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Market Freezes, Shadow Bank Runs and More: A Recap of the Monetary Economics Conference

By Tim Sablik

What features of an economy make money a useful social construct? Why did over-the-counter markets freeze during the 2007-2008 financial crisis? How do changes in monetary policy get transmitted to the broader economy? Researchers explored these questions and more at a recent conference hosted by the Richmond Fed.

Economists from the Federal Reserve System and research universities met in Richmond for a conference on monetary economics in December. This *Economic Brief* summarizes the research presented at the conference.

Is Money Essential?

What features of an economy make money socially useful? Economists classify money as "essential" if more desirable outcomes are feasible with it than without it. This requires frictions in the economy that make trade through bartering suboptimal. But many economic models feature frictionless economies where money doesn't improve outcomes and may even make things worse.

Bruno Sultanum of the Richmond Fed discussed results from an experiment seeking evidence of money's essentiality under various conditions. The paper he presented, "[Is Money Essential? An Experimental Approach](#)," was co-authored with Janet Hua Jiang of the Bank of Canada, Peter Norman of the University of North Carolina, Daniela Puzzello of Indiana University, and Randall Wright of the University of Wisconsin-Madison. In their experiment, they sought answers to four questions:

- Do agents use money when there is a monetary equilibrium?
- Do agents use money when there is no monetary equilibrium?

- Do recommendations about strategy from the experimenters help when a monetary equilibrium exists?
- Do recommendations from the experimenter matter when there isn't a monetary equilibrium?

To answer these questions, Sultanum and his co-authors designed an experiment with three players who meet to trade twice. In the first meeting, player 1 meets with player 2, then player 2 meets with player 3, after which the game ends. In each meeting, a player is either a consumer or a producer. A consumer chooses whether to make an offer for a good from the producer. The consumer can offer money or ask for the good for free. The producer then chooses whether to accept the offer. The experimenters tested two models: one in which all the players knew their roles from the start and one in which only player 1 did. They also varied whether player 1 began with money.

They found evidence that money is essential when theory would predict it should be. Through exit surveys, they concluded that play deviating from theory mostly resulted from player confusion.

Market Freezes

During the financial crisis of 2007-2008, markets with centralized trading continued to operate, but trading in over-the-counter (OTC) markets came to a halt. In an OTC asset market, traders must find counterparties and negotiate the terms of trade. During the financial crisis, OTC markets for mortgage-backed securities froze. This raises two questions for researchers:

- Why does trade break down despite potential gains from trade?
- Can the government intervene to restore normal market functions?

Despite the importance of answering these questions, there is no consensus economic model for studying market freezes. Randall Wright of the University of Wisconsin-Madison presented his paper "[Market Freezes](#)" — co-authored with Chao Gu of the University of Missouri, Guido Menzio of New York University, and Yu Zhu of the Bank of Canada — which modeled recurrent OTC market freezes as self-fulfilling prophecies.

Under standard assumptions, market freezes cannot happen. So, Wright and his co-authors looked at three variations of a standard model:

- There are assets with negative dividends, or so-called "toxic assets," which have lost significant value and for which there is no longer any functioning market.
- Agents pay a verification or sanitation cost to determine the value or safety of assets.
- Agents pay fixed entry costs, or the model features other nonconvexities.

Using these models, Wright and his co-authors were able to show how to generate temporary market freezes as an equilibrium phenomenon. They also showed how one asset market can affect other asset markets, as well as how a low inflation rate can help prevent market freezes.

Bargaining Under Liquidity Constraints

How do self-interested parties bargain to achieve mutually beneficial outcomes? Daniela Puzzello of Indiana University presented her paper on this topic, "[Bargaining Under Liquidity Constraints: Nash vs. Kalai in the Laboratory](#)_(PDE)," co-authored with John Duffy of the University of California, Irvine, and Lucie Lebeau of the Dallas Fed.

