Recent Research in Monetary Policy and Central Banking: A Conference Recap

By John Mullin

How did the Fed's pandemic-initiated corporate bond facility affect credit markets? What are the supply-side effects of monetary policy? Under what conditions do central bank reserves affect credit spreads? These were among the questions addressed by economists during a recent Richmond Fed research conference.

Economists from the Richmond Fed and several research universities met in Richmond for a conference in May in honor of economist and former Research Director Marvin Goodfriend. Throughout his career, Goodfriend wrote a number of influential papers on monetary policy and played a key role in the development of the Richmond Fed's Research Department. Conference participants presented papers on a variety of topics related to monetary policy, and this Economic Brief summarizes those presentations.

Fed Facilities and Effects on Corporate Credit Risk

Confronted with severe market turmoil during the early stages of the COVID-19 crisis, the Fed took a variety of measures to improve liquidity and confidence. On March 23, 2020, the Fed announced what was arguably its most sweeping and dramatic intervention in the economy to date: the creation of the Primary Market Corporate Credit Facility (PMCCF) and the Secondary Market Corporate Credit Facility (SMCCF), which were committed to buying substantial amounts of corporate debt in the primary and secondary markets, respectively.

To isolate the effects of the SMCCF program, the researchers compared the credit spread declines for corporate bonds eligible for purchase under the SMCCF program with spread declines for bonds of the same issuers that were not eligible for such purchase. They used data from the enhanced Trade Reporting and Compliance Engine (TRACE), which is a FINRA-developed vehicle for the mandatory reporting of publicly traded corporate debt.

They found that the program's initial March 23 announcement significantly reduced credit spreads on eligible bonds relative to ineligible bonds. Moreover, it significantly improved market liquidity by lowering bid-ask spreads. The researchers also found significant effects from a follow-up April 9 announcement that the SMCCF program would expand to include so-called "fallen angels," or corporate bonds with ratings that have declined below investment grade. According to their estimates, the April 9 announcement further narrowed corporate bond credit spreads on eligible bonds relative to ineligible bonds, and it reduced the credit spreads of fallen angels.

**Trade and a Global Phillips Curve**

Inflation rates tend to co-move across countries. For example, when the inflation rate declined in the U.S. during the 2007-2009 recession, it also declined in Europe, Canada, Japan and China. When U.S. inflation reversed course during the subsequent recovery, it also reversed course abroad. These co-movements indicate spillover effects transmitted through global asset and goods markets.


The researchers pose the question: What explains domestic inflation besides domestic factors? To address the question, they built a multi-country economic model that combines nominal rigidities (sticky prices) and multi-country trade linkages. In their model, the co-movements of prices and output are induced by global factors, common policies and the international transmission of foreign shocks. The model seeks to incorporate the intuitive idea that multilateral trade connects countries through a network in which the impact of trade shocks is transmitted through knock-on effects that effectively echo across the globe. In their model, multilateral trade and sticky prices give rise to a global Phillips curve that helps explain cross-country co-movements in GDP growth and inflation.

Under the assumption of integrated capital markets, their model captures a range of positive correlations among countries' macroeconomic indicators, even when countries' international trade is generally small relative to their overall economies. Using Bayesian methodology, they found that trade plays a quantitatively important role in determining cross-country macroeconomic correlations. Their counterfactual analysis suggests that
these cross-country correlations decline substantially in the absence of trade linkages. Under the assumption of financial autarchy, their model can produce negative macroeconomic correlations.

**Potential Inflation Benefits of Coordinating Monetary and Fiscal Policy**

An important legacy of the COVID-19 pandemic is increased U.S. government debt. Even before the onset of the pandemic, U.S. federal debt was forecast to grow by the end of the 2020s to its highest level as a percentage of GDP since 1946.

This situation has sparked a lively debate. Some prominent economists have argued that continued loose fiscal policy could lead to a return to the high and volatile inflation of the 1970s, while others are concerned that a stringent fiscal adjustment could negatively affect economic growth.


Using a state-of-the-art Two Agents New Keynesian (TANK) model, the researchers explore what they believe to be a more favorable and likely outcome: a coordinated monetary and fiscal policy strategy meant to temporarily increase inflation to levels above the Fed’s long-run 2 percent target. They argue that this coordinated strategy achieves two important goals:

- It mitigates a potential drag on economic activity due to expectations of the future fiscal retrenchments, which are needed to stabilize the large post-pandemic debt.
- It corrects a deflationary bias that has characterized the past 20 years, allowing the central bank to remove the risk of deflation and to move away from a low-interest-rate environment.

They provide evidence that this coordinated strategy is not new in the U.S. and is consistent with a novel fiscal theory of trend inflation. They offer an important caveat by pointing out that the coordinated strategy requires clear policy communication to avoid large swings in beliefs about the degree to which inflation will be used to stabilize debt.

