

The Institutional Limits of Technical Convergence: Real-Time Market Signals in Algorithmic Market Socialism

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ABSTRACT

Digital platforms coordinate production and exchange through data, prediction and algorithms, while recent work on socialist planning combines computation with consumer feedback. This paper uses a focused conceptual review to assess how far similarities in the use of market signals and computational feedback support claims of convergence between platform capitalism and algorithmic market socialism. It compares information functions, feedback rules, allocation criteria and institutional controls, then applies this framework to a design for real-time social accounting. The comparison yields two results. First, similar data and feedback mechanisms make technical convergence and partial coordination convergence plausible, but they do not establish similar allocations or institutions. Second, social ownership does not necessarily prevent platform-like concentration if data control, objective-setting, audit and appeal remain centralised. Market signals can therefore be used only as revisable inputs alongside non-market evidence. Data and model vintages must also be preserved so that decisions can be reconstructed and challenged. The paper's contribution is to separate four forms of convergence (technical, coordination, allocation and institutional) and to show why evidence at one level cannot be used as evidence at another.

Keywords: *algorithmic coordination; market socialism; platform capitalism; polycentric governance; real-time social accounting; socialist calculation debate*

INTRODUCTION

Market coordination means adjustment through prices and exchange, while planning means deliberate direction through organisational decisions. Private platforms nevertheless organise exchange through data, prediction and rules (Srnicek, 2017: 43–49). Lange's model also shows how a socially owned system can retain prices and consumer choice (Lange and Taylor, 1938: 60–84). These cases create an analytical puzzle: systems with different ownership structures may use similar prices, data and feedback mechanisms, but the meaning of this similarity remains unclear. Ownership and coordination should therefore be distinguished: the first concerns asset rights and claims to economic surplus; the second, how information enters decisions.

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The socialist calculation debate raises two information problems. Mises asks how different uses of production goods can be compared without exchange prices (Mises, 1990 [1920]: 15–20). Hayek argues that prices help communicate local and changing information that a central decision-maker cannot fully collect (Hayek, 1945: 519–27). Computation may support faster feedback, but how that information is used still depends on who controls the data, models and objectives.

Existing comparisons of platforms and computational planning often identify formal similarities without specifying the level at which similarity occurs. Lopes argues that capitalist and socialist economic planning can be formally similar while remaining distinct in their social aims and concrete political-economic relations (Lopes, 2025: 209–19). A shared technique can therefore be mistaken for evidence of similar allocations or institutions when the basis for that inference has not been tested.

This paper asks to what extent similarities in the use of market signals and computational feedback support claims of convergence between platform capitalism and algorithmic market socialism. Here, *market signals* refer to prices and quantities that convey scarcity, demand and consumer preferences. *Algorithmic market socialism* means a socially governed system that retains consumer signals and uses computation to coordinate production and revise decisions. A conceptual literature review is conducted to compare the two systems through information inputs, feedback rules, allocation outcomes and institutional controls. The review concludes that technical convergence and partial coordination convergence are plausible, but that allocation convergence is not established and that institutional convergence cannot be inferred from shared techniques.

The paper then differentiates convergence into four analytically distinct levels: technical, coordination, allocation and institutional convergence. They are not steps along the same pathway, and each has its own evidence requirements. The design for real-time social accounting is then presented to illustrate the application of these four forms to an information system. The two paths towards algorithmic coordination are compared in the first part of the paper to create a foundation for the framework. It then evaluates convergence at each level and examines real-time social accounting and the conditions of its governance.

AMETHOD AND ANALYTICAL APPROACH

A focused conceptual literature review is used in this paper. It identifies foundational texts that have shaped the socialist calculation debate and market-socialist mechanisms and contrasts them with works on platform coordination, real-time measurement and algorithmic governance. The sources are structured according to four elements: information inputs, rules for decision and feedback, allocation outcomes, and institutional controls. The same four questions are applied to both systems: what data enter the system, how decisions change with feedback, which outcomes follow under common constraints, and who holds rights and authority.

The two evidence bases are not symmetrical. While platform studies focus on current practices, market-socialist studies primarily analyse theoretical models. Consequently, the paper examines the extent

of convergence that the reviewed evidence can support, rather than treating the two systems as direct empirical comparisons. This is not an exhaustive systematic review. Its purpose is to determine what conclusions the evidence can support at each level and then apply the resulting framework to real-time social accounting.

