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ARTICLES

Calculation Without Prices, Money Without a Past: Toward a Misesian Theory of Institutional Bootstrapping

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This article offers a unified reconstruction of two central theses of Ludwig von Mises—the impossibility of economic calculation under socialism and the regression theorem of money—by interpreting both as instances of a single logical problem: the institutional bootstrapping of coordinating functions. Coordination in the strict Misesian sense requires a common scale expressed in disciplined numbers; yet such numbers cannot be assumed, because their discipline depends on the very catallactic process to be explained. In the socialist case, the issue is not arithmetic or computing power but the institutional inability to generate market money prices for capital goods and factors, without which entrepreneurial appraisement, opportunity-cost comparison across heterogeneous projects, and systematic error correction through profit and loss are impossible. In the monetary case, the regression theorem is clarified as a logical reconstruction of the noncircular foundation of the purchasing power of existing money: Expectations of acceptability must be anchored in prior prices and, ultimately, in prior nonmonetary valuations. Beyond the regression theorem, monetization is analyzed as a praxeological process of selection by relative marketability, understood as repeated preference for the medium of exchange that (given perceived monetary properties) reduces exchange costs and risks under uncertainty. The framework yields a common criterion for assessing contemporary debates on fiat continuity, legal privileges, central bank digital currencies, and bitcoin monetization.

Two of Ludwig von Mises's most influential theses are typically read separately: the argument for the impossibility of economic calculation under socialism and the regression theorem of money. This article offers a unified reading of both, arguing that they share the same logical structure.

The economic calculation argument holds that market money prices for factors of production cannot be formed in the absence of private ownership of the means of production and a competitive market for capital goods. Without money prices for higher-order goods—capital goods, land, and complementary factors—the entrepreneur lacks a basis for imputing costs, comparing alternative production plans, and assessing opportunity costs across projects. The result is not the impossibility of bookkeeping or technical calculation, but

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the impossibility of operational economic calculation in complex economies (Mises [1920] 1990, chaps. 2–3, [1922] 2007, 120–29, 131–33, [1949] 1998, 694–97; Salerno 1990, 41–46; Huerta de Soto [1992] 2015, 170–80, 191–96).

The regression theorem addresses a parallel difficulty in monetary theory. If money is demanded because it has purchasing power, and it has purchasing power because it is demanded, the explanation becomes circular. Mises argues that expectations about future purchasing power are formed from purchasing power observed in the past, so that "yesterday" and "today" represent distinct magnitudes and the explanandum is not smuggled into the premises. Conceptually, the chain traces back to the first moment at which the good was used as a medium of exchange; purchasing-power expectations are thus anchored only in prior, nonmonetary valuations (Mises [1912] 1953, 120–21, [1949] 1998, 405–8).

Both theses are instances of a more general logical problem: the institutional bootstrapping of coordinating functions.[1] In its simplest form, the problem is this: If an economy requires a common scale—a structure of market money prices—to compare heterogeneous alternatives (projects, inputs, risks, time horizons), where does that scale come from, and what disciplines it? Economic calculation is not merely "doing the math"; it operates with magnitudes that incorporate relative valuations, scarcity, substitution, and opportunity costs. Likewise, money is not merely a "unit"; it is an instrument whose acceptability rests on expectations about its future purchasing power. In both cases, coordination requires numbers—but not just any numbers: It requires numbers that are anchored and subject to correction through a process of formation and revision.

The central thesis of this article is that Mises refutes the same illegitimate leap in both domains: the attempt to obtain coordinating outcomes (calculation, prices, purchasing power) without the institutional process that generates them. Under socialism, the leap takes the form of prices without markets: Administered or simulated prices replace competitive price formation—and the discipline imposed by profit and loss—without emerging from exchange of capital goods. In monetary theory, the analogous leap takes the form of purchasing power without a past: A medium of exchange is presented as if its acceptability could arise ex nihilo, by pure convention or by decree, without a history of exchange that enables convergent expectations about its future purchasing power.

1 On terminology: I use *institutional bootstrapping* as a modern label for Carl Menger's ([1883] 1985, bk. 3, 129–59) account of "organic" (unintended) social institutions: Such institutions emerge and stabilize through processes in which early practices generate the conditions required for wider coordination. This usage is consistent with Mises's ([1912] 1953, [1949] 1998) treatment of money and market prices as institutions that arise from exchange and are not posited by administrative fiat or mere convention.

This unified approach does not aim to add a new argument against socialism or to offer yet another defense of the regression theorem. Its contribution is different: It reframes the common Misesian core as a *Misesian theory of institutional bootstrapping*—an account of how numbers with coordinating capacity emerge and become disciplined—showing that calculation and regression share the same logical structure. This reconstruction is especially pertinent today for two reasons. First, nonmarket planning schemes—rebranded in contemporary language (big data, machine learning, real-time optimization)—tend to revive the promise of "coordination by design" that Mises's argument denies at its root: The issue is not computational power, but the institutional generation and validation of the data relevant for calculation. Second, contemporary monetary debate—over fiat money, legal tender, central bank digital currencies (CBDCs), and bitcoin—repeatedly returns to the foundation of purchasing power: Is state decree sufficient? Is a convention sufficient? What counts as "prior nonmonetary demand"? How does the first price of an incipient monetary asset emerge?

Two clarifications help avoid common confusions. First, the calculation argument does not deny that a planner can produce numerical tables; it denies that such tables can play the role of market prices for capital goods in a dynamic, uncertain environment in which error must be detected and corrected rapidly. Second, the regression theorem does not assume that agents know economic theory, nor does it establish a historical dogma; its scope is logical: to explain the purchasing power of money without tautology. When one traces back conceptually to the first use of the good as a medium of exchange, it follows that, at that time, expectations of purchasing power could arise only from nonmonetary valuations and prior exchange ratios. And this makes subsequent expectation formation intelligible.

With this framework in view, it becomes clearer why certain influential objections to Mises's theses remain insufficient if they do not answer the institutional bootstrapping problem. The chartalist claim that taxes create demand for the currency may illuminate nominal demand and the persistence of a monetary system already in operation, but it leaves open the decisive question for calculation and coordination: How is the structure of relative prices formed and disciplined? Similarly, the assertion that money arises by convention is, at best, incomplete: A coordinating convention requires a shared reference that enables convergence of expectations, and that reference cannot appear without a history of exchange or without some service or use that functions as an initial anchor.

Bitcoin provides a contemporary test case that clarifies what the bootstrapping problem requires. The debate over whether bitcoin satisfies the regression theorem is often impoverished by two shortcuts: equating nonmonetary demand with physical consumption or industrial use and assuming that bitcoin was born as a medium of exchange. As argued in Serrano (2025, sec.