**The Supply-Side Effects of Monetary Policy**

According to many standard macroeconomic models, demand shocks have no effect on aggregate productivity. Yet, history has shown that measured aggregate productivity is indeed correlated with demand shocks. Variations in monetary and fiscal policy explain
between one-quarter and one-half of the observed movements in aggregate total factor productivity (TFP) at business cycle frequencies, an empirical finding that is robust across time and countries.

A common explanation for this contradiction is that aggregate productivity is poorly measured, perhaps due to unobserved fluctuations in capacity utilization or some other measurement bias.

Kunal Sangani of Harvard University presented an alternative explanation for the procyclicality of aggregate productivity. The paper he presented, "Supply-Side Effects of Monetary Policy," was co-authored with David Baqaee of UCLA and the late Emmanuel Farhi of Harvard University. Their research suggests that an economy's aggregate TFP is not an exogenously predetermined figure. Instead, it is an endogenous outcome that depends on how resources are allocated across firms.

The researchers analyze the transmission of aggregate demand shocks — such as monetary policy shocks — in an economy with heterogeneous firms, sticky prices, and variable markups and pass-throughs. Their model contrasts the benchmark New Keynesian model, where reallocations across firms are irrelevant to output.

Their model's results agree with evidence at both the micro and macro levels. Systematic differences in pass-through behavior across firms cause expansionary monetary shocks to have differential effects on low-markup and high-markup firms. In response to increases in demand, low-markup firms tend to pass a higher portion of their marginal costs increases into prices than high-markup firms. As consumers respond to the change in relative prices, production is reallocated from low-markup to high-markup firms. Because high-markup firms have higher TFP than low-markup firms, the reallocation raises aggregate productivity.

**An Independent Role for Reserves**

In recent years, the Fed has implemented monetary policy through administered interest rates and the provision of its reserves. Yet, a popular view among academics is that these tools are simply alternative means of achieving a target nominal interest rate, which is solely what matters for monetary policy. By contrast, many practitioners believe that there is more to monetary policy than the implementation of an interest rate target — that the central bank's supply of reserves (and hence its balance sheet size) has an independent effect on real activity through its influence on credit.

Saki Bigio of UCLA presented research aimed at improving the theoretical foundations of the view that central bank reserves exert an independent influence. His paper, "A Model of Credit, Money, Interest and Prices," was co-authored with Yuliy Sannikov of Stanford University's Graduate School of Business.
Their paper studies an economy with incomplete markets and aggregate-demand externalities in which credit is intermediated by banks that face settlement frictions. By supplying reserves and setting administered interest rates, the central bank can use these frictions in influencing many interest rates, including bank loan and deposit rates.

In the researchers' model, the central bank's administered interest rate on reserves sets a floor for all interest rates in the economy and, thus, gives the central bank direct control over inflation. The supply of reserves — which is altered via open-market operations — gives the central bank control over the credit spread between borrowers and savers. Monetary policy in this model operates in three possible regimes:

- In the "corridor" regime, credit spreads are positive, and monetary policy influences real activity through both the interest rate and reserve channels.
- In the "floor" regime, central bank reserves are abundant, and monetary policy is only effective through the interest rate channel.
- In the "liquidity trap" regime, the expansionary power of monetary policy reaches its limit.

A policy insight that emerges from the paper is that a central bank should operate in a corridor system with a lean balance sheet during booms but should operate in a floor system and expand its balance sheet during busts.

**Endogenous Learning and Anchored Expectation**

A common sentiment among central bankers is that anchoring inflation expectations is at the heart of monetary policy. Yet, the leading macroeconomic models of monetary policy assume model-consistent or "rational" expectations and, thus, equate inflation expectations with steady-state inflation outcomes. In effect, these models anchor inflation expectations so tightly that they are of little use in analyzing real-world scenarios in which expectations are more loosely anchored.

Laura Gati of the European Central Bank discussed her paper "Monetary Policy and Anchored Expectations: An Endogenous Gain Learning Model (PDF)," which examines how the anchoring of expectations formation affects the conduct of monetary policy.

In her model, expectations are formed through an adaptive learning scheme that uses an ad-hoc forecasting rule known as the "perceived law of motion" (PLM). Agents use the PLM to form and update expectations using recursive estimation techniques. Thus, forecasts respond to the volatility of the economic environment.

The paper's key takeaway is that central bankers face an intertemporal volatility trade-off. Because the model features a positive feedback loop between expectations and observables, tightly anchored expectations yield lower long-run economic volatility than more loosely anchored expectations. However, the aggressive interest rate responses
meant to anchor expectations induce heightened short-run volatility. Central bankers in the model respond to the trade-off and maximize public welfare by aggressively responding to signs that inflation expectations have become unanchored relative to their target level.

The research shows that, in the presence of expectations that can become unanchored, central bankers need to monitor the evolution of long-run expectations and adjust their policy instruments accordingly. Adhering to a Taylor rule is more costly in the model than under rational expectations because a Taylor rule deprives policy from responding to fluctuations in long-run expectations.