SHARED INFORMATION FUNCTIONS AND TWO PATHS TOWARDS ALGORITHMIC COORDINATION

To understand algorithmic resource management, the information functions of market signals must first be examined. Hayek argues that prices communicate dispersed and changing information without requiring one authority to know every local circumstance (Hayek, 1945: 521–27). Mises argues that exchange prices provide a common basis for comparing alternative uses of production goods through monetary calculation (Mises, 1990 [1920]: 15–20). An alternative system must therefore preserve this function or provide another shared basis for comparison.

Yet economic accounts are not complete measures of social well-being. They may be extended to include unpaid services and environmental damage, but these additions capture only some effects omitted from conventional accounts (European Commission et al., 2009: 12–13). Market signals should therefore serve as inputs rather than final social objectives. This limitation matters for the comparison: even when two systems use similar market signals, those signals do not establish similar objectives or allocations.

One example of algorithmic coordination is platform capitalism. Transactions are mediated by privately owned platforms, which also collect data and establish rules for access to markets or services (Srnicsek, 2017: 43–49). Although prices still matter, it is also the ranking, matching and access rules that determine which transactions occur. Algorithms can also be applied to guide, evaluate and manage workers (Kellogg et al., 2020: 366–72). An example of this type of control is provided by Uber. Rosenblat and Stark (2016: 3763–71) demonstrate the information asymmetries that enabled the platform to shape drivers' decisions. They also report that drivers felt frustrated and distrusted the platform when its predictions were inaccurate. This case suggests that control over data can strengthen the authority of platform owners over workers. However, it offers evidence on coordination and institutional control rather than on allocation outcomes.

Algorithmic market socialism follows a different path. It starts with social ownership and maintains feedback and choice through prices. Consumers retain freedom of choice in the Lange and Taylor model. A central planning board repeatedly adjusts accounting prices in response to shortages and surpluses rather than fixing a complete plan once and for all (Lange and Taylor, 1938: 60–86). Bardhan and Roemer retain competitive allocation under public ownership but extend the analysis to firm governance and managerial incentives. They propose bank-centred monitoring to address the soft budget constraint, in which expectations of rescue weaken financial discipline (Bardhan and Roemer, 1992: 101–09).

Dapprich and Cockshott follow a separate computational-planning route. Their model can calculate production requirements from input-output data, while observed or forecast demand informs revised output targets (Dapprich and Cockshott, 2023: 412–18). The three proposals address the same problem: how socially owned production can remain responsive to decentralised demand. They use different mechanisms: price adjustment, bank-centred financial discipline and computational planning. Together, these models show possible ways for socialist coordination to remain responsive, but they do not establish how effectively the mechanisms would work in practice. Implementation would still depend on predefined products, production requirements, local decisions and data availability.

Table 1 summarises the two paths across the four elements introduced in the method.

Table 1. Two paths towards algorithmic coordination

Element	Platform capitalism	Algorithmic market socialism
Information inputs	Transaction and behavioural data collected by the platform, together with the prices it sets or mediates (Srnicek, 2017: 43–49)	Consumer demand signals, accounting prices and input-output requirements reported to planning bodies (Lange and Taylor, 1938: 60–86; Dapprich and Cockshott, 2023: 412–18)
Decision and feedback rules	Ranking, matching and access rules revised continuously from observed behaviour (Kellogg et al., 2020: 366–72)	Accounting prices or output targets revised iteratively in response to shortages and surpluses
Allocation criteria	Expected revenue and growth of the platform	Stated social priorities, including access and distribution
Institutional controls	Private ownership, with concentrated control over data, rules and objectives (Rosenblat and Stark, 2016: 3763–71)	Social ownership, with objectives, audit and appeal left unspecified in the reviewed models (Bardhan and Roemer, 1992: 101–09)

Platform and socialist approaches both use demand data, computational models and repeated feedback. This comparison supports examining convergence at separate levels rather than treating functional similarity as institutional equivalence. The next section therefore separates convergence into four levels with different assessment questions and evidence requirements.

FOUR LEVELS OF CONVERGENCE

Convergence here means similarity at a specified level; it does not mean that systems become identical. The comparison below identifies technical, coordination, allocation and institutional convergence as four

separate levels. Technical convergence concerns data and computational functions. Coordination convergence concerns decision and feedback cycles. Allocation convergence concerns outcomes when systems face the same options, resources and technology. Institutional convergence concerns ownership, surplus distribution, objective-setting, data rights, audit and appeal procedures, and the distribution of authority. Evidence at one level therefore does not establish convergence at another; Table 2 gives a separate question, set of factors and conclusion for each level.