Puzzello and her co-authors studied bargaining solutions in a laboratory experiment. Typically, such experiments involve a fixed pie for players to bargain over, an explicit extensive form for the bargaining process, and no liquidity constraints. In contrast, the authors of this paper studied bargaining in situations where the players simultaneously decide both the size of the pie and how to split it. (An example would be negotiations between a firm's workers and management.) The authors also examined the role liquidity constraints play in bargaining solutions.

The experiment consisted of 30 rounds, with 10 participants per session. Half of the participants were assigned the role of consumer, and the other half were producers. Consumers and producers were randomly paired each round, and they had two minutes to bargain over production and payoff. The experimenters first studied this bargaining in an unconstrained environment and then in environments where consumers' money holdings were constrained.

In an unconstrained environment, theory predicts that parties will split the pie 50-50 through negotiation, which is what Puzzello and her co-authors found in their unconstrained experiment.

In the presence of liquidity constraints, theory offers two solutions, formalized by John Nash and Ehud Kalai. Nash predicted that a larger surplus would accrue to the buyer relative to the seller and the total gains from trade would be larger than those predicted by Kalai, who argued that surpluses would be equal between buyer and seller.

Puzzello and her co-authors found strong support for Kalai's prediction in their experiments: Players effectively agreed to share a smaller pie to achieve greater equality.

A Model of Retail Banking

Economists debate the role of banks in transmitting monetary policy. One theory holds that monetary policy affects the real economy through the supply of bank deposits. When the federal funds rate increases, the spread between it and the deposit rate widens. As a result,

deposits flow out of the banking system, and this outflow induces a contraction in lending activity.

Guillaume Rocheteau of the University of California, Irvine, presented a paper, "[A Model of Retail Banking and the Deposits Channel of Monetary Policy](#)," in which he and co-author Michael Choi, also of the University of California, Irvine, examined this theory. They developed a model to explore several questions:

- Is bank market power necessary and/or sufficient for the deposit channel of monetary policy to operate?
- Does the origin of bank market power matter for transmission?
- How do fintech advances — such as mobile banking and crypto payments — affect the transmission of monetary policy?
- What are the distributional effects of monetary policy across consumers with different liquidity needs?

In their model, banks have market power in deposit and loan markets. They found that when consumers have private information about their liquidity needs, a deposits channel for monetary policy emerges naturally. This channel isn't uniform across consumers and operates through those on the bottom of the distribution of deposit holdings. Allowing for both private information and two-sided bargaining powers, Rocheteau and Choi showed that the strength of the deposits channel is higher in more concentrated markets.

They also found that fintech innovations in the banking industry can both reduce and increase bank market power. Innovations that reduce market power by improving consumers' outside options weaken the transmission of monetary policy. However, innovations that reduce bank market power by limiting their information about consumers strengthened the transmission of monetary policy.

Q-Monetary Transmission

Another way monetary policy may impact the aggregate economy is through stock prices. An unexpected increase in the monetary policy rate causes stock prices to fall. According to the theory of Tobin's q , this implies that corporate investment should also fall. Thus, monetary policy can affect the economy through a decline in investment.

Ricardo Lagos of New York University presented a paper — "[Q-Monetary Transmission](#)," co-authored with Priit Jeenas of Universitat Pompeu Fabra — which examined whether such asset-price monetary transmission can happen in theory, as well as whether it has happened in practice. The authors first estimated how monetary policy impacts stock prices, using well-established empirical evidence on how a surprise increase in the Fed's policy rate causes stock indexes to fall. Second, they estimated how changes in stock prices affect firm investment. This would then allow them to estimate how changes in monetary policy affect the aggregate economy through changes in investment.

The challenge with estimating monetary policy transmission through asset price changes is that monetary policy can affect firms' investment decisions and stock prices in unrelated ways. For instance, a monetary shock that lowers demand for a firm's output could decrease both the firm's investment and stock price, but that doesn't necessarily mean that the company reduced investment because its stock price fell.

