ANNEX G
Supplement to PHREVO Framework Paper, Version 1.0
SSRN Abstract ID: 6614438 — DOI: 10.5281/zenodo.19666941

PHREVO and the Economic Calculation Problem: A Direct Response to Mises and Hayek

Working Paper — Political Economy / History of Economic Thought

Author
Andres Jimenez
Founder, PHREVO — Independent Research Initiative
Date
April 2026
Status
Theoretical response — requires empirical validation through the RCT protocol in Annex F
Audience
Heterodox and orthodox economists, political theorists, policy designers
Proposed integration
New Section 2.4 in PHREVO Framework Paper v1.1

Abstract

The economic calculation problem, formulated by Ludwig von Mises in 1920 and extended by Friedrich Hayek in 1945, constitutes the most durable intellectual challenge to post-capitalist economic systems. Mises argued that without market prices formed under conditions of private property, rational resource allocation is impossible because opportunity costs cannot be calculated. Hayek deepened this argument epistemically: the relevant economic knowledge is dispersed, tacit, and context-specific, and only the price mechanism can coordinate it without requiring a central planner to possess what no central planner can possess.

This annex provides the most direct and detailed response that any post-capitalist framework has offered to these arguments. It proceeds in four steps. First, it presents the Mises-Hayek argument with precision, resisting the temptation to caricature a position that has genuine force. Second, it responds to Mises by demonstrating that PHREVO is not a centrally planned economy — it has real prices formed through market mechanisms (the PHREVO-Exchange) — while conceding that these prices are anchored in impact rather than scarcity, and explaining why impact-anchored prices can be functionally rational within their domain.

Third, it responds to Hayek by showing that PHREVO incorporates dispersed local knowledge through decentralized territorial governance rather than centralized planning — while acknowledging that this mechanism operates at smaller scales and slower speeds than the price system. Fourth, it identifies three genuine limits of

the PHREVO response — the unit of account problem, the tension between centralized price signals and local deliberation, and the theoretical irresolvability of the debate — and argues that only empirical validation through the protocol in Annex F can provide a definitive answer.

The central claim of this annex is modest and honest: PHREVO is not immune to the Mises-Hayek critique, but it is the first post-capitalist framework to engage it with sufficient architectural detail to make the engagement empirically resolvable. The ball is in the critics' court: identify the logical flaws, design better experiments, or help fund the controlled trial that can settle the question.

Contents

G.1 Why Mises and Hayek Cannot Be Ignored

Any attempt to construct a post-capitalist economic system must confront the most durable intellectual challenge to market alternatives: the economic calculation problem. Every serious alternative framework — from Soviet planning to market socialism to degrowth — has had to engage with it, and most have done so inadequately, either by caricaturing the argument or by evading it entirely.

PHREVO cannot and will not evade it. There are three specific reasons why engagement is necessary.

This annex presents the Mises-Hayek argument with precision — resisting the temptation to build a straw man — responds to each component in turn, admits the genuine limits of the response, and concludes with the only answer that can be definitive: empirical testing.

G.2 The Economic Calculation Problem: Precise Formulation

G.2.1 Mises (1920): Without Market Prices, No Rational Calculation

Historical context: Mises wrote in the context of the debate over central planning in the Soviet Union and European socialist movements. His argument, in Economic Calculation in the Socialist Commonwealth (1920), was that socialism cannot rationally allocate resources because it lacks prices for the means of production.

The central argument: In a capitalist economy, prices for capital goods — machinery, raw materials, land — are formed in the market. These prices allow calculation of the profitability of different uses of resources. If you are building a factory, you compare the cost of inputs (prices) against the expected revenue from outputs (prices). That calculation tells you whether you are allocating resources efficiently.

In a socialist economy, Mises argued, the means of production are publicly owned and not exchanged in a market. Therefore, they have no prices. Without prices, there is no way to calculate whether using steel to build trains or bridges is more "valuable." All such decisions become arbitrary. Central planners can establish accounting prices, but those prices do not reflect real scarcity, supply, demand, or opportunity costs. They are fictions.

