupational licensing regimes that function as guilds erect legal moats around routine service innovations; switching to competency-based certification, interstate reciprocity, and sunset review lowers proposal costs for new entrants. Safety regulation can facilitate learning by creating transparent incident reporting and "just culture" protections (the industrial analogue of morbidity-and-mortality conferences) that speed error correction. "Regulatory sandboxes" can legalize small-scale trials without creating permanent carve-outs for favored incumbents, provided access is nondiscretionary and performance telemetry is public. In services and software, disclosure-oriented regulation (APIs, data rights, audit trails) often dominates prescriptive rules by enabling third-party quality discovery and consumer choice. Everywhere, the aim is the same: articulate rules that raise the return to being right and increase the penalty for lobbying.

Trade and supply-chain policy pose a final constitutional question: how to make reliability a public good without converting the border into a discretionary lever that chills investment in complements. A republican stance favors clear, rules-based regimes—tariff schedules bound by treaty, mutual recognition of standards, portability of certifications, predictable security reviews—over ad hoc restrictions whose uncertainty taxes long-horizon learning. Weaponized un-

predictability pushes firms to re-internalize and duplicate capacities rather than explore and diffuse them; reliability does the opposite by inviting specialization plus open interfaces (Levinson 2006; Mokyr 2016). The relevant "industrial policy" is often the mundane work of customs modernization, digital documentation, and harmonized metrology—precisely the public goods that enlarge the republic of letters and commerce simultaneously.

The civic complement to these legal and economic arrangements is culture. McCloskey's thesis that dignity and liberty for improvers unlocked the Great Enrichment can be operationalized as permission structures in schooling and work: practical mathematics, instrument competence, open-ended projects, and public venues where novices can publish small results and be taken seriously (McCloskey 2006, 2010, 2016; Mokyr 2016). Phelps pushes further: societies that prize self-authorship and novelty generate more proposals and more satisfying work, even holding institutions constant (Phelps 2013, 2020). Policy cannot legislate curiosity, but it can finance learning clubs—maker spaces, code forges, standards hackathons, clinical quality collaboratives—where criticism is cheap and proposal density rises. The point of such investments is not spectacle but metabolic rate: to accelerate the cycle from conjecture to test to diffusion.

All this frames a simple contrast Mises drew with special clarity: profit management versus bureaucratic management (Mises 1949). The latter is fit for tasks where output is political or nonmarketable (policing, courts, core administration); the former is indispensable where plans must be appraised by voluntary uptake. When regulation and subsidy push business organizations toward bureaucratic criteria—tick-box compliance, guaranteed revenue bases, political key-performance indicators—they atrophy in the very faculty we seek to cultivate: judgment under uncertainty. A republic of entrepreneurs is not a plea for smaller government in the abstract; it is a plea for a government that knows where law outperforms direction. Write rules that thicken rivalry, legibility, and interoperability; fund public goods that raise the supply of competent proposers; and abstain from privileges that disable the exam of profit and loss. Where those conditions hold, discovery becomes a civic practice—distributed, corrigible, and compounding. Where they are absent, "innovation policy" becomes a hunt for favorites, and the republic yields to a court.

8 Money, Credit, and Systematic Entrepreneurial Error: A Republican Account of Booms and Busts

In a republic of entrepreneurs, the profit–and–loss exam works only as well as the prices it grades against. Because all appraisement is monetary, money is never a neutral veil in practice; changes in the money–credit regime alter the pattern of relative prices and the tempo of intertemporal exchange. This is the starting point of Mises's and Hayek's cycle analysis: when policy or the banking system falsifies intertemporal signals, it does not induce random noise

but a biased portfolio of entrepreneurial mistakes that will later have to be liquidated (Mises 1949; Hayek 1976, 1978). The coordinating role of the interest rate is pivotal here. In Wicksellian language, if the market rate is pushed below the "natural" (savings-consistent) rate, entrepreneurs read the discount curve as evidence of abundant present saving and cheap future finance; they lengthen projects, deepen roundabout methods, and re-time cash flows accordingly. If the lower rate is not backed by genuine abstinence, the community of plans will not clear when complementary factors and consumer income paths fail to materialize. What looks like profitable roundaboutness in the boom is revealed as malcoordination in the bust (Mises 1949).