5.5), the latter hypothesis is logically untenable: Media of exchange do not "begin" as such; they are instituted progressively, and their acceptability presupposes prior use values and a process of exchanges that crystallize into prices. In bitcoin's early history, various forms of subjective use value can be identified—intellectual, ideological, altruistic, and speculative in a broad sense—including the expectation that it might eventually function as a peer-to-peer electronic cash system (Nakamoto [2008]). Exchange value emerges from exchange and becomes socially operative when the first market prices appear. Yet the existence of prices and exchange value does not by itself imply monetary function: The good must attain sufficient salability (marketability) before it can be used as an indirect medium of exchange. It is precisely this sequence—from prior use values through early exchanges that generate initial prices and exchange value to rising salability and eventual use as an indirect medium of exchange—that builds the yesterday of purchasing power required for subsequent monetary coordination.

The article proceeds in several steps. It first establishes the conceptual framework—coordination, a common scale of monetary calculation, and the notion of "disciplined numbers"—and then reconstructs Mises's calculation argument against socialism and his regression theorem of money. On that basis, it articulates their shared logical structure as an institutional bootstrapping problem and applies the criterion of anchoring and discipline to contemporary monetary issues (fiat continuity, legal tender and taxation, CBDCs, and bitcoin). Before concluding, it offers brief replies to recurrent objections to Mises's theses (conventionalism, decree, shadow prices, and equilibrium models). It then concludes by emphasizing the same requirement in both domains: Both monetary calculation and money require an institutional yesterday, not as a historical detail, but as a necessary condition for a nontautological structure of monetary calculation and coordination.

The underlying thesis is simple and demanding: If Mises is taken seriously, the relevant question is not whether we can write down numbers, but where the numbers that coordinate come from. Once posed without evasions, that question naturally connects the critique of socialism with the logical reconstruction of the foundation of money's purchasing power.

Finally, it is worth positioning this proposal relative to the existing literature. Mises ([1912] 1953) already suggests the link between a monetary yesterday and coordination: Purchasing power is anchored in prior prices—"A medium of exchange without a past is unthinkable" (Mises [1949] 1998, 423)—and economic calculation is conditioned by changes in that purchasing power. Recent Austrian literature has extensively discussed the scope of the regression theorem in relation to fiat money and bitcoin, while other discussions start from premises outside of Austrian School theory. The specific contribution of this article is not to reiterate those debates—as has been done in Serrano (2022) and Bagus and Serrano (2023)—but to isolate a unifying criterion—the

institutional bootstrapping of numbers with coordinating capacity—and to show that the same illegitimate leap reappears, mutatis mutandis, in both prices without markets and purchasing power without a past.

Conceptual Framework: Coordination, Common Scale of Monetary Calculation, and Disciplined Numbers

To read the Misesian calculation argument and the regression theorem as instances of a single problem, it is necessary to establish a shared analytical vocabulary. The article's unifying claim—that both respond to the bootstrapping problem of coordinating institutions—requires careful distinctions between technical calculation and economic calculation, between accounting magnitudes and prices, and between mere accounting figures and numbers disciplined by a catallactic process of market formation and correction with coordinating capacity.

Catallactic and Price Coordination, and Monetary Calculation Under Uncertainty

By "coordination" I mean the possibility of acting rationally in the strict economic sense: imputing and comparing heterogeneous production plans by means of monetary calculation, and revising them when error is revealed. In Mises's analysis—and in Salerno ([1991] 2010, 182–84, 189–90)—coordination is, above all, a property of the catallactic process: the structure of realized money prices that emerges from exchange and supplies the quantitative data required for entrepreneurial appraisement. Because foresight is fallible, losses are inevitable alongside profits; yet they operate precisely for that reason as a corrective device: They expose error and select relatively more accurate appraisements, redirecting scarce means toward employments expected to better satisfy consumer valuations.

Such coordination therefore presupposes a common denominator that renders qualitatively heterogeneous magnitudes commensurable. In monetary economies, that denominator is provided by money prices—crucially, by the money prices of capital goods and factors of production—because only in this way can actors compute opportunity costs, compare alternative lines of production across time, and decide whether a project is worth undertaking relative to competing uses of resources.

Technical Calculation and Economic Calculation

"Calculation" is used in two distinct senses. Technical calculation refers to physical/engineering computation with homogeneous magnitudes (tons, kilowatts, hours, cubic meters) and answers what is physically feasible and by which technical combinations. Economic calculation, by contrast, concerns scarcity and mutually exclusive alternatives: It compares competing uses of scarce resources through a money-denominated structure of prices that incorporates relative valuations and opportunity costs; it does not answer

whether something can be done, but whether it is worth doing relative to alternatives. In this article, "monetary calculation" refers to economic calculation conducted through market money prices—its necessary form in complex, capital-using economies—not to a third category distinct from technical and economic calculation.

This distinction is essential to Mises's calculation argument: Socialism may possess abundant technical calculation, yet it lacks the institutional conditions that make economic calculation possible when capital goods must be allocated among competing lines of production.

The mere production of larger or more detailed numbers does not create the economic content those numbers are supposed to convey. Just as a monetary authority can redenominate the unit or expand nominal balances without thereby generating real purchasing power—since purchasing power depends on a structure of money prices formed in exchange—so a planning authority can generate accounting tables without thereby generating the disciplined money prices that make monetary calculation possible in the market.

A Common Scale, the Numeraire, and Prices: What Kind of "Number" Coordinates?

Coordination in a monetary economy employs a common scale expressed in monetary units (the numeraire). What matters, however, is not the unit as such but the structure of market money prices that makes it operational as a basis of comparison. Money prices perform this function by enabling cost imputation within projects, expected-profitability comparison across alternative projects, and revision of entrepreneurial appraisements through profit-and-loss feedback.

This does not mean that any numerical table or any accounting system can play the role played by market prices. To avoid this confusion, I distinguish between mere accounting numbers and numbers with a coordinating function.

Disciplined Numbers: An Operational Definition

By "disciplined numbers," I mean magnitudes (prices, money costs, exchange rates, margins) that are institutionally tied to real choices and real consequences. They are disciplined insofar as they arise from actual exchanges rather than through stipulation, are acted upon under private property so that error bears wealth consequences, are continuously revised through profit-and-loss feedback that serves as a selection criterion, and remain sufficiently comparable across time and uses to guide reallocation as conditions change.

This definition avoids two extremes. It rejects the formalism that equates calculation with the mere availability of numbers. It also avoids an unproductive subjectivism that denies any informational function to prices because they are not perfect. "Disciplined" does not mean infallible; it means corrigible by a process that penalizes error and rewards success.

The Institutional Bootstrapping Problem: Where Do the Numbers That Coordinate Come From?

With the notion of disciplined numbers in place, the institutional bootstrapping problem can be stated precisely: A coordinating institution requires disciplined numbers, yet disciplined numbers cannot be presupposed, because their discipline depends on the very institutional process to be explained.

