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Banking Sector Accounting Practices and Financial System Stability

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Abstract

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This paper investigates the underexplored nexus between heterogeneous accounting practices within the banking sector and the emergent stability properties of the financial system as a whole. Departing from traditional analyses that treat accounting as a neutral, transparent reporting mechanism, we conceptualize accounting frameworks as active, constitutive elements of the financial ecosystem that shape bank behavior, risk perception, and interbank dynamics. Our novel contribution lies in modeling the financial system as a complex adaptive network where nodes (banks) employ one of three distinct accounting paradigms: Historical Cost Accounting (HCA), Fair Value Accounting (FVA), and a proposed hybrid, Dynamic Provisioning Accounting (DPA). We develop an agent-based computational model to simulate the propagation of liquidity and solvency shocks under varying compositions of these accounting practices. The model incorporates feedback loops where reported accounting figures directly influence market confidence, collateral values, and interbank lending decisions, thereby endogenizing systemic risk. Our results reveal several non-linear and counterintuitive findings. First, a system predominantly using FVA exhibits higher volatility and faster shock transmission, confirming some post-crisis critiques, but also demonstrates a greater capacity for early loss recognition and rapid system cleansing. Second, a homogeneous HCA regime fosters apparent short-term stability but can lead to the accumulation of hidden losses and larger, delayed systemic collapses—a 'stability illusion.' Third, and most originally, we find that a deliberately heterogeneous mix of accounting practices, particularly one that strategically embeds DPA banks as 'circuit breakers,' can enhance systemic resilience by dampening pro-cyclical feedback and creating asynchronous response mechanisms to shocks. The optimal mix is non-trivial and depends on network topology and shock origin. We conclude that financial system stability is not merely a function of individual bank capital but is profoundly mediated by the diversity and design of the accounting rulebook itself. This argues for a macroprudential approach to accounting standard-setting that considers systemic network effects, moving beyond the micro-level 'representational faithfulness' paradigm that has dominated standard-setting discourse.

Keywords: Accounting Practices, Financial Stability, Systemic Risk, Agent-Based Modeling, Fair Value Accounting, Network Theory, Macroprudential Regulation

1 Introduction

The stability of the financial system is a paramount concern for regulators, economists, and society at large. While extensive research has examined the role of capital adequacy, leverage, and interconnectedness in propagating crises, the constitutive role of accounting practices has received comparatively fragmented attention. Typically, accounting is viewed as a passive, retrospective lens through which the financial health of an institution is reported. This paper challenges that view, positing that accounting frameworks are active agents in the financial network. They do not merely measure value and risk; they create specific incentives, shape collective behavior, and fundamentally alter the transmission pathways for shocks. The choice between Historical Cost Accounting (HCA), which records assets at their original purchase price, and Fair Value Accounting (FVA), which marks assets to their current market value, is not a technical footnote but a critical determinant of systemic dynamics.

Our research is motivated by a gap in the literature. Prior work has often debated FVA versus HCA in a binary, micro-prudential context, focusing on individual bank volatility or the pro-cyclicality of FVA. Few studies have adopted a systemic, network-based perspective to ask: How does the *mix* of accounting practices across a banking network influence the resilience of the system to aggregate shocks? Does homogeneity in accounting, often sought for comparability, inadvertently create a monolithic vulnerability? Could intentional diversity in accounting measurement serve as a form of 'biological heterogeneity,' enhancing the adaptive capacity of the financial ecosystem?

To explore these questions, we develop a novel agent-based model of a banking network. Each bank is an autonomous agent characterized by a balance sheet, a chosen accounting paradigm (HCA, FVA, or Dynamic Provisioning Accounting (DPA)), and behavioral rules for lending, borrowing, and asset sales. The network structure defines interbank exposures. The core innovation of our model is the feedback mechanism from reported accounting numbers to system-wide state variables. A bank's reported capital ratio, determined by its accounting rules, affects its credit rating, the haircuts applied to its collateral in repo markets, and the willingness of other banks to lend to it. This creates a powerful loop where accounting measurements can become self-fulfilling prophecies, amplifying or dampening initial disturbances.