**Monetary Policy and Firms Acquiring Information**

Recent survey evidence finds that the average firm is highly uninformed about its economic environment. However, the evidence also shows that firms' uncertainty about aggregate variables varies considerably, with some firms making relatively accurate forecasts and others widely missing the mark. This evidence raises the question: Whose expectations matter for macroeconomic outcomes?

Hassan Afrouzi of Columbia University presented research on firms' information acquisition and its implications for monetary policy. His paper, "Selection in Information Acquisition and Monetary Non-Neutrality (PDF)," was co-authored with Choongryul Yang of the Federal Reserve Board of Governors.

The paper cites evidence from New Zealand showing that firms that have more recently changed their prices tend to have more accurate expectations about aggregate variables and are more certain about their own desired price changes. To the researchers, this evidence points towards a selection mechanism, according to which firms tend to acquire more information once an opportunity for a price change arrives. Motivated by this evidence, they build a theory of information choice under infrequent price adjustment.

They show that, under the assumption that the cost of information is linear, it is optimal for firms to only acquire information when they change their prices and to abstain from information acquisition otherwise. Accordingly, the model delivers a positive and strong relationship between firms' subjective uncertainty about their desired price and the time since their last price change. Moreover, the model generates a rich degree of heterogeneity in firms' subjective uncertainty that fits well with real-world data.

The researchers argue that these results have important implications for monetary policy. In their model, the output response to monetary policy depends only on the uncertainty of firms that are price setters — those firms that have the lowest uncertainty among all firms. This implies that the average uncertainty across firms overestimates the degree of uncertainty relevant for monetary policy and its effect on output.

**Monetary Policy With Opinionated Markets**
Private financial market participants often disagree with central banks about the future path of short-term interest rates. In the U.S., these differences of opinion have been seen in differences between the interest rate expectations implied by the forward federal funds market (which reflect the market's view) and the expectations implied by the Federal Open Market Committee's "dot plot" (which reflect the views of policymakers).

These disagreements are difficult to explain with conventional macroeconomic models. The literature typically focuses on the Fed's superior information about its policy rule or economic activity. Yet, as a practical matter, these disagreements are a source of concern for the Fed, as they suggest the possibility that the market might perceive the Fed's actions as mistakes.

Alp Simsek of the Yale University School of Management presented a framework that explicitly addresses differences in interest rate expectations. His paper, "Monetary Policy with Opinionated Markets," was co-authored with Ricardo Caballero of the Massachusetts Institute of Technology.

The paper presents a variant of the canonical New Keynesian model with sticky nominal prices. In the model, the economy is subject to an aggregate demand shock in each period. The key assumption is that the market and the Fed have "opinionated belief disagreements" about aggregate demand. Policymakers and market participants both learn over time as they observe aggregate demand. Each knows the others' beliefs and "agrees to disagree." The market considers Fed interest rate decisions that do not match the market's beliefs to be "mistakes."

The researchers find that, under these assumptions, the optimal policy for the Fed is to partially accommodate the market's view to mitigate the impact of perceived "mistakes" on output and inflation. Moreover, the optimal policy calls for the Fed to implement its own view gradually, as it expects the market to receive more information and move closer to the Fed's belief. Disagreements about future demand translate into disagreements about future interest rates. Disagreements also provide a micro-foundation for monetary policy shocks: After a surprise policy announcement, the market learns more about the Fed's beliefs.

**Resolving Indeterminacy in New Keynesian Models**

Within the New Keynesian paradigm, many important questions about monetary policy depend crucially on how an equilibrium is chosen. The problem goes back to an important rational expectation result published in the 1970s: A single path for the nominal interest rate is consistent with multiple paths for inflation and output. The typical approach for dealing with multiple equilibria in New Keynesian models is to select a specific equilibrium by assuming that monetary policy satisfies the Taylor rule, which implies that the central bank will adjust the nominal interest rate in response to changes in output and inflation.
Chen Lian of the University of California at Berkeley presented research that explores an alternative approach to multiple equilibria in New Keynesian models. His paper, "Determinacy Without the Taylor Principle (PDF)," was co-authored with George-Marios Angeletos of the Massachusetts Institute of Technology.

The researchers showed that the introduction of small frictions in social memory and intertemporal coordination can remove the indeterminacy of certain New Keynesian models. A crucial step of their analysis is the translation of a New Keynesian economy into a game among consumers. The basic idea is that a single consumer's optimal spending depends on expectations of other consumers' spending through general equilibrium feedback mechanisms. Under these assumptions, the model's unique surviving equilibrium is the same as that selected by the Taylor principle, without relying on it as an assumption.

They view their contribution not as a definite resolution of the New Keynesian model's indeterminacy problem, but rather as a new lens for understanding the problem and as a formal justification for selecting a particular solution. They also note that their results have important implications for economists' understanding of the Taylor principle as well as the fiscal theory of the price level.

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