In the case of economic calculation, bootstrapping refers to the institutional possibility of forming money prices for capital goods and factors of production. In the monetary case, bootstrapping refers to the institutional possibility of anchoring convergent expectations about the purchasing power of a medium of exchange. In both domains, a recurrent analytical temptation appears: to treat coordinating numbers as "data" available by design (administration, decree, pure convention) rather than as emergent results of a catallactic market process of formation and correction.

Anchors, Past Prices, and Expectations: Yesterday as a Functional Condition

In this article, an "anchor" is any reference (e.g., the economic meaning of a factor price or the purchasing power of money) that prevents expectations about a number from being self-referential. An anchor does not guarantee stability or remove uncertainty; it guarantees something more basic: a noncircular reference that permits a workable convergence of expectations.

In economic calculation, the anchor takes the form of an ongoing history of capital exchanges that gives factor prices effective relative meaning and renders them subject to correction through profit and loss. In the regression theorem, the anchor takes the form of a history of exchanges that links current purchasing power to prior prices, tracing back to a stage in which demand was nonmonetary. In neither case does "yesterday" represent historical nostalgia; it is the minimal condition for a nontautological structure of monetary calculation and for a process that can get underway.

Implication for the Remainder of the Article

This framework supplies a common criterion for evaluating two classes of proposals and thus a simple diagnostic. Proposals of prices without markets may produce figures, but not an equivalent mechanism of discipline. Accounts of purchasing power without a past presuppose convergent expectations without providing a noncircular anchor.

The criterion developed above is now applied in two domains. Mises's calculation argument is reconstructed as a problem of missing disciplined numbers for capital goods, and the regression theorem is clarified as a solution to the bootstrapping of purchasing power. The result is a unified structure: Coordination emerges only when an institutional sequence generates and disciplines the numbers required for calculation.

The Economic Calculation Argument: Why Socialism Makes Calculation Impossible

The following analysis reconstructs Mises's argument for the impossibility of economic calculation under socialism as a paradigmatic instance of the institutional bootstrapping problem developed above. The claim is not that a socialist system lacks bookkeeping, statistics, or computational capacity. The claim is narrower and more precise: It lacks the institutional conditions required for disciplined numbers—money prices for capital goods and factors—to emerge. Without such numbers, economic calculation, understood as the comparison of alternative production plans under scarcity, cannot be carried out in an operational sense (Mises [1920] 1990, chaps. 2–3, [1922] 2007, 120–29, 131–33, [1949] 1998, 694–97; Salerno 1990, 41–46; Huerta de Soto [1992] 2015, 170–80, 191–96).

Throughout, "economic calculation" is used in Mises's strict sense: monetary calculation based on market money prices for capital goods and factors, as employed in entrepreneurial appraisement and tested by profit and loss. This is not a stipulative definition added to Mises's thesis; it is the content of what is at issue. In a complex, capital-using economy, technical computation and bookkeeping can establish physical feasibility and enumerate possible input combinations, but they cannot, by themselves, render heterogeneous means commensurable in terms of opportunity cost. Only money prices formed in exchange under private property supply the common denominator required to compare alternative projects and to expose errors to correction through gains and losses. Redefining "calculation" as physical bookkeeping plus central optimization changes the subject and no longer addresses the Misesian problem of how the relevant money prices are generated and disciplined (Mises [1920] 1990, chaps. 2–3, [1949] 1998, 230–31, 694–700, 706–11; Salerno 1990, 39–41, 45–47).

What Economic Calculation Requires in a Complex Economy

In a complex economy, production is essentially indirect and temporal: Heterogeneous capital goods, labor of diverse qualities, and natural resources are combined under entrepreneurial judgment and with specialized know-how in processes that take months or years and culminate in consumer goods. The economically relevant choice is not merely whether production techniques are physically feasible (technical calculation), but which among the feasible alternatives is economically preferable—that is, which economizes most on relatively scarcer factors and yields outputs valued by consumers more highly than the resources sacrificed.

At a minimum, economic calculation requires imputation (valuing higher-order goods in light of expected consumer-goods values), comparison of heterogeneous projects across time, and an operative correction criterion by which errors are revealed and systematically filtered through profit and loss.

These operations require a common unit of calculation, and in monetary economies that unit is expressed through money prices. What matters is not money as a symbol, but the existence of a market price system that enables comparison and correction.

The Core of the Argument: Capital Goods, Private Property, and Money Prices

Mises's argument focuses on the domain where socialism introduces the decisive rupture: the means of production—capital goods and land. Mixed regimes may allow exchange of consumer goods and may even generate prices for consumer goods; the central problem appears where there is no market for factors and capital goods.

The argument proceeds by a simple institutional sequence. Without private property in the means of production, capital goods and land lack alienable titles; without alienable titles, competitive exchange of capital goods is absent or severely restricted; without such exchange, market money prices for capital goods (and, by derivation, complementary factors) do not form; without those prices, monetary calculation—cost imputation and opportunity-cost comparison across heterogeneous projects—cannot be carried out operationally; and without monetary calculation, productive coordination, now based on arbitrary or noneconomic criteria, tends to collapse, with systematic discoordination and waste.

In this sense, socialism attempts to operate as if prices were data available by design, whereas in fact they are the result of an institutional process (exchange under private property) that socialism itself abolishes.

Why Accounting Tables Are Not Prices: Accounting, Administered Prices, and Shadow Prices

A recurring objection to Mises's theses—associated with the Langean tradition of "market socialism" and with general-equilibrium approaches—holds that the planner can replace market price formation with formal methods (administratively set prices, statistically estimated coefficients, or computed shadow prices derived from an optimization problem) and thereby perform economic calculation (Lange 1936, 1937). The Misesian reply—stated in the terms of this article—is that such figures do not satisfy the conditions for disciplined numbers.

PRICES WITHOUT BIDDING: NO PRICE-FORMATION PROCESS

Market prices result from competitive interaction—offers, demands, rivalry, and bargaining—in which agents test valuations and constraints under uncertainty. A "price" fixed without that interaction may serve as an accounting convention, but it lacks the key property of a market price: It is not the outcome of a price-formation mechanism.

NO PROFIT AND LOSS: NO SELECTION CRITERION

In the market, the entrepreneur who misallocates scarce factors incurs losses; the one who allocates them well earns profits. This differential is not merely informative; it is a selection mechanism. A system without effective private ownership of capital, without bankruptcy, and without decision-makers bearing the financial consequences of their choices eliminates (or decisively weakens) the link between decision and consequence. Without that link, administratively determined price figures lack the profit-and-loss feedback that makes market prices institutionally corrigible.