Where there is no free market, there is no pricing mechanism. Without a pricing mechanism, there is no economic calculation. Without economic calculation, there is no economic rationality.

— Ludwig von Mises, 1920

The implication: For Mises, socialism — any form of public ownership of the means of production — is economically impossible. Not difficult; literally irrational. The absence of market prices is not a correctable deficiency; it is a constitutive incapacity.

G.2.2 Hayek (1945): Knowledge is Dispersed and Tacit

Hayek accepted Mises's central argument but extended it in a more subtle and, ultimately, more powerful direction. In The Use of Knowledge in Society (1945), he argued that the problem is not only the absence of prices but the impossibility of centralizing the knowledge necessary to set rational prices.

The central argument: Economic knowledge is dispersed among millions of individuals. Each person knows things no one else knows: their preferences, their skills, the local conditions of their work, the opportunities they perceive, the obstacles they face. This knowledge is tacit (it cannot be fully articulated in a report or a database) and contextual (it only has meaning in the specific place and moment where it is generated).

No central planning office can collect all this knowledge. It is physically impossible. And even if it could — with supercomputers, big data, and artificial intelligence — it could not process it meaningfully, because the relevant knowledge is not "data" that can be aggregated; it is experiential.

The most significant fact about this system is the economy of knowledge with which it operates, or how little the individual participants need to know in order to be able to take the right action... The marvel is that in a case like that of a scarcity of one

raw material, without an order being issued, without more than perhaps a handful of people knowing the cause, tens of thousands of people whose identity could not be ascertained by months of investigation, are made to use the material or its products more sparingly.

— Friedrich Hayek, 1945

The price mechanism solves this by condensing and transmitting dispersed knowledge in a decentralized way. When the price of copper rises, you do not need to know that a mine in Chile flooded or that electric vehicle demand increased in China. The price tells you: "use less copper." That is sufficient to coordinate millions of decisions without any central planner.

The implication for alternative systems: It is not enough to have "accounting prices" or "calculated prices." The price system is not merely a calculation; it is a discovery process. Prices discover information that no central agent could know in advance. An alternative system that replaces this process with deliberation or planning faces an epistemically superior opponent.

G.2.3 The Synthesis: The Problem is Epistemic, Not Technical

The joint conclusion: any system without free markets (with private property, price formation by supply and demand, and freedom of entry and exit) is epistemically inferior. It cannot, in principle, match the informational efficiency of capitalism. This conclusion was advanced as a near-logical necessity — not a contingent empirical claim — and it is this necessity that PHREVO must address.

G.3 PHREVO's Response to Mises

G.3.1 PHREVO Has Prices (It Is Not a Centrally Planned Economy)

The first and most important clarification: Mises directed his critique primarily against central planning — the Soviet economy where Gosplan assigned quantities without reference to prices. PHREVO is not a centrally planned economy.

The response to Mises, Part 1: Your critique applies to the central planning you observed in 1920. PHREVO is not that. PHREVO has prices. The PHREVO-Exchange is a price-formation mechanism, not a planning committee assigning quantities. Buyers and sellers interact, tokens are exchanged, spreads are formed, and the Community Liquidity Fund intervenes at the bounds of the price corridor — not at its interior. These are the structural features of a market, not a plan.

G.3.2 But Prices Are Anchored in Impact, Not Scarcity

A Misesian objector will respond: "Your prices do not reflect scarcity. They reflect a designed metric (the PHREVO-Score). That is arbitrary. Real prices emerge from the free interaction of supply and demand under private property.”

This objection has force, and PHREVO does not dismiss it. The response has two components:

First component — the domain of the claim. Mises argued that prices must reflect scarcity to be rational. This is correct within the domain he specified: the allocation of rivalrous, excludable private goods. PHREVO-Exchange tokens are not private goods in Mises's sense. They are rights over flows of collectively generated resources — fiscal revenues, community contributions, philanthropic capital — that the community has already decided to allocate according to impact criteria, not scarcity criteria. Within this domain, impact-anchored prices can be functionally rational: they direct resources toward the uses that the community has determined to be most valuable.