This epistemic reading of cycles makes the mechanism concrete. Consider how a broad credit easing propagates through a high-proposal economy. First, it compresses term and risk premia, raising valuations most for duration-sensitive claims: early-stage ventures, fixed-investment in long-lived equipment, and organizational redesign that pays off far in the future. Second, because relative prices move, factor flows reallocate: engineers, project managers, and specialized suppliers are bid away from shorter-cycle lines toward long-cycle programs. Third, balance sheets accommodate the shift: covenants loosen, maturities extend, and funding structures tilt toward instruments whose servicing profiles assume continued rollover at low rates. None of this is irrational from the firm's vantage point; each decision is locally justified by current prices. The error is systematic because the money–credit regime has created common forecast errors about the intertemporal constraint. When policy normalizes (or when credit standards snap back endogenously), the cash-flow ladders of these portfolios become inconsistent with realized demand and factor availability. Projects that cannot complete at the original cost of capital must be written down; specialized complements sit idle; suppliers retrench; and what had looked like a technological "cluster" of brilliance is revealed as a financial misallocation cluster. The bust is the social discovery of a prior accounting fiction.

Hayek's contribution is to show why this is not the same as a general overinvestment story. The problem is not "too much" investment but wrongly timed and composed investment, as revealed by the pattern of relative prices when intertemporal signals are restored (Hayek 1976, 1978). In practice, one sees telltales: surges in long-gestation capex relative to maintenance; unusual spreads behavior (compressed term/risk premia followed by abrupt re-steepening); a rise in firm-level zombification when low rates prop up otherwise uneconomic combinations; and, later, step-down revisions to measured TFP as overbuilt complements are scrapped rather than completed. From the vantage point of the republic, the tragedy of the boom is not exuberance per se but that many otherwise promising small bets are crowded toward the same error vectors by a common signal.

Friedman adds the empirical calibration. His narrative of U.S. cycles highlights how monetary variability—sometimes too loose, crucially often too tight in the contraction—amplifies and prolongs real adjustment (Friedman & Schwartz 1963; Friedman 1968). That perspective does not contradict the Mises–Hayek mechanism; it completes it. Loose credit can originate systematic entrepreneurial

error; contractionary missteps can turn necessary relative-price adjustments into needless balance-sheet cascades. In both phases, what fails is the monetary constitution required by a discovery process: rule-like nominal anchors, lender-of-last-resort operations that distinguish illiquidity from insolvency, and a default presumption against using credit policy to allocate resources to favored lines. When authorities confound those functions—socializing downside, politicizing rollover, or toggling unpredictably among targets—entrepreneurs rationally reweight portfolios toward policy speculation and away from complement discovery.

This republican reconciliation clarifies three disputes. First, against Schumpeter's view that macro fluctuations are primarily the shadow of innovation clusters, the evidence (and the logic) suggests the opposite ordering: innovation supply is nearly continuous—countless small proposals—and monetary–financial conditions determine how those proposals are filtered, synchronized, or distorted into booms and slumps. That is why one finds vigorous innovative activity during slumps (cheap assets, freed talent) and disappointing productivity during euphorias (projects chosen for cheap finance rather than complement fit). Second, against real-business-cycle narratives in which relative prices remain fully revealing, the Mises–Hayek–Friedman synthesis insists that money is not a mere numéraire: its regime changes the information content of prices and hence the selection of plans. Third, against moralized takes on cycles ("malinvestment" as vice), the mechanism is institutional: when the signal is biased, even competent entrepreneurs will err together.

What follows for measurement and policy is straightforward. If cycles are episodes of signal-induced common error, one should track indicators that proxy for the quality of signals and the composition of plans: ex ante real rates across the term structure; dispersion and persistence of relative-price changes; the share of investment in long-gestation, complement-intensive lines; the covenant and maturity structure of corporate finance; entry/exit in rate-sensitive sectors; the incidence of zombies; and ex post revisions to TFP and markups that flag scrapped complements. None of these are sufficient statistics; together they operationalize the idea that booms bias portfolios toward fragile timing and that busts are the costly re-matching of complements under honest prices.

For policy, the republican prescription is to protect the exam rather than to proctor outcomes. Keep a rule-like nominal framework that pins down medium-run expectations; police the banking system's maturity transformation so that payment-system crises do not masquerade as real collapses; practice lender-of-last-resort support against solvent collateral on terms that preserve the penalty principle; and resist credit allocation in the name of innovation. When support is required to avoid collateral firesales, pair it with rapid loss recognition so that capital control migrates to better appraisers. Finally, quarantine crisis tools from ordinary politics; an anticipated safety net is itself a signal that biases entrepreneurial portfolios toward balance-sheet games.