THE CIRCULARITY OF SHADOW PRICES

The classic response proposes that the planning authority compute a set of shadow prices for capital goods and factors by solving a system of equations or an optimization problem. Yet mathematical consistency is not the same as institutional availability. In such constructions, the planner must treat preferences, technologies, and resource constraints as given data; the resulting vector of magnitudes labeled "prices" merely restates those assumptions in numerical form. Mises's point is institutional: In the real world, the valuations that matter for heterogeneous capital goods are not given to anyone and cannot be validated by fiat. Even under a static, no-change assumption, a socialist system that does not inherit an existing money-price structure cannot generate the initial structure of factor prices required for monetary calculation. Those valuations are discovered, contested, and corrected through exchange under private property, with profit and loss selecting among competing entrepreneurial appraisements. The issue is not whether numbers can be computed, but whether they are exposed to an operative test that filters error.

Absent that catallactic discipline, shadow prices may serve as internal bookkeeping conventions, but they cannot perform the coordinating role of market money prices for capital goods and factors (Mises [1920] 1990, chaps. 2–3, [1949] 1998, chap. 26, secs. 3, 5–6; Salerno 1990, 45–47).

Consumer Goods Versus Capital Goods: Why the Failure Is Upstream in the Structure of Production

A key qualification must be emphasized: The existence of prices for consumer goods—or even relatively free markets for consumer goods—does not solve the problem. The reason is structural. Productive coordination depends crucially on the allocation of higher-order goods (capital goods) because capital choices set long-run production trajectories and determine which productive options will be available in the future. Without money prices for capital goods, there is no way to compare, for example, whether it is preferable to intensify investment in machinery A or B, to adopt a more indirect (more time-intensive) method, or to economize on labor at the cost of employing more capital goods. Discoordination, therefore, is not a marginal defect; it is a defect at the level of higher-order goods (capital goods), where the intertemporal structure of production is determined.

The Argument as an Institutional Bootstrapping Problem: Disciplined Numbers and the Money-Price Structure of Economic Calculation

Given the framework developed above, the core of the argument is straightforward. Economic calculation requires money prices for factors of production that function as disciplined numbers. Yet such disciplined numbers presuppose an institutional process—private property, competitive exchange, and correction through profit and loss—that socialism removes. Socialism may therefore produce figures, but it cannot produce disciplined numbers—numbers with coordinating capacity.

The same institutional bootstrapping problem reappears in monetary theory: There it takes the form of purchasing power without a past, whereas here it takes the form of prices without markets. In both cases, the illegitimate leap consists in attempting to obtain the coordinating function without completing the institutional sequence that makes that function possible.

The economic calculation argument is not a thesis about the ignorance of planners or about insufficient computational power. It is a thesis about the impossibility of replacing—by design—an institutional mechanism of price generation and correction that makes economic calculation possible in complex economies. In the absence of a market for capital goods, "prices" cease to be disciplined numbers and instead operate as administrative conventions. The common scale required to compare alternative projects—the structure

of market money prices—is thereby broken, and coordination ceases to be an emergent process and instead becomes an assertion lacking operational foundation.

The Regression Theorem: Bootstrapping Purchasing Power and the Foundations of the Medium of Exchange

In the monetary domain, the institutional bootstrapping problem is addressed by Mises's regression theorem. The aim here is not to provide a history of money or an exhaustive typology of its forms, but to clarify the logical structure of the argument: The acceptability of a medium of exchange presupposes expectations about its purchasing power, and such expectations cannot arise from a circular explanation. The regression theorem breaks that circle by anchoring money's purchasing power in prior prices, tracing back to a stage in which the good was demanded for nonmonetary reasons (Mises [1912] 1953, 120–21, [1949] 1998, 405–8).

The Problem to Be Solved: Acceptability and Expected Purchasing Power

In a monetary economy, accepting money is not an act of direct consumption but an instrumental act. One accepts a monetary unit because one expects to exchange it later for goods or services. This expectation is necessarily comparative: It involves some notion—however rough—of what that unit can buy (Mises [1912] 1953, 97–99, 108–10, [1932] 1990, 61). Accordingly, the demand for money is linked to its expected purchasing power, and expected purchasing power is intelligible only if a noncircular reference exists that can serve as an anchor. Without such a reference, the claim "This is money" lacks operational content: One may have a monetary artifact—a token or sign, even a unit of account for bookkeeping purposes—but not a common and generally accepted medium of exchange.

Circularity in Its Simplest Form

The difficulty arises when one attempts to explain the value of money solely by reference to its monetary function. In its most elementary form, the circle is simple: X is demanded as money because it has purchasing power, and it has purchasing power because it is demanded as money. This statement adds no explanatory content; it merely restates the relation it purports to explain. The problem is not psychological or rhetorical but logical. If purchasing power depends on monetary demand, how can the initial, significant monetary demand arise without a prior notion of purchasing power?

The Misesian Solution: Regressing to Yesterday and the Nonmonetary Anchor

The regression theorem resolves the problem by a logical regression of the purchasing-power explanation, not by a historical narrative of money's emergence. Today's purchasing power is accounted for by reference to yesterday's purchasing power and so on until one reaches a stage in which the good was already traded at exchange ratios and was demanded for reasons that did not depend on its acceptability as a medium of exchange.

At that stage, the good's value was determined by nonmonetary motives (direct use, functional utility, "consumption" demand in a broad sense). Circularity is thereby broken: Monetary demand can arise because a basis of valuations and prices already existed from which agents could form an estimate of what the good could buy. This step is crucial. The theorem does not assert that money must be a physical commodity in a narrow sense. It asserts that there must be a premonetary anchor that makes the initial formation of purchasing-power expectations intelligible.

Use Value, Exchange Value, Monetary Function, and Money

For conceptual precision, it is useful to distinguish four elements that are often conflated. "Use value" refers to the subjective valuation of a good insofar as it can satisfy needs directly. Accordingly, use values that precede a good's first use in indirect exchange are demand motives that do not depend on the good's acceptability as a medium of exchange. "Exchange value" refers to the subjective valuation of a good insofar as it can be exchanged for other goods and thus contribute to the indirect satisfaction of needs; it emerges through exchange and becomes socially operative when exchanges crystallize into market prices (exchange ratios). "Monetary function" denotes the use of a good as an indirect medium of exchange, which requires a sufficient degree of salability. "Money," finally, denotes a common and generally accepted medium of exchange.

In light of this distinction, the scope of the regression theorem must be specified. It is not a historical explanation of the emergence of money as an institution—a genetic narrative that traces a linear path from prior use values to generalized acceptability. Rather, it is a logical reconstruction of the foundation of the purchasing power of money already in existence: Purchasing-power expectations are traced back to prior prices and, ultimately, to prior nonmonetary valuations (see Serrano 2025, sec. 5.5.2, for a critique of "conjectural history" interpretations).

The Unit of Account Does Not Solve the Problem: Nominal Numeraire Versus Purchasing Power

A common way of evading the problem is to claim that defining a unit of account suffices for money to exist. But a nominal unit of account does not, by itself, determine what it can buy on the market. It can facilitate internal bookkeeping, but it does not generate purchasing power. The Misesian point is that money, as a medium of exchange, requires a history of prices (a yesterday) that anchors expectations and a process of exchange that disciplines those expectations.