Table 2. Four levels of convergence

Level	Assessment question	Factors considered	Current conclusion
Technical	Do the systems use similar data to perform comparable computational functions?	Inputs, model purpose and update frequency	Plausible from the reviewed mechanisms, but not directly compared
Coordination	Do the systems use comparable decision and feedback cycles?	Decision rules and sequence, feedback timing and local discretion	Partial convergence is plausible where both systems use repeated feedback, but decision rules and local discretion may differ
Allocation	Under the same options and constraints, how similar are the outcomes?	Same scenario, resources and technology; stated priorities; quantity, access, distribution and environmental outcomes	Not likely to be established; identical tools and constraints can still produce different outcomes due to differences in objective priorities
Institutional	Are ownership, objectives, rights and authority comparable?	Governance records; surplus and data rights; audit and appeal rules; local autonomy	Cannot be inferred from similarity at the other levels and is not established by the reviewed evidence

Technical convergence

Technical convergence is plausible at the level of mechanisms. Platform and socialist approaches can use demand data and computational models to compare options, forecast requirements and update estimates. The conclusion remains limited because the reviewed literature does not directly compare the two systems

using the same tasks, inputs and update frequency. The available evidence therefore suggests technical similarity, but it does not demonstrate technical equivalence between the systems.

Coordination convergence

Partial coordination convergence is also plausible because platform and socialist approaches revise decisions through repeated feedback. However, platform evidence sets out current rules for ranking, matching and worker control, while the socialist literature primarily proposes price adjustment or computational planning. Thus, even where the feedback cycle is similar, decision rules, feedback timing and local discretion may vary. This allows only a limited comparison of mechanisms; it does not show that the two systems coordinate decisions in the same way.

Allocation convergence

Allocation convergence does not occur automatically with the use of the same tools and data. Suppose that two systems evaluate the same plans based on the same information, resources and technology. Plan A has higher expected profit, while Plan B serves more eligible users. A system that prioritizes profit may choose A, while one that prioritizes access may choose B. Identical tools and constraints can therefore produce different allocations when priorities differ.

This example illustrates a logical possibility rather than an observed pattern and draws on Lopes's distinction between the method of planning and its social purpose (Lopes, 2025: 209–19). Even identical allocations would not prove institutional convergence, because the same outcome can arise under different ownership structures and rights over economic assets. The reviewed evidence therefore does not establish allocation convergence. A matched empirical comparison would need to hold options, resources and technology constant, record decision priorities, and compare quantity, access, distribution and environmental outcomes. It could then test whether greater similarity in constraints and priorities is associated with greater similarity in allocations.

Institutional convergence

Institutional convergence must be assessed separately because the same allocation can arise under different institutional arrangements. Relevant criteria include ownership and surplus distribution, control over objectives, data rights, independent audit, appeal rights and the division of authority. Kroll et al. (2017: 656–72) argue that automated decisions can be made more accountable through procedures that verify whether decision rules were applied consistently. Selbst et al. (2019: 59–60, 64–67) show why technical systems must be assessed in their wider social and legal context. Similarity across these criteria would provide evidence of institutional convergence but would not by itself prove democratic control.

The reviewed platform evidence describes private ownership and concentrated control over rules and data. By contrast, the socialist models begin with social ownership but do not provide enough detail to compare the systems across all of these institutional criteria, especially data rights, independent audit, appeal and divided authority. The reviewed evidence therefore does not establish institutional convergence.

Taken together, the reviewed evidence suggests technical and partial coordination convergence, but it does not establish allocation or institutional convergence. Real-time social accounting should therefore be treated as an information layer with separate governance conditions, not as evidence that the systems have institutionally converged.

APPLYING THE FRAMEWORK IN PRACTICE

Real-time social accounting applies the four-level analysis to technical and coordination questions. It provides a revisable information layer in which market and non-market evidence can inform decisions, while objectives, data rights and review remain institutional questions. Here, ‘real-time’ means frequent, versioned updates rather than instantaneous or complete information.

Real-time social accounting should produce initial estimates under established rules and revise them when new data signal changes in market conditions. It needs to distinguish activity over a period from amounts at a certain date, maintain consistent accounts and separate price changes from changes in output volume (European Commission et al., 2009: 39–40, 295–301). These rules would help to reduce inconsistency across updates. An operational system would also need clear guidelines to combine price changes, attach monetary values and reconcile competing estimates.

Non-price factors such as quality, inventories, delivery times, working conditions, access, distribution, energy use and emissions should also be accounted for. While these measures may not capture all externalities or all aspects of well-being, they do make non-price information more visible.