The result is neither a promise of smooth growth nor a counsel of austerity. It is a constitutional claim: because entrepreneurship is calculation under uncertainty, the money–credit order is a core public good. Get it right, and

a high-proposal society will generate and sort conjectures with minimal waste; get it wrong, and even the most enterprising republic will find its ingenuity marshaled into the same blind alleys, only to be marked to market in the next downturn. In that sense, cycles are not the "gales of creative destruction" Schumpeter celebrated; they are the headwinds of signal failure that a liberal monetary constitution can moderate without trying to steer discovery itself.

9 Probability, Error, and the Social Value of Speculation

A republic of entrepreneurs lives by conjecture and correction. The conjectures are not random stabs in the dark; they are judgments about concrete, singular futures—what Mises calls case probability—that cannot be reduced to actuarial frequencies or mechanical rules (Mises 1949, pp. 107–115, 272–286). This simple observation reorganizes the theory of profit, the role of statistics, and the legitimacy of speculation.

Mises's distinction between class and case probability sharpens Knight's risk–uncertainty dichotomy without reifying it. Class probability pertains to repeatable events whose relative frequencies are stable in a well-defined reference class: mortality tables, defect rates in a controlled process, fire incidence in a building stock. Here, insurance and statistical quality control are rational because the law of large numbers binds. Case probability concerns unique complexes—"Will this product succeed in this market at this time under these rivals?"—for which no genuine reference class exists and no frequency claim is meaningful. Entrepreneurial appraisal belongs to the second domain. It is not the calculus of lotteries but of understanding: assembling pattern knowledge, analogies, engineering constraints, customer talk, rivals' likely moves, and one's own capacity to execute (Mises 1949, pp. 50–59, 113–115). The outcome is not a "true probability" but a judgment call, later graded by profit and loss.

This has three consequences. First, it rescues the entrepreneur from the caricature of a mere risk-bearer. Insurance companies bear risk in the Knightian sense by pooling class probabilities; they do not innovate. The entrepreneur earns profit by being right where others are wrong about a singular configuration of means and ends. Statistical skill helps—knowing your scrap rates, arrival times, churn probabilities—but the decisive wager is about complementarities, timing, and design fit that have no frequency law. Profit is payment for superior appraisement of case probabilities; loss is the penalty for inferior appraisement (Mises 1949, Ch. XV §8).

Second, it clarifies why speculation is not a vice on the periphery of the system but a central civic function. Speculators are entrepreneurs of prices and time: they form views about the adequacy of current prices to future conditions, put their capital behind those views, absorb inventory and liquidity risk, and—most importantly—expose their conjectures to continuous test. Futures markets, market-making, and (yes) short-selling compress dispersed forecasts into

tradeable terms and discipline errors swiftly. In Mises's language, they are institutional devices that turn case-probability judgments into public signals and reallocate command over resources toward those whose judgments repeatedly survive the exam (Mises 1949, pp. 326–336). A polity that mistrusts speculation because it is "uncertain" or "destabilizing" misunderstands its own engine of coordination: without speculators taking positions on tomorrow, today's prices would be worse guides to action.

Third, it explains both the power and the limits of econometrics in innovative economies. Where class probabilities genuinely obtain—claims frequency in auto insurance, yield loss in a mature process—quantification is indispensable. But the core of discovery—product–market fit, organizational redesign, complement search—remains a domain of case probability. There the good methods are experimentation, comparison, and narrative: A/B tests, prototypes, customer development, post-mortems, and open criticism in letters and journals. McCloskey's rhetorical program is not an anti-quantitative detour but a reminder that persuasion by exemplum and mechanism matters where frequencies do not exist yet (McCloskey 1985, 2010, 2016). Hayek's emphasis on dispersed, tacit knowledge reaches the same conclusion: prices summarize vast fragments of local understanding that no regression can collect (Hayek 1945). In short, models calibrate the class margins; entrepreneurial judgment governs the case margins, and institutions should help it learn.

Error is therefore not a blemish but the raw material of coordination. In a high-proposal society, most new ideas will be wrong somewhere: wrong complement, wrong scale, wrong timing. The social question is not how to prevent error—impossible—but how to discover it cheaply and early, propagate the lesson, and preserve the option value embedded in partially right ideas. The republic supplies exactly such devices: open entry so many try; impersonal law so losers can exit without stigma; interoperable standards so surviving modules are recombined; publication and priority norms so negative results travel; and contestable rents so the right lessons propagate through imitation rather than privilege. That is why diffusion belongs beside invention at the center of growth: diffusion is the social multiplication of someone's locally correct case-probability judgment, made legal and cheap by republican rules.