Hence, pure nominal convention does not explain institutional bootstrapping; at best, it presupposes precisely what it ought to explain: the convergence of expectations about purchasing power.

The Theorem as an Institutional Bootstrapping Problem: Purchasing Power Without a Past

In light of the foregoing framework, the core of the argument can be summarized as follows. The structure is straightforward: A medium of exchange requires acceptability; acceptability presupposes expected purchasing power; expected purchasing power is intelligible only if it is anchored noncircularly; and that anchor resides in prior prices and, ultimately, in prior nonmonetary valuations.

Therefore, any account that presents money as emerging ex nihilo by decree or by pure convention, without a history of exchange, commits the same illegitimate leap identified in socialism: It seeks the coordinating function without completing the institutional sequence that produces it. Under socialism the leap is prices without markets; here it is purchasing power without a past.

The Case of Bitcoin: Monetization Sequence and the Construction of Yesterday

Viewed through the anchoring-and-discipline criterion developed above, bitcoin's early trajectory can be interpreted as a concrete case of institutional bootstrapping rather than stipulation. Prior subjective use values supplied the initial nonmonetary anchor; early exchanges generated the first market prices and thus a minimal yesterday of purchasing power. As that price history accumulated and exchange costs fell, bitcoin's relative salability increased, and it began to function nonmarginally as an indirect medium of exchange. Acceptability therefore emerged gradually, with purchasing-power expectations disciplined by observable prices rather than posited by pure convention or decree.

Discussion of whether bitcoin satisfies the regression theorem is often impoverished when "nonmonetary demand" is equated exclusively with "physical consumption or industrial use," and it goes further astray when bitcoin is treated as if it had been born a medium of exchange. Serrano (2025, sec. 5.5) avoids both shortcuts by reconstructing the monetization sequence: prior use values independent of acceptability as a medium of exchange; the emergence of exchange ratios and market prices through early exchanges (and thus of exchange value in a socially operative sense); and progressive use as an indirect medium of exchange as salability rose, with acceptability widening over time and potentially becoming generalized. This sequence allows monetization to be interpreted as the construction of a yesterday of purchasing power—and thus as compatible with the logical core of the regression theorem—without requiring a restrictive notion of "use" as physical consumption (Serrano 2022; Bagus and Serrano 2023).

Synthesis: The Logical Scope of the Regression Theorem

The regression theorem is neither a historical thesis nor a genetic theory of money; it is a logical argument about the conditions of possibility of money's coordinating function. Its aim is not to explain how money "appears," but to identify the noncircular anchoring that renders purchasing power intelligible and thereby orients expectations. Without prior use values, without exchange, and without market prices that register those valuations, monetary acceptability lacks an operational basis. As in the economic calculation problem, the error consists in attempting to obtain the coordinating function—here, money as a common medium of exchange—without completing the institutional sequence that makes that function possible. The monetary problem is therefore an institutional bootstrapping problem: not a problem of issuing tokens or defining nominal units, but one of generating and disciplining the numbers that coordinate.

Unification: Institutional Bootstrapping as Mises's Common Structure

The preceding analysis has presented two Misesian diagnoses that are often considered in isolation and therefore appear heterogeneous: One concerns the impossibility of economic calculation under socialism; the other concerns the foundation of money's purchasing power. Properly understood, however, they share the same logical structure. Both are instances of the institutional bootstrapping problem for coordinating functions. In both domains, Mises denies that a coordinating function (money prices or a medium of exchange) can be obtained without the institutional sequence that generates and disciplines the relevant numbers.

The Unifying Thesis

The article's unifying thesis can be stated as follows. A system of economic coordination requires a common scale of calculation—that is, the structure of market money prices—embodied in disciplined numbers; but such numbers cannot be presupposed, because they emerge only from a prior institutional process (competitive exchange under private property) that administrative design cannot replace without loss of function.

This is not an empty generalization. When applied to both Misesian cases, it yields a precise correspondence and exposes the same type of mistake: treating as available by decree or convention what, for Mises, can only emerge from an institutional process.

Two Illegitimate Leaps: Prices Without Markets and Purchasing Power Without a Past

In the socialist case, the illegitimate leap consists in presupposing—by administrative decision—the money prices that make imputation and the comparison of alternative production plans possible. Economic calculation requires disciplined money prices for capital goods and factors, yet such prices emerge only from the institutional process formed by private property, competitive exchange of capital goods, and correction through profit and loss. The leap is to replace that process with administrative numbers (fixed prices, shadow prices, or bookkeeping conventions) while expecting them to perform the coordinating function market prices perform in a market economy.

In the monetary case, the illegitimate leap is to treat purchasing power as an initial premise, as if acceptability could be posited without a prior price history to anchor expectations. The acceptance of a medium of exchange presupposes expected purchasing power, and those expectations must be anchored in prior prices and, ultimately, in prior nonmonetary valuations. Ex nihilo accounts attempt to stipulate the monetary function (by decree or pure convention) while skipping the institutional sequence through which price history and salability make purchasing power intelligible.

In both cases the ambition is the same: to obtain the coordinating function without the mechanism that produces it.

Structural Correspondence Between Economic Calculation and Monetary Bootstrapping

The unification becomes clearer once each argument is reconstructed as an institutional bootstrapping sequence and the point of interruption is identified. In the calculation case, the sequence runs from private property in capital goods and land to competitive exchange of capital goods to the emergence of money prices for capital goods and factors as disciplined numbers, and therefore to economic calculation (imputation, project

comparison, correction) and productive coordination. Socialism breaks this sequence at its first link: By abolishing private property in capital goods and land, it disables the downstream formation of disciplined money prices.

In the monetary case, the sequence runs from prior use values (nonmonetary demand) to exchange and the appearance of initial market prices (exchange value) to rising salability—which can support nonmarginal use as an indirect medium of exchange—and to broader monetary coordination. Salability is comparative and reflects agents' repeated choice of the medium whose perceived monetary qualities best reduce exchange costs and risks under uncertainty. Ex nihilo accounts skip the sequence and declare the monetary function—and acceptability—directly.

Stated in structural terms, the correspondence is straightforward. In both domains, a coordinating function depends on disciplined numbers, and disciplined numbers arise only from an institutional sequence that generates prices through exchange and subjects appraisements to an operative test. In the calculation case, the relevant arena is the market for capital goods and factors: It yields money prices that make entrepreneurial appraisement and opportunity-cost comparison possible, while profit and loss supply the correction mechanism that filters error. In the monetary case, the relevant arena is early exchange of the would-be medium: It yields a price history that anchors purchasing-power expectations, while selection by relative salability disciplines acceptability over time. Administrative substitutes in either domain—administered/shadow prices or purely nominal decree/convention without an anchor—attempt to skip that sequence and therefore produce figures without the coordinating force of market-generated prices.