To meet this challenge, Lagos and Jeenas used cross-sectional evidence of stock price changes that were only correlated with a monetary policy shock. They then used this to estimate the effect of stock price changes on firms' investment decisions.

Using this approach, Lagos and Jeenas found that an unexpected, 25-basis-point increase in the federal funds rate resulted in a 0.25 percent drop in aggregate investment three quarters later through the asset price monetary transmission channel. This suggests that the transmission of monetary policy shocks through stock prices accounts for a nonnegligible amount of the overall impact of monetary policy on aggregate investment.

Shadow Bank Runs

In the financial sector, short-term debt is often used to fund illiquid assets. For example, traditional banks use short-term deposits to make long-term loans. A conventional view in economics is that these arrangements are prone to runs in part because redemptions must be processed on a first-come, first-served basis. If a financial firm only has enough liquidity to pay a fraction of its creditors at any given moment, then all creditors will rush to redeem their contracts if they lose confidence in the firm to avoid being left with nothing. The wholesale (or shadow) banking sector lacks this sequential service protocol and yet appears to still be vulnerable to runs, as seen during the 2007-2008 financial crisis. In the conventional Diamond and Dybvig banking model, such arrangements should not necessarily be prone to runs.

David Andolfatto of the St. Louis Fed presented a paper — "[Shadow Bank Runs](#)," co-authored with Ed Nosal of the Atlanta Fed — which featured a model to show that sequential service is not necessary to render banking arrangements run-prone when the investments financed by banks are subject to fixed costs of production. The returns on investments with fixed costs decline if production is scaled back, such as because of a sudden lack of funding. Using short-term debt to finance this type of investment is potentially unstable. If creditors lose confidence and call in their loans, production collapses as financing vanishes, driving down the return on the investment and justifying the initial loss of confidence.

Given that financial arrangements outside the traditional banking sector can be prone to runs even absent sequential servicing, should policymakers do anything to reduce run risk? Any financial arrangements can be made run-proof, but doing so may come at a cost.

The conventional view in economics is that banks provide a valuable service by transforming liquidity from short term to long term, even though that arrangement is vulnerable to runs. Andolfatto and Nosal examined how policies designed to prevent runs vary under different conditions and compared them to recent policy interventions by the Security and Exchange Commission and the Fed. They found that not all policies that render financial arrangements in the shadow banking sector run-proof necessarily improve depositor welfare, but they acknowledged that it was difficult to make conclusive statements about the merits of any particular policy intervention.

Disintermediating the Fed Funds Market

Banks and government agencies borrow and lend reserves overnight on the federal funds market to maintain necessary reserve levels at the Fed. The Fed implements monetary policy in part by adjusting the interest rate in this market. But for more than a decade, the volume of trading in the fed funds market has been declining. There are several possible explanations for this development, including:

- Higher trading costs because of new regulations
- A composition effect resulting from banks being displaced by government-sponsored enterprises, which trade less on the fed funds market
- Abundant reserves in the banking system since the 2007-2008 financial crisis

Russell Wong of the Richmond Fed presented a paper in progress — "Disintermediating the Federal Funds Market," co-authored with Mengbo Zhang of the Shanghai University of Finance and Economics — which examines the decline of intermediaries in the fed funds market as a possible explanation for the decline in trade volume. Intermediaries in the fed funds market are banks that buy and sell funds on the same day. Wong and Zhang found that the activity of these intermediaries declined substantially over the same period that overall trading declined in the market. This was because both the number of intermediary banks operating in the market fell and trading by the remaining intermediaries accounted for less of overall market activity.

Wong and Zhang used a search model to identify why this disintermediation had occurred as well as what effect it may have had on the fed funds market. They concluded that disintermediation has occurred because of changes in the way the Fed has conducted monetary policy since the 2007-2008 financial crisis. There are now abundant reserves in the banking system, and the Fed implements monetary policy primarily by changing the interest it pays on reserves and through reverse repo operations. But Wong and Zhang also concluded that the fed funds market featured excessive intermediation prior to these changes.

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