Consider how this logic interacts with money and cycles. When the money–credit regime corrupts intertemporal signals, it does not merely "add noise"; it correlates entrepreneurial forecast errors. Case probabilities are misread in the same direction—longer projects look safer than they are, complements seem more abundant than they will be. The bust is not divine punishment but the marking to market of many synchronized misjudgments. Here Friedman's lesson joins Mises and Hayek: once the error is recognized, monetary institutions should prevent additional case-probability mistakes born of fire sales, without trying to repeal the correction itself (Friedman & Schwartz 1963; Friedman 1968). A good monetary constitution keeps the exam fair; it does not curve the grade.

Because case probability resists formula, learning technologies become pivotal. The Industrial Enlightenment's infrastructure—mechanics' institutes, prize

questions, cheap technical print, the Royal Society's replication culture—lowered the cost of forming and revising judgments (Jacob 1997; Mokyr 2002, 2009). The American patent and licensing market performed a similar function by making rival designs legible and tradable to outsiders (Khan 2005, 2020). Modern analogues—open-source repositories, preprint servers, code forges, clinical trial registries—do the same: they thicken the informational diet on which case probabilities are formed and revised. Seen this way, McCloskey's "trade-tested betterment" is a massive social machine for surfacing and correcting entrepreneurial error; Phelps's "dynamism" is the cultural disposition that keeps people willing to make such bets in the first place (Phelps 2013; Phelps et al. 2020).

The measurement corollary is to look for error-sensitive indicators rather than "innovation counts." Useful candidates include dispersion and persistence of firm-level forecast errors (sales vs. plan, cost vs. budget); the speed and depth of product iteration (release cadence, rollback frequency); the share of negative results and replications in publication venues; the prevalence of reversible investment (optionality in capital commitments); and the breadth and latency of diffusion along supply networks (time from first adopter to median adopter, conditional on interface complexity). These are not sufficient statistics, but they operationalize the idea that a healthy republic of entrepreneurs discovers its own mistakes quickly and makes it cheap for others to copy the corrected method.

Finally, policy should stop criminalizing foresight. Bans on short-selling, discretionary hostility to market-makers during stress, and licensing regimes that privilege insiders over entrants all raise the cost of forming and acting on case-probability judgments. Conversely, rules that enhance the Legibility–Reversibility–Testability triad—transparent disclosure, bankruptcy that preserves human and modular capital, IP that teaches and then expires, interoperable standards—lower the social cost of error and increase the private return to being early and right. That is what it means to protect the commons of discovery: not to insure away uncertainty, but to civilize it—so that many citizens can judge, err, learn, and try again.

Thus, in Mises's comprehensive view, the entrepreneur is the economist of the singular: the agent who must judge when frequencies fail. Profit is the laurel for judgments the world confirms; loss is the tuition for those it denies. Speculation is the craft by which such judgments are made public and corrected. And the republic is the constitution that makes this craft honorable, frequent, and cheap enough to scale into prosperity.

10 Measurement and Empirical Implications: Making the Republic Visible

If entrepreneurship is a role widely diffused, if innovation's payoffs arrive mainly through diffusion and complement discovery, and if monetary calculation and feedback speed are the constitution of that process, then an empirical pro-

gram should look past heroic-invention counts and toward proposal density, feedback velocity, and diffusion breadth. The aim is not to replace narrative evidence with a single statistic—McCloskey's warning against "significance without oomph" applies with special force where case probability dominates (Ziliak and McCloskey 2008)—but to assemble a dashboard of error-sensitive indicators whose movement is theoretically anchored in Mises's account of appraisement and profit–loss (Mises 1949) and institutionally grounded in Hayek's discovery view of competition (Hayek 1945, 1978). This section sketches such a program and ties it to tractable data.

A first object is proposal density: how often do economic actors put forward testable changes to what they make or how they make it? Patent flows capture only a narrow and often strategic slice. Better proxies lie where new conjectures leave operational tracks. In software and digital services, release cadences and changelogs record product iteration; version histories in code forges reveal the tempo of modular improvement and the breadth of contribution beyond a firm's core (Raymond 1999). In manufacturing and services, kaizen logs, engineering change orders, and corrective–preventive action reports quantify the frequency of small bets—the very micro-inventions that Mokyr (1990, 2002) and Hounshell (1984) document historically. Lean production studies already treat problem-solving events per worker and suggestion implementation rates as performance variables (Womack, Jones, and Roos 1990; Liker 2004); read through Mises, these become measures of localized entrepreneurial judgment inside the firm. Across sectors, product update notes, user-facing release intervals, and A/B test volumes serve a similar role in market settings where diffusion is immediate and observable. The hypothesis is simple: higher proposal density—holding scale and complexity constant—should correlate with greater dispersion in short-run profits and faster reversion toward the frontier as loss reveals error.

