

Calculation Blackout Zones

Programmable Money and the Fragmentation of Calculation

I. The Unseen Edit

Money speaks. Every transaction whispers a preference, a valuation, a fragment of knowledge no planner could assemble. When a buyer hands over coins for bread, the price that emerges is not a mere number; it is a signal that ripples outward, touching the miller, the farmer, the futures market for wheat. All of it linked in a single conversation, denominated in a common tongue. The market order depends on this conversation remaining unedited.

Now imagine the state does not merely tax, regulate, or prohibit. Imagine it rewrites the grammar of money itself. A central bank digital currency is programmed to reject certain transactions at the point of payment—not because a compliance officer flags them, but because the code refuses to execute. A bottle of wine, a donation to a controversial cause, a payment to a cryptocurrency exchange: the digital currency simply will not move. The seen effect, as Hazlitt would remind us,¹ is frictionless enforcement of some public goal. The unseen effect is that the price of what was blocked can no longer enter the dominant monetary conversation. It is silenced before it can speak.

I call this silence a calculation blackout zone: a domain where transactions cannot enter the principal settlement network, so the integrated prices that ordinary entrepreneurial calculation needs can no longer form. In what follows, I advance two independent arguments. The first, extending Mises, shows that programmable exclusions fragment the common denominator of calculation in a way that no earlier intervention could. The second, building on Hayek and Huerta de Soto, shows that the same exclusions suppress the spontaneous evolution of alternative monetary institutions that might otherwise fill the void. The analysis concerns central bank digital currencies endowed with transactional restrictions that occupy the dominant settlement position; it does not claim that every proposed CBDC has these features. What it does claim is that when the state writes code into the medium of exchange, it edits the knowledge markets produce. That edit, once made, is invisible to the very price system it damages.

II. Calculation Blackout Zones

Mises demonstrated that a socialist economy cannot calculate because it lacks market prices for capital goods. Without a common denominator in which to compare heterogeneous costs and benefits, the planner is reduced to guessing.² The deeper premise is that money prices form an integrated price system, a network of exchange ratios, expressed in a single unit, that emerges from voluntary trade. Its defining property is direct commensurability: an entrepreneur can compare the expected revenue of a project with its costs in the same unit without forecasting the relative value of two monies.

¹ Henry Hazlitt, *Economics in One Lesson* (New York: Harper & Brothers, 1946), ch. 1.

² Ludwig von Mises, *Socialism: An Economic and Sociological Analysis*, trans. J. Kahane (London: Jonathan Cape, 1936), pt. 2; Mises, *Human Action: A Treatise on Economics* (New Haven: Yale University Press, 1949), ch. 26.

A socialist economy lacks such a system entirely. A programmable CBDC extinguishes it selectively, creating localised zones where the integrated price signal goes dark.

Where a programmable CBDC prohibits a category of transaction, the entrepreneur's legally relevant accounting unit, the principal settlement network, can no longer generate an integrated price for that category. Any price formed outside that network cannot substitute, because it cannot be directly compared with the liabilities that define the entrepreneur's legal and financial obligations.

The dominant unit is the network in which taxes are demanded, contracts enforced, and interbank obligations settled. It is the unit in which the entrepreneur's ultimate obligations are legally extinguished. Mises himself, in *The Theory of Money and Credit*, argued that money is fundamentally the medium of payment, the thing in which debts are discharged.³ The state, by designating the unit for tax payment and court judgments, establishes it as the final settlement medium for all obligations the legal system will enforce. An entrepreneur may appraise a project in any numéraire she chooses, but its viability is ultimately tested against liabilities that must be settled in the state-sanctioned medium. Tax authorities do not accept Bitcoin; courts do not award damages in foreign currency unless specifically contracted; creditors can force settlement in the domestic unit. The profit-and-loss calculus that determines whether the venture can continue must therefore be expressed in that unit.

Multinational firms allocate capital using a global reporting currency while filing taxes in many local currencies, but each subsidiary retains access to its own local settlement network. The entrepreneur in a blackout zone cannot do the same. The network link is severed, and with it the ability to bring internal appraisals into the settlement unit without introducing a separate, legally irremediable dimension of uncertainty.

A price in another medium must be translated into the settlement unit to enter the legally relevant profit-and-loss calculus. Translation introduces an exchange-rate forecast whose uncertainty is orthogonal to the supply-and-demand conditions of the good. More fundamentally, translation cannot replicate the finality of settlement. A forward exchange contract can lock in a rate, but it cannot lock in the legal acceptance of the converted funds for tax payment or court-ordered restitution. The state's settlement unit alone extinguishes legal obligations directly. Any price formed outside it remains one step removed from the closure of the entrepreneurial decision cycle.

Thus the legally relevant accounting unit becomes the epistemic anchor because the institutional framework, rather than the entrepreneur's preferences, privileges one unit above all others. When programmable exclusion denies access to that unit for a category of transaction, it severs the link between productive activity and the settlement of legal obligations.