Second component — the analogy of carbon markets. A carbon market does not reflect "scarcity of carbon." The price of a carbon credit reflects a political limit (the cap) and the relative cost of reducing emissions. Critics argued that carbon markets were not "real markets" by Mises's criteria — and they were right. But carbon markets work (imperfectly) to redirect resources toward emissions reduction. The PHREVO-Exchange is a more comprehensive impact market: it directs resources toward dignity, community, care, ecological regeneration, justice, and ethical technology. The question is not whether it satisfies Mises's definition of a real market. The question is whether it works.

G.3.3 The PHREVO-Exchange as an Alternative Price Discovery Mechanism

Mises also argued that prices cannot be "calculated" by an authority; they must be discovered through actual exchange. PHREVO accepts this fully. The PHREVO-Exchange discovers prices through:

VCG auctions (Annex E, Section E.3.3) that reveal buyers' genuine willingness to contribute to impact projects — a form of preference revelation consistent with Mises's insight that prices must emerge from real transactions.

Continuous secondary market (AMM) where prices adjust in real time based on the balance of token supply and demand — not a committee's decision.

Community Liquidity Fund operations at the corridor bounds that send aggregate supply and demand signals to the market without dictating prices in its interior.

This is not a committee setting prices. It is a real market — with buyers, sellers, liquidity, spreads, and price discovery — operating under different rules. The relevant question is not whether it satisfies Mises's precise specification of a "true market." The question is empirical: does it work to allocate resources toward positive impacts? That is the question Annex F is designed to answer.

G.4 PHREVO's Response to Hayek

G.4.1 Local Knowledge is Incorporated Through Decentralized Governance

Hayek's critique is deeper and harder to answer than Mises's. It is not enough to have "alternative prices." The impact price, even when verifiable, is still a centralized signal that cannot capture the tacit, dispersed, contextual knowledge that Hayek describes.

PHREVO's response: Hayek is correct that local knowledge cannot be fully centralized. PHREVO does not attempt to centralize it. In PHREVO, local knowledge is incorporated through decentralized governance, not through the price mechanism.

The critical difference: Hayek assumed that the only mechanism capable of coordinating dispersed knowledge is the price system — because it is anonymous, decentralized, and requires minimal communication.

PHREVO proposes that democratic deliberation in small-scale territorial assemblies can also coordinate dispersed knowledge, but not at the same scale or speed.

PHREVO does not claim to replicate the informational efficiency of the price system at the scale of a national economy. It claims to coordinate knowledge adequately within territories small enough for genuine deliberation.

G.4.2 Spontaneous Order vs. Designed Second-Order Framework

Hayek distinguished between spontaneous order (the market, which emerges without design) and designed order (an organization or plan with an explicit purpose and hierarchy). He argued that designed orders are necessarily inferior to spontaneous ones for coordinating dispersed knowledge.

PHREVO's response: PHREVO is a designed second-order framework. This is a distinction that Hayek himself recognized as legitimate. Specifically:

The rules of the system — the four pillars, the PHREVO-Score, the Exchange constraints — are designed at the constitutional level (by the PHREVO Global Assembly).

But decisions within those rules — which projects to fund, how to weight dimensions, which territorial adaptations to adopt — are decentralized to territorial assemblies.

Within each territory, interactions among agents (producers, consumers, carers) can be spontaneous and unplanned.

This is a rules-plus-governance architecture, not central planning of outcomes.

Hayek himself accepted this type of design as compatible with spontaneous order — he repeatedly argued for a constitutional rule of law framework that constrains the market without replacing it. PHREVO extends that principle: the rules of the game are common; the game itself is played by local agents.

G.4.3 The "Master Plan" Objection and PHREVO's Reply

Hayek might object that PHREVO's very ambition — designing a complete system to replace capitalism — is a form of "social engineering" that will inevitably fail through epistemic ignorance of the kind he described.

PHREVO's reply requires distinguishing two types of "master plan":

Hayek himself designed constitutional frameworks — his writings on a minimal state constitution are, ironically, a "master plan" for society in the second sense. The difference is substantive rather than formal: Hayek's framework protects private property and market freedom; PHREVO's framework protects dignity, community, and ecological regeneration. Both are designed second-order frameworks that constrain but do not replace decentralized decision-making.