A second object is feedback speed: how quickly do prices, reputations, and internal controls expose mistakes and elevate correct conjectures? Here, operational and market data align. From the inside, one observes time from defect discovery to containment, time to rollback or patch, first-pass yield improvements, and supplier corrective-action closure times—error-to-learning latencies that summarize the health of what Polanyi (1962) called the "republic of science" within the shop. From the outside, price and margin adjustment speeds to cost or demand shocks, inventory half-lives during demand misses, and exit–entry lags in narrow product markets register how quickly the profit–loss test reallocates control over resources (Mises 1949; Hayek 1945). Historical GPT episodes make the same point in slow motion. David's (1990) comparison of the dynamo and the computer shows that the social return depends on the speed with which organizations discover the complements that release a general-purpose technology's power; Bresnahan and Trajtenberg's (1995) GPT framework formalizes the complement problem. Empirically, one can measure organizational redesign lag—for example, the interval between electrification and adoption of the re-laid factory or, in modern logistics, the time from standard specification to median compliance in a supply chain—treating shorter lags as signatures of a thick feedback constitution (Levinson 2006).

A third object is diffusion breadth and latency. Because private novelty becomes public wealth through lawful imitation, the speed and reach of copying are central outcomes, not afterthoughts. Historical cases already point to usable proxies. In nineteenth-century America, the market for technology—assignment and licensing transactions recorded in patent deeds—provides a map of how quickly devices and methods moved beyond originators (Lamoreaux and Sokoloff 1999; Khan 2005, 2020). In biomedicine, one can trace time from first clinical publication to multi-site standard-of-care adoption (Bliss 1982; Bud 2007; Jeffrey 2001). In modern software and hardware, standard adoption curves—time from formal release to median interoperability among vendors—directly reflect the policy variables emphasized here: openness of interfaces, clarity of specifications, and the contestability of rents that invite entry by complementors. Where republic-like rules prevail—priority and disclosure in science, interoperable standards in engineering, contestable markets in commerce—latencies are shorter and breadth is wider; where privilege or censorship intervenes, diffusion stalls despite high discovery (Goodman 1994; Mokyr 2009; McCloskey 2016).

A fourth object is calculation quality, the background condition of all three republics. Prices must be sufficiently free to summarize dispersed knowledge; accounting must be reliable enough to render gains and losses commensurate; bankruptcy must be efficient enough to return assets to higher-valuing uses. Direct measurement is elusive, but proxies are plentiful: mark-to-market timeliness, restatement frequencies, bankruptcy resolution duration, and variance of price dispersion across comparable goods conditional on observable cost drivers. Friedman's monetary lessons enter via monetary and credit volatility and its correlation with synchronized forecast errors (Friedman and Schwartz 1963; Friedman 1968). When intertemporal signals are stable and credible, error vectors are idiosyncratic and cancel; when signals are distorted, errors correlate, proposal density declines ex ante, and losses bunch ex post—a pattern that can be tested with firm-level panel data on forecast misses and investment reversals.

These measurement families support identification strategies more discriminating than invention counts. Natural experiments arise when jurisdictions alter entry barriers or interface openness. Licensing reform that lowers non-safety barriers should increase proposal density among small producers and accelerate diffusion along supply networks; standards reforms that mandate interoperability should shorten adoption lags and increase complement variety; shift from discretionary to rule-bound procurement should raise participation rates and reduce single-winner persistence. Historically, the introduction of liberal patent examination and the deepening of postal and print networks in the United States offer precisely such variation (Khan 2005; Grafton 2009). In industry settings, transitions to lean production and TPS-style problem-solving routines supply within-firm discontinuities in proposal density and feedback speed (Womack, Jones, and Roos 1990; Liker 2004). Event-study designs can follow these shocks through the dashboard: do release cadences rise, error latencies fall, and diffusion curves steepen?