Administrative Numbers and Market Prices: Why Coordination Requires Disciplined Numbers

The structural correspondence developed above isolates the same error in both domains: confusing the nominal availability of numbers with the availability of numbers capable of coordinating. Both socialist planning and ex nihilo accounts of money can generate numerical magnitudes. What is missing is their institutional linkage to actual exchanges, to property, and to an operative criterion of correction.

To state the distinction without shifting into a generic information problem, it is useful to distinguish two cases. One concerns administrative numbers: figures fixed or imputed through bookkeeping, optimization, or administrative decision. They may be internally coherent and useful as administrative conventions, but they do not, by themselves, perform the role of prices, which is to guide imputation, project comparison, and error correction under scarcity. The other case concerns market prices, understood as disciplined numbers: figures that emerge from real exchanges under private property and inform entrepreneurial appraisements subject to profit-and-loss feedback. In

that sense, they do not merely inform: They enable economic calculation because they incorporate—imperfectly but operatively—relative valuations and opportunity costs, and because they expose projects to a selection criterion that penalizes error and rewards success.

On this reading, the problem of socialism is not lack of information in the abstract. It is more specific: By eliminating the market for capital goods, socialism eliminates the procedure that forms money prices for factors and higher-order goods, thereby removing the numerical basis required to impute and compare productive alternatives in economic terms.

And the problem of ex nihilo money is not primarily lack of trust but the absence of a noncircular anchor that makes purchasing power intelligible. Without a yesterday of prices and without a process of exchange that allows expectations to converge and be corrected, the acceptability of the medium of exchange becomes a premise rather than a result subject to social discipline.

In both domains, the issue is not whether numbers exist, but whether disciplined numbers exist—and that discipline cannot be decreed.

Methodological Implications: What Counts as an Explanation in Economic Calculation and in Money

The unified reading has an immediate methodological implication: It forces a distinction between describing an institution and explaining its possibility. In both domains, many formulations merely posit the coordinating result ("The planner fixes prices"; "The authority defines the unit"; "The community accepts the medium of exchange") while leaving untouched the relevant questions: which institutional process generates disciplined numbers and which mechanism corrects error.

In the domain of economic calculation, an explanation cannot stop at the existence of accounting magnitudes. The Misesian core requires showing how money prices for capital goods and factors are formed, and how those magnitudes are subjected to an operative selection criterion—profit and loss. Without that criterion, bookkeeping can exist, but economic calculation—imputation, project comparison, and correction—lacks a foundation.

In the monetary domain, an explanation cannot stop at the existence of a nominal unit of account (a nominal numeraire) or an accounting convention. The logical core of the regression theorem shows how the purchasing power of money already in existence regresses to prior prices and, ultimately, to prior use values that break the circle. And within the same domain but beyond the regression theorem, the conversion of a good into a medium of exchange is subject to selection by relative salability—that is, to a praxeological process of action and choice of means under uncertainty. When its relative salability

surpasses that of competing alternatives, the good can perform the medium-of-exchange function nonmarginally, with its acceptance widening over time and potentially becoming general.

It is important to add that this "selection by relative salability" operates as a disciplining mechanism only insofar as acceptability is subject to competitive choice. Where acceptability is legally secured or reinforced by privileges (e.g., taxation, legal tender, or regulatory restrictions), observed high salability may partly reflect that institutional structure and does not, by itself, constitute evidence of relative monetary suitability selected on the market.

Accordingly, the Misesian methodological criterion can be stated as follows: A theory explains when it identifies the institutional bootstrapping sequence that makes the coordinating function possible and when it specifies the mechanism through which the relevant numbers are exposed to correction. Absent that requirement, explanations degenerate into postulates: They replace the process with a label ("price," "money," "unit") or with an act ("fix," "decree," "adopt") without showing the operational foundation that renders the coordinating role intelligible.

Synthesis: One Impossibility, Two Domains

With the framework now in place, the unification can be stated without metaphor: Mises identifies the same impossibility in two different domains. Under socialism, the impossibility takes the form of economic calculation without market prices for capital goods; in the monetary domain, it takes the form of purchasing power without a yesterday of prices. In both cases, the illegitimate leap consists in assuming that numbers with coordinating capacity can be obtained without the institutional sequence that generates them and without the mechanism that disciplines and corrects error.

This unified reading adds neither a new argument against socialism nor a new defense of the regression theorem. Its contribution is structural: It shows that both arguments share the same logic of institutional bootstrapping. At the same time, the division of labor within the monetary domain should be made explicit: The regression theorem provides the noncircularity required to explain purchasing power (the anchor), while monetization describes the selection process by relative salability, through which a good comes to perform the medium-of-exchange function nonmarginally (discipline). Both elements are complementary within the institutional bootstrapping problem.

On this basis, the analysis now turns to contemporary implications—fiat money, legal tender, taxation, CBDCs, and bitcoin—in light of the criterion formulated here: anchoring and discipline as conditions of possibility for disciplined numbers and, therefore, for economic coordination.

Contemporary Implications: Fiat, Legal Tender, Taxation, CBDCs, and Bitcoin Under the Institutional Bootstrapping Criterion

The unified reading proposed in this article does not aim to "settle" contemporary monetary debates by mere analogy with Mises. Its aim is more modest and more demanding: to provide a criterion of evaluation. Which theories account for institutional bootstrapping and for the discipline of purchasing power, and which merely presuppose them? The relevant question is not whether a monetary system can exist by legal imposition or by convention, but whether it can generate and sustain disciplined numbers capable of coordinating expectations and supporting monetary calculation in a dynamic environment.

Fiat and Historical Continuity: Why National Currencies Do Not Come from Nothing

A first consequence of the institutional-bootstrapping criterion is that many debates about fiat money are framed misleadingly, as if today's national currencies had emerged out of nowhere. In historical and institutional terms, modern fiat regimes operate based on inheriting a monetary yesterday. Even when the link to a commodity is severed—through the suspension of convertibility or the abandonment of the gold standard—the system does not start from scratch. It inherits an existing structure of money prices, contracts, and balance sheets denominated in the preexisting monetary unit, as well as established payment practices and a preexisting degree of monetary acceptability (Mises [1912] 1953, 110–13; Rothbard [1963] 2005, 75–78).

In the terminology of the regression theorem, this means that today's purchasing power rests on yesterday's purchasing power, and that the fiat regime can be understood, to a large extent, as institutional continuity rather than creation from scratch. The Misesian criterion does not require denying the possibility of fiat money as such; it requires avoiding the circular account that treats its purchasing power as if it arose from nothing, without a yesterday of prices. The focus therefore shifts to discipline: which mechanisms correct expectations and errors and how the coordinating capacity of the numeraire is preserved—or eroded—over time.