What if an entire sector migrates to Bitcoin, with workers paid in it, suppliers accepting it, debt denominated in it? Even then, the firm's legal existence remains denominated in the state's unit of account. The Bitcoin balance sheet must be translated into that unit for tax filing, regulatory compliance, and legal claims. The translation reintroduces the severance. The alternative price system is internally coherent but externally incommensurable with the legal framework. The accounting gap has not been closed; it has moved.

³ Ludwig von Mises, *The Theory of Money and Credit*, trans. H.E. Batson (London: Jonathan Cape, 1934), ch. 1, §3.

This reveals the theorem's precise nature: the legally relevant integrated price, the price directly comparable with formal liabilities in the medium that extinguishes them, can no longer form within the principal settlement network. Any alternative price system is separated by an institutional gap that market liquidity cannot bridge.

Parallel currency systems (Switzerland with franc and euro, Argentina with peso and dollar)⁴ do not involve a structural prohibition on using the principal settlement unit. A Swiss firm invoicing in euros can still convert into francs and compare with franc costs. Under a programmable CBDC, the transaction cannot enter the principal settlement network at all.

Sufficiently deep alternative markets may provide liquid prices, but convertibility does not guarantee settlement finality. A spot rate cannot eliminate uncertainty about the exchange rate at future tax or debt dates. Forward contracts and swaps hedge market risk but not institutional uncertainty, including changes in tax law, legal status of the alternative medium, or reporting requirements.⁵ Moreover, hedging introduces counterparty risks enforceable only through the dominant legal framework. The entrepreneur adds another layer of contracts but never escapes the principal settlement network.

The integrated price required for rational calculation is not merely a convertible price, but one directly comparable with formal liabilities inside a single accounting framework. Liquidity enables conversion; it does not restore direct comparability.

Multinationals maintain access to each relevant settlement network; no subsidiary is excluded from its own principal network. Historical episodes of monetary fragmentation—bimetallism, free banking, hyperinflations⁶—were general, affecting all transactions and allowing new settlement conventions to evolve. A calculation blackout zone is selective: too narrow to generate its own alternative legal settlement conventions.

Mises acknowledged black market prices under socialism but denied that they enable rational calculation, because they are parasitic on the surrounding unhampered order.⁷ In a blackout zone the parasitic relationship is inverted: as more domains are excluded, the integrated order contracts and alternative prices lose their anchors.

If the reasoning holds, the absence of a legally relevant integrated price in the common settlement system is a structural obstacle to rational calculation. Calculation is not impossible in the absolute sense Mises reserved for full socialism, but it is systematically fragmented to a degree that erodes the profit-and-loss mechanism's guiding function.

⁴ On parallel currency systems, see F.A. Hayek, *Denationalisation of Money: The Argument Refined*, 3rd ed. (London: Institute of Economic Affairs, 1990).

⁵ On the limits of hedging as a substitute for monetary integration, see Jesús Huerta de Soto, *Money, Bank Credit, and Economic Cycles*, trans. Melinda A. Stroup (Auburn, AL: Ludwig von Mises Institute, 2006), ch. 2.

⁶ On bimetallism and free banking, see Lawrence H. White, *Free Banking in Britain: Theory, Experience, and Debate, 1800–1845*, 2nd ed. (London: Institute of Economic Affairs, 1995); on hyperinflation and currency substitution, Jörg Guido Hülsmann, *The Ethics of Money Production* (Auburn, AL: Ludwig von Mises Institute, 2008), ch. 9.

⁷ Mises, *Socialism*, pt. 2, §2; Mises, *Human Action*, ch. 26, §3.

III. Why Programmable Money Is Different

Previous interventions distorted prices but left the monetary network intact. Programmable money selectively prevents prices from entering the legally relevant accounting network. That changes the epistemic structure of calculation, not merely incentives.

State action affecting the monetary order may take three broad forms. The first is automation. Tax software, customs systems, and similar technologies enforce general legal rules while leaving money itself neutral. Prices continue to form within a common monetary framework, albeit under additional burdens. The second is standard economic intervention. Price controls, tariffs, and sin taxes alter the terms of exchange within that framework. Prices still emerge, but they are distorted rather than eliminated. Programmable money belongs to a third category, and it differs in kind. Here the prohibition is embedded directly in the medium through which prices are integrated. Once a programmable CBDC refuses a category of transaction, no legally relevant integrated price can form within the principal settlement network. The difficulty is not that the price signal is distorted. It is that, for the excluded transaction, the signal never enters the common monetary calculus at all.

Historically, states manipulated money—coin clipping, exchange controls, banking monopolies, SWIFT sanctions—but none altered the executable architecture of the monetary medium to prevent specific transactions at the point of exchange.⁸ Existing regulatory practices—AML de-risking, frozen payment processors, merchant category restrictions, all approach this boundary.⁹ A programmable CBDC consolidates these fragmented controls into the monetary architecture, making exclusion continuous, invisible, and automatic. The argument does not claim that entrepreneurs become incapable of judgment within blackout zones. It claims that those judgments lose access to the legally relevant integrated monetary framework that disciplines error through comparable profit-and-loss calculation.