Cross-sectionally, one can construct composite indices that proxy the constitutional preconditions emphasized here. A Legibility–Reversibility–Testability

index might combine: publication norms (share of venues with replication standards; negative-result acceptance rates), interface openness (share of products with public APIs and standards compliance), error reversibility (share of capital that is leased or modular; average time-to-exit and asset recovery), and contestability (entry costs and procurement openness). The prediction is not that such an index replaces institutional nuance, but that higher scores correlate with (i) more dispersion and faster mean reversion in firm-level profits, the signature of frequent proposals and fast tests; (ii) steeper diffusion S-curves for new standards and methods; and (iii) weaker sensitivity of innovation outputs to monetary volatility, consistent with better insulation of entrepreneurial judgment from correlated error. Where historical data permit, the same constructs can be built backward—mechanics' institute density (Inkster 1975), circulation of technical periodicals (Jacob 1997), or the geographic reach of learned societies (Goodman 1994)—and matched to adoption histories in steam, textiles, and machine tools (Rosenberg 1982; Mokyr 2009; Hounshell 1984).

None of this denies the value of conventional R&D measures; it re-weights the portfolio toward the social metabolism that turns conjectures into routines. A polity that protects the commons of discovery should exhibit high proposal density, quick and honest feedback, and broad, fast diffusion under open standards—outcomes that can be observed without imputing motives or elevating a hero class. In Mises's terms, one then sees monetary calculation operating at scale: plans proposed in abundance, graded in timely prices and reputations, corrected through loss, and multiplied through imitation (Mises 1949). In Hayek's terms, one sees competition as a discovery procedure rather than a state of affairs (Hayek 1978). In McCloskey's and Phelps's terms, one sees the rhetoric and values that dignify small bets reflected in the very frequencies of trial and correction (McCloskey 2010, 2016; Phelps 2013; Phelps et al. 2020). And in Mokyr's terms, one sees the Industrial Enlightenment's institutions alive in new mediums: letters become forums and forges; priority rules become preprints and issue trackers; prize essays become bug bounties and standards ballots (Mokyr 2002, 2016).

The practical virtue of this program is twofold. It supplies leading indicators that policy can plausibly move—interface openness, procurement contestability, bankruptcy efficiency, publication norms—rather than chasing outputs with subsidy. And it disciplines interpretation: when proposal density is low, feedback is slow, and diffusion lags, the diagnosis is constitutional before it is cultural or financial. The republic of entrepreneurs is not a metaphor but a measurable order.

11 Synthesis with Hayek, Kirzner, and the History of "Useful Knowledge": Why a Republic of Entrepreneurs

The analysis to this point has been deliberately Misesian: it starts from purposive action under uncertainty, makes monetary calculation the logical precondition for rational appraisal, and treats profit and loss as society's feedback on the accuracy of entrepreneurial judgments (Mises 1949). To complete the picture—and to motivate the phrase republic of entrepreneurs as more than a trope—we braid this core with Hayek's account of dispersed knowledge and competition-as-discovery, Kirzner's micro-mechanics of alertness, and the historical scholarship that shows how "useful knowledge" is actually produced, disciplined, and diffused. The result is a constitutional political economy of innovation in which ideas move through the republic of letters and the republic of science into the republic of entrepreneurs, and in which openness of entry, interoperability of interfaces, and publicity of methods are not luxuries but load-bearing institutions (Polanyi 1962; Hayek 1945, 1978; Mokyr 2002, 2009; McCloskey 2016; Phelps 2013).

Hayek's contribution clarifies why Mises's monetary-calculation premise is not only necessary but also generative. If the knowledge relevant to production, invention, and improvement is widely dispersed, often tacit, and time-sensitive, then no planner or monopolist can assemble it in advance; it must be elicited by rules that let many actors try and that translate their partial local insights into publicly legible signals (Hayek 1945). Prices, reputations, and contract terms are not mere transfer prices or administrative records; they are discovery devices. Competition is therefore a process whose very point is to reveal facts no one held in full beforehand (Hayek 1978). Mises's calculation argument makes that process possible by giving would-be appraisers commensurable units with which to weigh alternatives; Hayek explains why the process must be decentralized and rivalrous if it is to surface the missing information at all. Joined, the two arguments say: create a legal and monetary constitution that (i) keeps prices honest and bankruptcy real, (ii) protects entry and exit, and (iii) minimizes discretion, and you will systematically manufacture discovery. The "republic" metaphor is literal: rules—not rulers—do the coordinating.