We simulate a range of shock scenarios—including asset price collapses and liquidity freezes—across networks with varying proportions of HCA, FVA, and DPA banks. Our analysis moves beyond simple averages to examine the distribution of outcomes, the contagion pathways, and the emergence of system-wide properties from local interactions. The findings offer a new perspective for regulators, suggesting that financial stability policy must encompass not just capital and liquidity buffers, but also the architectural design of the informational infrastructure—the accounting rulebook—itself. By demonstrating that accounting diversity can be a stabilizing force, we provide a theoretical foundation for reconsidering the drive towards global accounting uniformity.

2 Methodology

Our methodological approach is rooted in complexity science and computational economics. We construct an agent-based model (ABM) to capture the non-linear interactions and emergent phenomena that are central to systemic risk but often intractable to closed-form analytical solutions. The model world consists of N banking agents, connected in a directed network representing interbank lending relationships. The network topology can be varied, but core results are derived from a scale-free network, which mirrors the heterogeneous connectivity observed in real-world banking systems.

Each bank i maintains a simplified balance sheet with assets A_i (comprising interbank loans IB_i, a portfolio of tradable securities S_i, and loans to the real economy L_i) and liabilities Lb_i (including interbank borrowing IBB_i, customer deposits D_i, and equity E_i). The key differentiating factor is the accounting rule $R_i \in \{HCA, FVA, DPA\}$ applied to the securities portfolio S_i.

Under HCA, securities are held at amortized cost unless an impairment is deemed permanent. Reported value $V_i^{HCA}(t) = V_i^{HCA}(t-1)$ unless a discrete impairment test is triggered. Under FVA, securities are marked-to-market continuously: $V_i^{FVA}(t) = p(t) \cdot q_i$, where $p(t)$ is the market price and q_i is the quantity held. Our proposed DPA framework is a hybrid designed to mitigate pro-cyclicality. It uses a through-the-cycle valuation that incorporates long-term expected losses, building provisions in good times: $V_i^{DPA}(t) = p(t) \cdot q_i - \Phi(\bar{p}, \sigma_p)$, where Φ is a dynamic provision based on the long-run average price $\bar{p}$ and volatility σ_p.

The model operates in discrete time steps. In each period, banks engage in: (1) Asset price determination, where the price $p(t)$ for the securities is influenced by aggregate selling pressure; (2) Accounting valuation, where each bank calculates its equity $E_i(t)$ based on R_i; (3) Interbank market clearing, where banks with low reported capital ratios face higher funding costs and reduced access to liquidity; (4) Behavioral responses, where banks may be forced to sell assets (creating fire sales) if they breach regulatory or internal capital thresholds.

The critical feedback loop is formalized as follows. A bank's reported capital ratio $CR_i(t) = E_i(t)/A_i(t)$ influences its perceived riskiness. We model this via a funding cost function $r_i(t) = r_0 + \gamma \cdot f(CR_i(t))$, where f is decreasing in CR_i. Furthermore, the haircut on securities posted as collateral is an increasing function of the *system-wide* volatility of reported capital ratios. Thus, a wave of FVA-driven write-downs can increase haircuts for all banks, tightening liquidity universally. This captures the notion that accounting numbers are not mere reports but inputs into a decentralized risk-assessment mechanism that governs the system's liquidity flow.

We initialize the system with random allocations of accounting rules and simulate it over T periods. A shock is introduced as a sudden drop in the fundamental value of securities or a withdrawal of deposits. We track system stability metrics: the number of bank failures, the total fire-sale volume, the depth and duration of the interbank market freeze, and the final aggregate lending to the real economy. Each simulation is run 1000 times with different random seeds to generate robust distributions of outcomes for each accounting regime mix.

3 Results

The simulation results reveal complex, non-linear relationships between accounting practice composition and systemic stability. We present key findings thematically.

First, the volatility-stability trade-off is nuanced. A homogeneous FVA regime (100% FVA banks) leads to the highest immediate volatility in reported capital following a shock. Contagion via the interbank network is swift, as losses are recognized instantaneously and transmitted through counterparty exposures and elevated funding costs. This often results in a larger initial wave of failures compared to other regimes. However, this 'fast and furious' response also means that losses are quickly realized and allocated. The system finds a new, lower equilibrium relatively quickly, and the subsequent recovery, in simulations where a core of banks survive, can be more vigorous. The latent, unrecognized losses that can fester under HCA are absent.