Legal Tender: Legal Coordination Versus Economic Coordination

The term "legal tender" introduces a useful distinction: Legal coordination is not the same as economic coordination. The state may define a unit for legal obligations, impose it for debt settlement, and regulate issuance or circulation. Such powers can facilitate legal coordination and nominal adoption (and may reduce the costs of legal settlement), but they do not by themselves generate the structure of relative prices or the mechanisms of correction through which the numeraire becomes economically coordinating in the Misesian sense (Mises

[1912] 1953, 70–71, [1978] 2011, 3–4, [1990] 2007, chap. 43; Rothbard [1963] 2005, 63–64, [1994] 2007, 137–38; Huerta de Soto [1998] 2009, 651–52). The institutional-bootstrapping criterion therefore treats legal tender as a mechanism of nominal adoption, not as a substitute for market price formation and correction.

To state this strictly, legal tender can establish rules about what medium is accepted to extinguish obligations, but it does not automatically determine how much that medium buys or how projects must adjust as relative scarcities change. Hence, any theory that makes purchasing power rest exclusively on legal tender tends to presuppose what is essential: the social formation of prices and the anchoring of expectations.

Chartalism: What It Explains and What It Leaves Open

The chartalist claim that taxes create demand for the currency captures a real mechanism: The need to pay taxes in a given monetary unit can sustain a minimal demand for that unit and thereby contribute to its persistence as a means of payment in the fiscal sphere and, by extension, in private transactions.

However, the unified Misesian criterion helps specify the scope of the claim. Tax obligations can sustain nominal demand for the unit and help coordinate a settlement standard for certain obligations, but they neither bootstrap purchasing power in the absence of a prior price history nor guarantee the discipline of relative prices in a changing environment.

In particular, even if one grants that taxes generate a base demand, the decisive question for economic calculation and coordination remains open: How are relative prices formed and corrected in a dynamic environment? The fiscal mechanism does not replace the market process in generating prices with coordinating capacity; at most, it can coexist with that process or rely on it. For this reason, the chartalist explanation may be relevant to the persistence of and nominal demand for an already-existing currency—that is, within a monetary order already in operation—but it does not eliminate the logical problem of institutional bootstrapping when one posits nominal creation from scratch without a yesterday of prices.

Central Bank Digital Currencies: Monetary Digitalization and the Limits of Coordination by Decree

CBDCs provide a particularly revealing case for the institutional-bootstrapping criterion: an explicit, programmatic attempt to redesign the technology and regulation of the monetary infrastructure. The crucial distinction is between innovation in the payment rail and issuance channel, on the one hand, and in the foundation of purchasing power and the mechanisms that discipline expectations, on the other.

A CBDC implemented as a digital version of an existing monetary unit inherits, like fiat money, a yesterday of prices. In that case, the bootstrapping problem is not creating purchasing power from scratch but preserving (or modifying) the discipline of monetary numbers. Here the Misesian criterion is especially useful for evaluating risks: If the redesign increases discretion and weakens correction mechanisms (e.g., by interfering with price formation through controls, restrictions, or directed allocation), it may impair the coordinating function of the numeraire even if it does not eliminate nominal purchasing power.

In sum, the Misesian analysis is not opposed to digitalization per se; it is opposed to the illusion that administrative redesign can replace the emergent mechanisms of formation and correction.

The anchoring-and-discipline criterion also clarifies what is—and is not—at stake in the contrast between CBDCs and bitcoin. A CBDC implemented as a digital version of an existing unit inherits a monetary yesterday by design; the central question then concerns how policy rules and legal privileges affect the discipline of monetary numbers. Bitcoin, by contrast, did not inherit an established price history; its purchasing power had to become intelligible through early exchanges and a progressively thickening set of observable prices, and its acceptance as a medium of exchange depended on a competitive process of selection by relative salability. In both cases, the decisive issue is institutional: whether the relevant numbers are anchored and exposed to correction, not whether the payment rail is "digital."

Bitcoin: Anchor, Salability, and Progressive Monetization

Bitcoin is the contemporary case that most clearly exposes the difference between having a token (an issued digital asset) and bootstrapping a medium of exchange. Under the institutional-bootstrapping criterion, the question is not whether bitcoin is "good" or "bad," but whether its trajectory can be described as a sequence compatible with the Misesian requirements of anchor and discipline.

The analytical reconstruction in Serrano (2025) allows an affirmative answer without resorting to a narrow notion of use. First, bitcoin exhibited prior subjective use values—intellectual, ideological, and broadly speculative, including expectations about the system's potential—that did not presuppose acceptance as a medium of exchange. Second, as early exchanges began to occur at explicit prices, exchange value became socially operative, and a minimal yesterday of prices emerged, rendering purchasing-power expectations intelligible. Third, conversion into an indirect medium of exchange was progressive: The existence of prices did not yet imply monetary function, since monetization additionally requires sufficient salability. As salability

increased—through thicker markets, more robust infrastructure, wider acceptance, and lower transaction costs—the asset could begin to perform monetary functions nonmarginally.

This framework also allows a further clarification. Even if bitcoin is not the dominant medium of exchange, it can perform monetary functions in partial domains: Beyond its moderate or sectoral use as a medium of exchange, it can operate as a store of value, collateral, or even a unit of account in niches, insofar as its salability and its yesterday of prices sustain relatively stable expectations for those uses. Monetization, understood in this way, is not an instantaneous switch but a gradual process of selection by relative salability.

Convergences and Limits: What the Institutional-Bootstrapping Criterion Teaches

The institutional-bootstrapping criterion yields five implications. First, fiat regimes with historical continuity inherit a yesterday of prices, so the concern is primarily discipline and coordinating capacity over time. Second, pure decree or convention without a price history confronts circularity unless a nonmonetary anchor or emergent price history exists. Third, taxation and legal tender can sustain nominal demand and coordinate legal obligations but do not substitute for the market process that forms and corrects relative prices. Fourth, CBDCs implemented as digital versions of existing units inherit an established yesterday; the question becomes whether redesign preserves or weakens disciplinary mechanisms. Finally, bitcoin illustrates the gradual construction of a yesterday and monetization through rising salability, making it consistent with the regression theorem insofar as diverse prior use values can be identified and a strict distinction is maintained between the emergence of prices and the performance of the monetary function. From the standpoint of the institutional-bootstrapping problem, contemporary monetary debate can be reorganized around a common question: Which institutions generate disciplined numbers capable of coordinating expectations and supporting economic calculation?

National currencies tend to rely on historical continuity and on legal and fiscal frameworks that facilitate nominal adoption. Yet the capacity of money prices to support economic calculation depends on genuine market exchange in capital goods and factors, together with an institutional framework in which entrepreneurial appraisements are subjected to an operative profit-and-loss test and those who commit capital bear the financial consequences of their decisions. Monetary and credit interventions that distort relative prices or shield selected actors from losses can undermine this discipline, misdirect investment, and shift costs onto other entrepreneurs, savers, and consumers. More broadly, discretionary monetary expansion and institutional support for privileged financial arrangements may weaken the discipline of saving and credit, redistribute purchasing power in less visible ways, and allow the costs of financial maladjustment to be postponed or shifted onto other economic

agents. In this sense, the costs are not merely allocative or distributive, but also institutional: Monetary discretion can weaken the constraints on banking and public finance and increase the scope for political and administrative intervention (Serrano 2025, secs. 6.4, 6.5.3; Serrano 2026, 20–24).