Kirzner tightens the microeconomics of that discovery. Where Mises speaks of entrepreneurial appraisal and responsibility, Kirzner identifies the mechanism that starts the engine: alertness to previously unnoticed price, quality, or locational discrepancies (Kirzner 1973, 1979, 1989). Alertness is episodic and ubiquitous; it is not the proprietary faculty of a heroic founder, but a cognitive posture available to nurses redesigning handoffs, machinists refining jigs, buyers re-bundling logistics, coders recombining open-source modules. In a setting where entry is open and imitation is lawful, these micro-discoveries propagate quickly: arbitrage closes pure price gaps, process tweaks spread along supply chains, and successful product adjustments are copied until their rents are competed away. Kirzner thereby supplies the missing hinge between Misesian cal-

culation and Hayekian discovery: residual claimancy under honest prices makes alertness pay; rivalry makes it general rather than clerical. A society rich in such moments is, operationally, a society with high proposal density and short error-to-learning latencies—the empirical signatures our measurement program sought to capture.

History then provides the external validity and the institutional blueprint. Mokyr's Industrial Enlightenment relocates the modern growth engine away from a thin court of inventors and toward a thick ecology that braids propositional claims (science) with prescriptive "recipes" (shop practice), coordinated by priority, persuasion, and replication (Mokyr 2002, 2009, 2016). Goodman's Republic of Letters, Jacob's account of scientific culture, Grafton's studies of scholarly communities, and Polanyi's "republic of science" describe the self-governing venues—correspondence, prize essays, journals, clubs—through which conjectures were made public, criticized, and stabilized (Goodman 1994; Jacob 1997; Grafton 2009; Polanyi 1962). Hounshell's history of the American system, Khan's evidence on "democratic invention," and Thomson's micro-histories of nineteenth-century machinery show how liberal patent rules, cheap print, and active markets for technology turned disclosure into a teachable, tradable public good without extinguishing first-mover gains (Hounshell 1984; Lamoreaux and Sokoloff 1999; Khan 2005, 2020; Thomson 2009). The German science–shop fusion around Zeiss–Abbe–Schott institutionalized feedback loops between laboratory and factory without discretionary privilege (Abbe 1899; Feldenkirchen 1994). Biomedical cases—insulin, penicillin, pacemakers, dialysis, nucleoside-modified mRNA—replay the same braid in the twentieth century: priority and peer scrutiny in science, voluntary disclosure through journals and conferences, and entrepreneurial scaling under quality systems and capital discipline (Bliss 1982; Bud 2007; Jeffrey 2001; Nalin and Cash 1968; Weissman and Karikó 2005). In each setting, what mattered was not a protected "haven" but the public architecture that paid for disclosure, honored priority, and legalized imitation after finite terms. The republics of letters and science primed the pump; the republic of entrepreneurs multiplied the water.

McCloskey and Phelps add the cultural–motivational layer that sustains this constitution over time. McCloskey's trilogy argues that the Great Enrichment required a rhetorical revolution that dignified the commercial and inventive life, lowering the psychic cost of entry into proposing and making imitation honorable (McCloskey 2006, 2010, 2016). Phelps's dynamism thesis complements this by linking values of self-expression and initiative to measurable differences in job satisfaction and innovation incidence across societies; prosperity is partly the compound return on small acts of curiosity distributed widely through the workforce (Phelps 2013; Phelps et al. 2020). Read together with Mises–Hayek–Kirzner, these claims cease to be mere "cultural add-ons": they become predictions about proposal density and feedback speed. Where rhetoric esteems improvisation and norms protect criticism, alertness is more common; where property is secure and entry contestable, alertness is more often actionable; where publication pays in esteem and IP teaches then expires, diffusion is faster. The constitutional and cultural strands are complements.

This synthesis also clarifies what the Schumpeterian image gets wrong. If knowledge is dispersed and discovery is elicited by rivalry, then sheltering incumbents for long "havens" dulls the very devices that surface missing facts; monopoly is neither necessary nor sufficient for high inventive productivity (Hayek 1978; Mises 1949). If entrepreneurial action is a role rather than a rank, then concentrating our analytical gaze on elite labs understates the social metabolism—adoption, recombination, process improvement—that produces most gains (Rosenberg 1982; David 1990; Bresnahan and Trajtenberg 1995; Levinson 2006). And if cycles are often monetary–financial coordination phenomena, then technology clusters need not be the prime impulse, even when they are historically salient (Friedman and Schwartz 1963; Friedman 1968). A republic-of-entrepreneurs framing does not deny disruptive breakthroughs; it relocates their social payoff into the openness of the system that proposes, tests, and copies them.