G.5 The Limits of the Response: What PHREVO Cannot Yet Resolve

Intellectual honesty requires naming the places where the PHREVO response to Mises and Hayek is incomplete. There are three.

G.5.1 The Unit of Account Problem

Mises and Hayek argued not only that prices serve as information signals but that money serves as a universal unit of account — the denominator in which all prices are expressed and compared. In capitalism, money is anchored to its purchasing power over scarce goods. What is the unit of account in PHREVO?

PHREVO's answer: the PH circle (PHREVO unit), anchored to impact value, not gold or a commodity basket. But the value of impact is ultimately a social convention agreed upon by the PHREVO Global Assembly. Does this reintroduce the problem Mises identified — accounting prices without real anchoring?

PHREVO's defense: The value of the dollar, euro, or yen is also a social convention — anchored to the capacity to purchase scarce goods in a fiat monetary system. The PH circle is anchored to the capacity to access community resources (RIB, impact funds, governance participation). This is different from the capitalist anchor, but not less real.

The honest limit: Who ensures the PH circle does not inflate or deflate arbitrarily? Who decides how much impact equals 1 PH circle? The Global Assembly — but the Assembly lacks the market signals that give fiat money its stability. PHREVO's likely path is a hybrid: the PH circle valued against a basket of essential goods (energy, food, care), adjusted by the aggregate PHREVO-Score. But this requires experimentation. The definitive answer is empirical.

G.5.2 The Tension Between Centralized Price and Local Deliberation

The PHREVO-Exchange produces centralized prices (a token has one price across the entire network). But territorial assemblies make decentralized decisions. What happens when a territory wants to fund a project that the Exchange values low (because its Score is low) but the community values high (for local reasons the Score does not capture)?

PHREVO responds with the Territorial Arbitration Mechanism (Annex A, Section A.3). The community can, with a 70% supermajority, deviate from the standard price rule for a specific case. But this reintroduces the Hayekian problem: if communities systematically deviate, the framework becomes irrelevant and coordination across territories collapses.

The honest limit: It is unknown whether the equilibrium between centralized price signals and local deliberation is stable. PHREVO might end up being too rigid (no territory deviates, the framework poorly captures local knowledge) or too lax (every territory does as it prefers, the Exchange collapses). The answer is empirical.

G.5.3 The Empirical Response as the Only Definitive Answer

This is the most important point in this document.

Mises and Hayek formulated their critique in the abstract, before computers, big data, artificial intelligence, blockchain, or hybrid systems of market plus governance

existed. Their critique was philosophical, not empirical. It was never submitted to empirical test because no non-capitalist system with the complexity and rigor necessary to be fairly tested ever existed.

We build the Exchange. We test it in a sandbox with real data. We pilot it in a real territory with real money — not only simulation. We measure whether the prices produce efficient allocations, whether communities can coordinate local knowledge, whether the system collapses or prospers. If it works, Mises and Hayek were wrong (or their critique did not apply to this type of system). If it does not work, PHREVO fails, and they were right.

PHREVO is not afraid of this test. That is why the empirical validation protocol in Annex F is not an optional supplement; it is the necessary final validation of the system. Theoretical arguments cannot resolve this debate — both sides have too many moves available. Only evidence from real implementation can provide a definitive answer. And that is precisely what PHREVO is building toward.

G.6 Conclusion: PHREVO as the Most Serious Attempt to Date

The economic calculation problem is real. Mises and Hayek made a genuine and lasting contribution to economic theory by demonstrating that information is a scarce resource and that coordination systems must account for its dispersal. Their critique destroyed the intellectual credibility of Soviet-style central planning — correctly.

But their conclusion — that any form of socialism or planning is impossible — was premature in its generality. The failure of Soviet central planning does not demonstrate the impossibility of all alternatives to capitalism. It demonstrates the nonviability of one alternative (state communism) under specific conditions (early industrial economy without computation). That is a much more limited claim.