Some of these calculations are now more feasible due to advances in data collection, but not all measurement problems can be solved by them. Online prices can deliver faster and more detailed evidence of inflation, as the Billion Prices Project shows. However, online data cover only part of the economy, and comparable products must be matched carefully (Cavallo and Rigobon, 2016: 151–59, 172–73). Online prices can therefore improve one part of a real-time account, but labour conditions, access to public services and environmental harm still require separate evidence. Non-price factors remain harder to measure. Informal activity, public services and environmental damage may lack observable prices or consistent data. More frequent updates can improve the timeliness of quantified indicators, but they cannot determine which social and environmental effects should be included or how they should be valued. Different choices can produce different results, so control over valuation is also a question of authority.

As estimates are revised, the system must preserve the information available at each decision date. Giannone et al. (2008: 665–69) show how nowcasting updates estimates as data released at different times enter an evolving information set. After these updates, however, the latest estimate no longer reflects what was known earlier. Orphanides demonstrates that using *ex post* revised data can misrepresent past decisions by attributing later information to decision-makers (Orphanides, 2001: 964–70, 979–83). The proposed account would therefore store each estimate with its data vintage, range of plausible values and

model version. This record would make revisions visible and allow reviewers to reconstruct the information used in past decisions.

Taken together, real-time accounting could make coordination more responsive without producing objectively correct decisions. More regularly updated accounts may detect shortages, unused resources or unequal allocation sooner. Separate market and non-market estimates would also show the evidence behind different judgements. Political institutions would still choose objectives and make trade-offs, while local or sectoral decisions could be tested against observed outcomes and revised through repeated feedback. The proposal therefore addresses technical and coordination capacity, but its effects on allocation and institutions would need to be assessed separately.

GOVERNANCE AND LIMITATIONS

Because technical capacity does not settle institutional outcomes, real-time social accounting must also be assessed against three governance limits: incomplete local knowledge, strategic responses to targets and disagreement over social objectives.

First, Boettke and Candela (2023: 44, 51–53) argue that computation cannot replace the discovery of context-specific knowledge through competition. Planning should therefore retain local signals and allow revision rather than assume complete knowledge.

Second, policy changes may alter behaviour and make earlier predictions unreliable (Lucas, 1976: 19–20, 39–41). Ostrom (2010: 554) uses HFC-23 credits to illustrate how the Clean Development Mechanism could be exploited when rewards for abatement became unusually profitable. This does not demonstrate that real-time accounting will be manipulated, but it shows why faster measurement alone is insufficient.

Third, numbers cannot decide how profit, access and other social goals should be balanced. Welfare analysis involves value judgements (Bergson, 1938: 310–11), and algorithmic measures may hide contested choices when they are treated outside their social and legal context (Selbst et al., 2019: 62–66). Objectives should therefore be set through accountable procedures that allow affected groups to challenge decisions.

Together, these problems show the need for local discretion, measures to prevent the manipulation of targets and accountable goal setting. Polycentric governance offers one possible response by linking autonomous decision centres that learn from one another (Ostrom, 2010: 552). In the structure proposed here, local units address local conditions, sector bodies coordinate shared capacity, and national institutions set distributional and environmental limits. They are linked by common standards but retain local discretion. This is a distribution of authority but not a removal of power imbalances.

CONCLUSION

This review poses the question of what can be learned from the common use of market signals and computational feedback in platform capitalism and algorithmic market socialism. The comparison indicates that similarity at one level does not imply similarity at another. Similar data and models make technical convergence plausible, and comparable feedback cycles suggest partial coordination convergence. This paper does not measure either convergence directly. Allocation convergence remains untested. Functional similarity cannot be treated as evidence of institutional convergence, because ownership, rights and decision-making authority may still differ. Social ownership can thus coexist with platform-like concentration where control over data, objectives, audit and appeal remains centralised.

In practice, prices and market feedback may give valuable indications of scarcity and demand, but cannot fully reveal working conditions, access to necessary services, the distribution of resources and environmental costs. This could be addressed by real-time social accounting, which integrates market data with broader social and environmental evidence. Public institutions would then have to weigh these various factors and remain responsible for the resulting trade-offs. A real-time account would be only an information layer, not a mechanism for setting social objectives, and those objectives would need to be accompanied by accountable procedures, divided authority, independent review and appeal.

These are conceptual findings rather than general empirical claims. The review was not an exhaustive search of the databases or a matched systems comparison, nor was it an examination of real-time accounting in practice. The computational methods and institutional arrangements of the two systems should therefore be the focus of future empirical studies. Such research should examine evidence at each of the four levels separately before asking whether similarity at one level is accompanied by similarity at another.

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