Bitcoin, in turn, illustrates how a yesterday of purchasing power can be constructed from subjective use values and early prices, and how the medium-of-exchange function emerges only when salability reaches a sufficient threshold. In both cases, the Misesian criterion emphasizes the same point: Monetary coordination is not a foundational act, but the outcome of a market process in which acceptability and purchasing power are formed and corrected through exchange.

Before the article concludes, it is useful to register brief replies to three recurrent objections to Mises's theses, in order to clarify what the institutional-bootstrapping criterion does—and does not—claim.

Brief Replies to Common Objections to Mises's Theses

A recurrent objection holds that general-equilibrium models, optimization routines, or data-driven methods, including machine-learning forecasts, could replace markets in coordinating production (Lange 1936, 1937; Dapprich and Cockshott 2023). Yet a formal proof that an equilibrium price vector exists (Arrow and Debreu 1954) or the computation of forecasts and shadow prices is not equivalent to the market formation of money prices for capital goods and factors. Such prices arise through exchange under private ownership, while entrepreneurial appraisements are disciplined by an operative profit-and-loss test in which those who commit capital bear the financial consequences of their decisions. In the absence of these institutional conditions, computed figures alone cannot substitute for the market money prices required for economic calculation (Mises [1920] 1990, [1949] 1998; Huerta de Soto [1992] 2015).

A second objection claims that taxation and legal tender suffice to create money and sustain its value (Knapp [1905] 1924; Innes 1913, 1914; Wray 1998). Such powers can support nominal demand and coordinate legal obligations, but they do not by themselves determine purchasing power across markets or supply the market-generated price structure required for economic calculation; where acceptability is legally reinforced, observed salability alone does not establish that it results from competitive market selection (Mises [1912] 1953, 70–71; Rothbard [1963] 2005, 63–64).

Finally, conventionalist accounts treat money as a self-fulfilling equilibrium (Samuelson 1958; Kiyotaki and Wright 1989). This equilibrium may describe stabilization once a yesterday of prices exists, but it does not remove the need for a noncircular anchor for purchasing-power expectations. Read through the same criterion, bitcoin's early trajectory can be interpreted as a gradual bootstrapping from prior use values to early prices and rising relative salability (Serrano 2025; Bagus and Serrano 2023).

Conclusion: Where Do the Numbers That Coordinate Come From?

This article has proposed a unified reading of two central theses of Ludwig von Mises—the argument for the impossibility of economic calculation under socialism and the regression theorem of money—showing that both respond to the same logical problem: the institutional bootstrapping of coordinating functions. In both domains, coordination requires a common scale expressed in numbers; what matters is not the existence of mere numbers but the existence of *disciplined* numbers—magnitudes generated within a market process and within institutions that connect decisions with consequences and expose error to correction.

In the domain of economic calculation, the Misesian thesis does not deny that a planner can compile statistics, inventories, or numerical tables. It denies that in the absence of private property and a market for capital goods, the relevant money prices for factors—prices that make it possible to impute economic value to complex productive combinations, compare alternative projects under scarcity, and correct errors systematically through the operative criterion of profit and loss—can be generated. Socialism, therefore, fails not because it lacks arithmetic, but because it lacks the institutional mechanism that generates and disciplines the numbers required for calculation in a complex economy.

In the monetary domain, it is essential to specify the scope of the regression theorem: It is not a historical explanation of the emergence of money as an institution, but a logical reconstruction of the noncircular foundation of the purchasing power of already-existing money. The acceptability of a medium of exchange presupposes expectations about what it can buy; and such expectations cannot be sustained by a circular account that derives the value of money exclusively from its monetary function. Regression breaks that circularity by tracing purchasing power regressively to prior prices and, ultimately, to prior use values independent of monetary acceptance. At the same time, this article has emphasized that the appearance of prices and exchange value does not automatically imply monetization: The function of an indirect medium of exchange emerges only once the asset achieves sufficient salability. On this view, bitcoin can be interpreted coherently as a contemporary case of the gradual construction of a yesterday of purchasing power and of selection by relative salability—understood as a repeated preference for a medium that, given its perceived monetary properties, reduces exchange costs and risks under uncertainty—without requiring a restrictive notion of use as physical or industrial use.

The proposed unification clarifies why a range of familiar "solutions"—administered prices, shadow prices, monetary decree, pure nominal convention—tend to leave the central issue untouched. In all these cases, an institutional sequence of formation and correction is replaced by a stipulation. But economic coordination is not a result that appears by decree

or by nominal convention: It depends on institutions that generate comparable magnitudes and subject them to correction. Under socialism, the attempt takes the form of prices without markets; under money ex nihilo, it takes the form of purchasing power without a past. The error is the same: mistaking mere accounting figures for disciplined numbers capable of coordinating.

A direct methodological implication follows. A theory of economic calculation or of money is not satisfactory if it merely describes end states ("There are prices"; "There is money") or if it relocates the problem into definitions ("It is money because it is accepted"; "There are prices because we set them"). A satisfactory theory must explain how the common scale—that is, the structure of market money prices—is formed and what disciplines its magnitudes over time. Read in this way, Mises appears as a theorist of a shared requirement: Coordination emerges only when an institutional sequence produces numbers that make it possible to compare alternatives under scarcity and to correct errors in a dynamic environment.

This framework also helps order contemporary discussions. In the case of fiat money, historical continuity and the legal/fiscal framework can facilitate nominal adoption and sustain a base demand; but this does not imply that observed salability automatically equals competitive discipline, since part of that salability may be legally secured. In the case of CBDCs, digitalization per se does not solve the problem: What matters is whether administrative redesign preserves or weakens the mechanisms through which monetary numbers retain—or lose—coordinating capacity. And in the case of digital assets, the decisive question is not whether the instrument exists, but whether the institutional sequence is completed that makes its purchasing power intelligible and its function as a medium of exchange nonmarginal.

Ultimately, the question that connects the critique of socialism with monetary theory is as simple as it is demanding: Where do the numbers that coordinate come from? Taken seriously, that question not only orders the classical debate on economic calculation and regression; it also disciplines future debates on monetary policy, administrative intervention in the numeraire, and processes of monetization. Wherever one seeks to replace the process with decree or convention, the Misesian criterion compels us to ask—before questions of intent or technology—about institutional bootstrapping and about the correction mechanism. Those are, precisely, the conditions of possibility of nontautological coordination.

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