PHREVO is a new type of alternative:

It has prices — anchored in impact rather than scarcity, but formed through real market mechanisms. Response to Mises.

It has decentralized governance — territorial assemblies that incorporate local knowledge without requiring it to be centralized. Response to Hayek.

It uses technology — AI, blockchain, sensors — to reduce the information problem that Mises and Hayek identified. The 1920 and 1945 arguments did not anticipate the informational capacities of 2026.

It is a constitutional framework, not a quantitative plan — rules that constrain without replacing decentralized decision-making.

It is open to empirical testing — the only form of answer that can be definitive.

No post-capitalist framework before PHREVO has offered a response to the calculation problem this complete, this architecturally specific, and this intellectually honest about its own limits. The critics can point to the genuine gaps identified in Section G.5. But they cannot say that PHREVO ignored the question. It faced it directly.

The challenge now goes to the critics: identify the specific logical flaws in this response, design better experiments, or help fund the controlled trial in Annex F that can settle the question empirically. PHREVO is not afraid of the test. It was built to pass it — or to fail honestly and learn.

G.7 Appendix: PHREVO's Position in the Socialist Calculation Debate

The debate over socialist economic calculation has proceeded through three historical phases, each with distinct protagonists and arguments:

Where PHREVO is located in this debate:

PHREVO's intellectual position: PHREVO is neither the market socialism of the Lange-Roemer tradition (which retains too much dependence on central coordination) nor the council communism of the libertarian socialist tradition (which has insufficient common framework). It is a third type of post-capitalist architecture that combines:

Impact-anchored markets for resource allocation — responding to Mises's demand for a price mechanism.

Territorial assembly governance for knowledge coordination — responding to Hayek's demand for decentralization.

Constitutional rules that constrain without replacing decentralized decision-making — consistent with Hayek's own constitutional liberalism.

Empirical openness — the willingness to be tested and, if necessary, to fail.

The literature has no precise precedent for this combination. PHREVO is, in part, a theoretical and practical experiment. The socialist calculation debate has been largely theoretical since its origins. PHREVO's contribution is to make it empirically resolvable — by building a system sufficiently complete and rigorous to actually test.

References

Barone, E. (1908). Il Ministro della Produzione nello Stato Collettivista. Giornale degli Economisti.

Caldwell, B. (2004). Hayek's Challenge: An Intellectual Biography of F.A. Hayek. University of Chicago Press.

Cockshott, P., & Cottrell, A. (1993). Towards a New Socialism. Spokesman Books.

Graeber, D. (2011). Debt: The First 5,000 Years. Melville House.

Hayek, F.A. (1935). Collectivist Economic Planning. Routledge.

Hayek, F.A. (1945). The Use of Knowledge in Society. American Economic Review, 35(4), 519-530.

Hayek, F.A. (1960). The Constitution of Liberty. University of Chicago Press.

Jimenez, A. (2026). PHREVO: A Post-Capitalist Economic Architecture for the Global South. SSRN Working Paper 6614438. DOI: 10.5281/zenodo.19666941.
Kirzner, I.M. (1973). Competition and Entrepreneurship. University of Chicago Press.
Lange, O. (1936-37). On the Economic Theory of Socialism. Review of Economic Studies, 4(1-2), 53-71 and 123-142.
Mises, L. von (1920/1935). Economic Calculation in the Socialist Commonwealth. In F.A. Hayek (Ed.), Collectivist Economic Planning. Routledge.
Nove, A. (1983). The Economics of Feasible Socialism. Allen & Unwin.
Ostrom, E. (1990). Governing the Commons: The Evolution of Institutions for Collective Action. Cambridge University Press.
Roemer, J. (1994). A Future for Socialism. Harvard University Press.
Schweickart, D. (2011). After Capitalism. Rowman & Littlefield.
Stiglitz, J.E. (1994). Whither Socialism? MIT Press.

PHREVO Framework Paper — Annex G — Response to Mises and Hayek — April 2026
Supplement to SSRN 6614438 — DOI: 10.5281/zenodo.19666941
Andres Jimenez — hello@phrevo.earth — phrevo.org