Second, the homogeneous HCA regime presents a 'stability illusion.' Following a moderate shock, reported capital ratios remain largely unchanged, as impairments are delayed. Interbank lending continues unabated, and there are few immediate failures. The system appears stable. However, if the shock is persistent or deep, the eventual recognition of losses—often triggered by a liquidity crisis forcing asset sales—can be catastrophic. When the impairment threshold is finally crossed for many banks simultaneously, the system experiences a synchronized, large-scale failure. The total cumulative loss in lending to the real economy can be significantly greater than in the FVA case, due to this delayed and clustered collapse.

Third, and most significant, heterogeneous regimes frequently outperform homogeneous ones in terms of overall systemic resilience, measured by the preservation of the network's lending function. Introducing a minority of DPA banks (20-30%) into a predominantly FVA system acts as a powerful stabilizer. The DPA banks, with their through-the-cycle provisioning, show less volatility in their reported capital. During a crisis, they maintain better access to funding and can act as liquidity providers or acquirers of distressed assets, effectively becoming 'circuit breakers' that halt the fire-sale feedback loop. Their presence reduces the correlation in bank distress across the network.

Similarly, a mix of HCA and FVA banks creates an asynchronous response to shocks. The FVA banks absorb and signal the shock early, while the HCA banks provide a temporary buffer, preventing a complete liquidity seizure. This can 'buy time' for coordinated policy intervention. The optimal mix is not 50/50, but skewed towards one paradigm depending on the shock type. For liquidity shocks, a higher proportion of HCA/DPA banks is beneficial. For solvency shocks rooted in asset overvaluation, a higher proportion of FVA banks leads to a healthier long-term outcome.

Network analysis of contagion pathways shows that in homogeneous systems, shocks propagate uniformly. In heterogeneous systems, the shock's path is irregular and depends on the accounting identity of the initially affected node and its neighbors. A shock hitting an FVA bank propagates quickly but may be contained by a neighboring DPA bank. A shock hitting an HCA bank may lie dormant until it reaches a part of the network with different accounting rules. This 'patchwork' response reduces the correlation of failures, a key metric of systemic risk.

4 Conclusion

This paper has advanced a novel thesis: the stability of the financial system is an emergent property influenced not just by the economic fundamentals of its constituent banks, but by the very rules used to measure and report those fundamentals. By modeling the banking network as a complex adaptive system where accounting practices are integral components of agent behavior and network interaction, we have demonstrated that the diversity of these practices can be a critical, and previously overlooked, source of systemic resilience.

Our findings challenge the prevailing regulatory and standard-setting philosophy that prioritizes uniformity and comparability above all else. While uniformity reduces information processing costs for investors, our model suggests it may create a systemic vulnerability by synchronizing the responses of all institutions to market shocks. The intentional introduction of measured diversity—such as through the sanctioned use of alternative measurement bases like dynamic provisioning or through the strategic placement of institutions using different rules—could act as a macroprudential tool. It would make the system more robust to a wider variety of shocks by creating non-linear dampeners and circuit breakers within the network's informational fabric.

The policy implication is profound. Accounting standard-setters, such as the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB), have traditionally operated with a micro-level objective of providing decision-useful information to investors. Our research indicates that a macroprudential mandate must also inform their deliberations. The systemic consequences of accounting choices, particularly their interaction effects in a networked environment, should be a formal part of the standard-setting due process. This might lead to standards that permit or even encourage a degree of controlled heterogeneity for systemically important financial institutions.

Future research should extend this model in several directions. First, incorporating more realistic bank behavioral rules, such as strategic herding or regulatory arbitrage between accounting regimes, would enhance the model's realism. Second, exploring the interaction between accounting diversity and other policy tools, like capital conservation buffers or central bank lending facilities, would be valuable. Third, empirical validation, though challenging due to the lack of real-world accounting diversity, could be sought through natural experiments or analysis of historical periods with greater variation in practice.

In conclusion, financial stability is not built on measurement alone, but the choice of measurement ruler itself bends the financial landscape. Recognizing accounting as a core element of financial architecture, rather than just its depiction, opens new avenues for safeguarding the system against future crises.

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