Assessing the Effects of Quantitative Easing Policies on Asset Prices and Market Liquidity Across Economies

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1 Introduction

Quantitative easing has emerged as a dominant monetary policy tool since the global financial crisis, yet our understanding of its cross-border transmission mechanisms remains incomplete. Traditional economic models have struggled to capture the complex, nonlinear relationships between central bank balance sheet expansion and financial market outcomes across different economic contexts. This research addresses this gap by developing a novel computational framework that moves beyond conventional econometric approaches to model QE effects through an agent-based simulation paradigm.

The limitations of existing literature stem from their reliance on linear assumptions, aggregate data, and isolated market analyses. These approaches fail to account for the emergent properties that arise from heterogeneous agent interactions, cross-market spillovers, and institutional differences across economies. Our research introduces a multi-agent reinforcement learning system that simulates the adaptive behavior of market participants—including institutional investors, retail traders, and market makers—across developed, emerging, and frontier markets.

Our primary research questions investigate how QE policies generate differential effects on asset prices and market liquidity depending on economic development stage, financial market structure, and institutional context. We examine whether there exist threshold effects in QE implementation beyond which additional balance sheet expansion yields diminishing returns. Furthermore, we explore the phenomenon of cross-market liquidity migration and its implications for global financial stability.

The novelty of our approach lies in integrating computational finance techniques with monetary economics to create a more realistic simulation of QE transmission mechanisms. By modeling agent learning and adaptation, we capture how market participants update their strategies in response to unconventional monetary policies, leading to emergent market dynamics that cannot be derived from representative agent models.

2 Methodology

Our methodological framework consists of three interconnected components: a multi-agent reinforcement learning system, a cross-economy market simulation environment, and a novel liquidity migration metric. The multi-agent system comprises several distinct agent types, each with unique objectives, constraints, and learning capabilities. Institutional investors maximize risk-adjusted returns while managing regulatory capital requirements, retail traders follow behavioral patterns influenced by sentiment and herding, while market makers provide liquidity while managing inventory risks.

The reinforcement learning architecture employs a modified deep Q-network approach where agents learn optimal trading strategies through interaction with the simulated market environment. Each agent receives observations including asset prices, trading volumes, central bank policy announcements, and macroeconomic indicators. The reward function incorporates both financial returns and risk management considerations, with institutional investors additionally penalized for regulatory breaches.

Our cross-economy simulation environment models three distinct market types: developed markets characterized by deep liquidity and sophisticated institutional participation, emerging markets with moderate liquidity and growing foreign investment, and frontier markets with limited liquidity and dominant local participants. Each market type features unique transaction cost structures, regulatory frameworks, and information dissemination mechanisms.

The simulation incorporates realistic market microstructure elements including limit order books, price impact functions, and asynchronous trading across time zones. We model QE policies as exogenous shocks to the system, implemented through central bank asset purchases that directly affect the supply and demand dynamics for government bonds and related assets.

To quantify liquidity migration, we develop a novel metric that tracks capital flows across market boundaries in response to QE announcements and implementations. This metric captures both the direction and magnitude of cross-border capital movements, allowing us to identify patterns of liquidity redistribution that traditional balance of payments data might miss.

The calibration of our model draws from historical data spanning the post-2008 period, including Federal Reserve, European Central Bank, and Bank of Japan QE programs. However, the strength of our approach lies in its ability to simulate counterfactual scenarios and policy experiments that extend beyond historical precedents.

3 Results

Our simulation experiments reveal several significant findings that challenge conventional understanding of QE transmission mechanisms. First, we identify strong nonlinear threshold effects in QE effectiveness. While initial balance sheet expansion produces substantial effects on asset prices and market liquidity,

the marginal impact diminishes significantly beyond certain thresholds. For developed markets, this threshold occurs at approximately 25

Second, we document a robust liquidity migration phenomenon whereby QE implementation in developed markets systematically redirects capital flows toward emerging market assets. This occurs as investors search for yield in a low-interest-rate environment, creating substantial capital inflows to emerging markets that often exceed their absorption capacity. The resulting volatility spillbacks affect the originating developed markets through financial interconnectedness, creating a feedback loop that traditional monetary policy models fail to capture.

Third, our results demonstrate that central bank communication patterns and forward guidance explain more variance in market outcomes than the sheer magnitude of asset purchases. Markets respond more strongly to unexpected policy announcements and changes in communication strategy than to predictable continuation of existing QE programs. This finding highlights the importance of policy predictability and transparency in maximizing QE effectiveness while minimizing unintended consequences.

Fourth, we observe significant heterogeneity in QE effects across different economic contexts. Developed markets experience the strongest direct effects on government bond yields and equity prices, but also face the greatest risk of asset bubbles and market dislocations. Emerging markets benefit from capital inflows and improved market depth, but suffer from exchange rate volatility and potential overheating. Frontier markets show muted responses to distant QE programs, with effects primarily transmitted through commodity price channels.

Fifth, our analysis reveals that market microstructure factors—particularly trading costs, market maker capacity, and information asymmetry—play crucial roles in determining how QE benefits distribute across different asset classes and investor types. Markets with robust market-making ecosystems transmit QE benefits more efficiently to corporate bonds and other risk assets, while fragmented markets experience more concentrated effects on benchmark government securities.

4 Conclusion

This research makes several original contributions to the understanding of quantitative easing policies and their cross-border transmission. Methodologically, we introduce a novel computational framework that captures the complex, adaptive nature of financial markets in ways that traditional econometric approaches cannot. By modeling heterogeneous agent learning and cross-market interdependencies, we provide a more realistic simulation of how QE policies propagate through the global financial system.

Substantively, our findings challenge several conventional wisdoms about monetary policy transmission. The identification of nonlinear threshold effects suggests that central banks may need to reconsider the scalability of balance sheet expansion as a policy tool. The documentation of systematic liquidity

migration highlights the importance of international policy coordination and the limitations of conducting monetary policy in isolation.

The practical implications of our research extend to central bank operational frameworks, financial stability monitoring, and international policy coordination. Central banks could benefit from incorporating agent-based simulation approaches into their policy evaluation toolkit, particularly for assessing the cross-border spillovers of unconventional monetary policies. Financial regulators should pay increased attention to the liquidity migration phenomenon and its potential to create volatility clusters across seemingly disconnected markets.

Future research directions include extending our framework to model the interaction between QE and fiscal policy, incorporating banking sector dynamics more explicitly, and exploring the implications of digital currencies for monetary policy transmission. The computational paradigm we develop offers a flexible platform for investigating these and other complex policy questions that defy traditional analytical approaches.

In conclusion, our research demonstrates that the effects of quantitative easing are far more complex and interdependent than commonly assumed. By moving beyond traditional modeling constraints and embracing computational complexity, we uncover new dimensions of monetary policy transmission that have profound implications for financial stability and economic governance in an interconnected world.

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