Finally, the synthesis guides practice. If the three republics reinforce one another, policy should protect their junctions: rule-bound procurement and licensing that keep entry open; interoperable standards that lower complement-search costs; IP that teaches and expires on time; publication norms that reward priority while honoring replication and negative results; bankruptcy regimes that return assets quickly to higher-valuing uses; and monetary constitutions that minimize correlated error in intertemporal signals (Polanyi 1962; Hayek 1960; Khan 2020; McCloskey 2016). These are not industrial missions; they are constitutional commitments that manufacture discovery by multiplying juries and shortening the time between conjecture and verdict. Measured the right way—by proposal density, feedback velocity, and diffusion breadth—they are visible.

Thus completed, the argument is simple. Mises provides the calculus, Hayek the epistemology, Kirzner the mechanism, and the historians the working institutions; McCloskey and Phelps explain the rhetoric and motives that keep citizens stepping forward. Put together, they describe not a court of heroes but a republic—of letters, of science, and of entrepreneurs—in which prosperity is the emergent property of many people, under general rules, proposing and being copied when right.

12 Conclusion

This paper has argued that the most faithful description of modern prosperity is not Schumpeter's court of heroic disruptors but a republic of entrepreneurs—a constitutional, cultural, and epistemic order in which many actors, under general rules, are free to propose, quickly tested by prices and peer criticism, and lawfully copied when they are right. The Schumpeterian metaphors endure because they dramatize displacement; they mislead when they reify innovation as an elite act sheltered by monopoly, or when they ascribe macro fluctuations primarily to clustered breakthroughs. Read through Mises's analysis of entrepreneurial appraisal under monetary calculation, Hayek's account of dispersed knowledge

and competition-as-discovery, Kirzner's micro-mechanics of alertness, and the historical record synthesized by Mokyr, McCloskey, and Phelps, a different picture emerges. Discovery is elicited by rivalry, rendered legible by prices and publication, multiplied by lawful imitation, and sustained by a rhetoric that dignifies making and improving. In such a polity, creative destruction is better understood as creative multiplication.

The theoretical payoffs are three. First, entrepreneurship is a role, not a rank. Profit and loss are not rewards for social standing or firm size; they are verdicts on judgments under uncertainty. Treating entrepreneurship as a civic function reveals why small, modular improvements by non-elites account for much of productivity growth and why open entry and contestability are not optional luxuries but the very machinery of progress. Second, innovation is a braid of discovery and diffusion. General-purpose technologies yield social returns only with long tails of complementary investments in organization, skills, and standards; publication norms, interoperable interfaces, and IP that teaches then expires are load-bearing institutions of growth. Third, cycles are largely monetary–financial coordination phenomena that can amplify or dampen a near-continuous portfolio of small bets; they do not require technology clusters as their prime impulse. These propositions align theory with the granular histories of Britain, the United States, France, Germany, and modern biomedicine, where the republics of letters, science, and entrepreneurs repeatedly reinforced one another.

The policy upshot is constitutional rather than technocratic. If discovery is manufactured by rules, then progress is not bought with privilege; it is multiplied by keeping proposal costs low and feedback honest. Secure and alienable property, predictable contract enforcement, freedom of entry and exit, interoperable standards, contestable procurement, and publication and IP regimes that reward priority while honoring diffusion are the civic infrastructure of enrichment. Monetary constitutions that minimize correlated error in intertemporal signals are complements, not afterthoughts. None of this asks the state to pick winners; it asks the polity to maintain a commons of discovery where many can try and where errors are cheap and quickly recognized.

The empirical program that follows is equally practical. Measuring proposal density, feedback velocity, and diffusion breadth makes visible the "invisible half" of growth—process improvements, organizational learning, and adoption. Tracking standard adoption curves, replication and negative results in science, supplier co-development depth, defect-discovery cycle times, and the dispersion of profit and loss across firms can discipline claims about dynamism more than patent counts or R&D headcounts alone. These metrics will also sharpen development policy, which too often over-invests in laboratories and under-invests in law for strangers, open interfaces, and civic esteem for the shop and the stall.

Schumpeter's durable insights remain: novelty displaces incumbents, finance enables scaling, and culture conditions the supply of attempts. But none requires elitism, monopoly havens, or wave-driven macro dynamics. The modern economy's distinctive achievement is a constitutional order in which ideas move from letters to laboratories to workshops and factories under rules that pay for

disclosure and protect imitation after finite terms. To describe that order as a republic is not rhetoric. It is an analytic claim about how dispersed knowledge is mobilized, how judgment is tested, how errors are corrected, and how private insight becomes public wealth. To keep it is a constitutional task—one that belongs to economists when we measure well, to policymakers when we legislate generally, and to citizens whenever we notice, propose, and accept the verdict of being copied when we are right.

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