Consider a manufacturer exporting medical equipment. Its costs—labour, debt, taxes—are all in the domestic settlement unit. The overseas distributor falls under a programmable exclusion. The final sale cannot enter that network. The entrepreneur can estimate demand and negotiate prices in alternative currencies, but cannot bring those revenues into direct comparison with formal liabilities. The accounting framework that ordinarily reveals profit or loss is fragmented across two legally incommensurable media.

Huerta de Soto's theory of dynamic efficiency shows that entrepreneurship discovers new knowledge.¹⁰ When legally relevant integrated price signals are absent, discovery is foreclosed—not through competitive failure, but through removal of the institutional precondition for discovery. The unseen cost is the innovation that never begins.¹¹

⁸ On coin clipping, see Thomas J. Sargent and François R. Velde, *The Big Problem of Small Change* (Princeton: Princeton University Press, 2002), ch. 2. On SWIFT as an instrument of financial exclusion, see Henry Farrell and Abraham L. Newman, "Weaponized Interdependence: How Global Economic Networks Shape State Coercion," *International Security* 44, no. 1 (2019): 42–79.

⁹ On AML de-risking, see Financial Action Task Force, "De-Risking," FATF Guidance (Paris, 2021). On payment processor exclusions, see *United States v. Operation Choke Point*, H. Rep. No. 115-704 (2018).

¹⁰ Jesús Huerta de Soto, *The Theory of Dynamic Efficiency* (London: Routledge, 2009), chs. 1–3; Huerta de Soto, *Socialism, Economic Calculation and Entrepreneurship* (Cheltenham: Edward Elgar, 2010), chs. 3–4.

¹¹ This applies Hazlitt's "unseen" logic at the entrepreneurial level. See Hazlitt, *Economics in One Lesson*, ch. 1; Frédéric Bastiat, "That Which Is Seen, and That Which Is Not Seen" (1850), in *Selected Essays on Political Economy*, trans. Seymour Cain (Irrington-on-Hudson: Foundation for Economic Education, 1964).

IV. The Suppression of Monetary Evolution

Independently, programmable money suppresses the spontaneous evolution of monetary institutions. Hayek argued that the state's monopoly on legal tender produces instability, and that competition between private issuers would discover more stable and innovative forms of money. Huerta de Soto systematised this as dynamic efficiency applied to institutions.¹²

A programmable CBDC intensifies the monopoly. Because taxes, interbank settlement, and regulatory compliance are all denominated in it, economic actors must use it for core functions. Alternative monies cannot interoperate with these functions and thus cannot generate the network effects needed to evolve into genuine competitors. The institutional niche is occupied; the evolutionary process that might have produced a Hayekian competitive monetary order is progressively constrained—not by legal prohibition, but by the architecture of the dominant medium.¹³

Mises showed that interventions breed further interventions. Calculation blackout zones add an epistemic dimension. Because the missing integrated prices never appear in economic data, regulators cannot perceive the distortion. The visible economy seems to function normally while blackout zones accumulate. When instability emerges, regulators attribute it to market failure and respond with further algorithmic controls, widening the zones. The spiral is self-reinforcing and invisible to the instruments of economic observation.¹⁴

V. The Knowledge That Money Must Record.

This essay has introduced the concept of calculation blackout zones to capture a phenomenon that existing Austrian categories do not fully describe: the selective fragmentation of legally relevant integrated price signals through the programming of the dominant unit of account. If the theorem advanced here is correct, this fragmentation extends Mises's calculation problem to a new, localised mechanism, and is accompanied by a suppression of the institutional evolution that might generate alternatives.

The analysis implies a clear institutional principle: the infrastructure of money should remain permissionless, general, abstract, and open, so that any lawful transaction can be conducted without algorithmic pre-authorisation. Law may penalise prohibited actions after the fact; it should not reprogramme the medium of exchange to make them structurally impossible.

¹² Hayek, *Denationalisation of Money*, chs. 3–5. For the extension to institutional competition, see Huerta de Soto, *The Austrian School: Market Order and Entrepreneurial Creativity* (Cheltenham: Edward Elgar, 2008), chs. 4–5.

On Bitcoin as spontaneous monetary evolution, see Philipp Bagus, *The Tragedy of the Euro*, 2nd ed. (Auburn, AL: Ludwig von Mises Institute, 2012), conclusion; for a broader Austrian framework, see Hayek, *Denationalisation of Money*, ch. 3.

¹⁴ Ludwig von Mises, *Interventionism: An Economic Analysis* (Irvington-on-Hudson: Foundation for Economic Education, 1998), especially chs. 1–2.

Markets require more than freedom to trade. They require a monetary order capable of recording what trade reveals. A programmable currency that selectively refuses exchange edits the knowledge markets produce. That knowledge, once erased, cannot be recovered by any planner, because no planner ever possessed it. The highest task of those who value a free society is to insist that the code of money, the code that enables prices to form, entrepreneurs to discover, and institutions to evolve, must remain a neutral recorder of human action, not an instrument of its direction.

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