FRBSF ECONOMIC LETTER

Number 2004-13, June 4, 2004

Interest Rates and Monetary Policy: Conference Summary

This Economic Letter *summarizes the papers presented at a conference on "Interest Rates and Monetary Policy" held at the Federal Reserve Bank of San Francisco on March 19 and 20, 2004, under the joint sponsorship of the Federal Reserve Bank of San Francisco and the Stanford Institute for Economic Policy Research. The papers are listed at the end and are available at http://www.frbsf.org/economics/conferences/0403/index.html.*

The six papers presented at this conference address key questions, advancing our knowledge of how macroeconomic shocks are transmitted through the economy and how they affect the prices of financial assets.

Four of the papers focus on the term structure of interest rates (the relationship between short-term and long-term interest rates) and how it interacts with macroeconomic fundamentals. Changes in nominal interest rates may stem from any number of sources, including movements in real interest rates, changes in expected inflation, and changes in an asset's risk characteristics—default risk, prepayment risk, and so on. The difficulty is that none of these sources can be observed directly; instead, they must be inferred. Therefore, several of the conference papers develop models that extract information from the term structure of interest rates and macroeconomic aggregates about these sources. Ang and Bekaert develop a model to extract the real term structure, expected inflation, and inflation risk, from nominal interest rates; Rudebusch and Wu formulate a joint macro-finance model and examine how the macroeconomic fundamentals affect the term structure; Dai, Singleton, and Yang construct a regime-switching model and relate different term structure regimes to the business cycle; and Piazzesi and Swanson extract risk premiums from federal funds futures.

The remaining two papers are more closely related to the monetary policy transmission mechanism. Kozicki and Tinsley show how imperfect policy credibility can affect the way macroeconomic shocks are propagated through the economy; Onatski and Williams use an estimated model to explore the design and robustness of policy rules.

The term structure of real interest rates

Typically, the term structure of nominal interest rates has a positive slope, that is, financial assets with longer maturities tend to have higher interest rates than do assets with shorter maturities. Ang and Bekaert explore this phenomenon by decomposing movements in nominal interest rates into movements in real interest rates and in expected inflation. Because real interest rates and expected inflation cannot be directly observed, Ang and Bekaert build a model that allows them to infer them from their impact on other variables in the economy. They apply their model to data on short-term rates (3-month nominal interest rates), longer-term rates (four-, twelve-, and twenty-quarter maturity Treasury yields), and a measure of inflation (the consumers price index). The authors find that while short-term real interest rates are volatile and long-term rates are smooth and persistent, there is no significant slope to the real term structure. Instead, their results indicate that the positive slope typically present in the nominal term structure is caused by an inflation risk premium that is increasing in maturity. Ang and Bekaert also find that variations in expected inflation and in inflation risk premiums explain about 80% of the variation in nominal interest rates and that these variables are also the main determinants of nominal interest rate spreads at long horizons.

A macro-finance model of the term structure

Rudebusch and Wu develop a macro-finance model and examine the joint movement of the term structure and macroeconomic variables. The model provides macroeconomic interpretations of the unobservable or "latent" factors found in empirical term structure studies and also incorporates term structure dynamics into the macroeconomic model following the tradition of the asset-pricing approach from the finance literature.

By first closely examining a canonical latent-factor term structure model, the authors find that the "level" factor is closely associated with the central bank's long-run inflation target and that the "slope" factor captures the central bank's responses to cyclical variations in inflation and output gaps. They then incorporate such relationships in formulating the joint macro-finance model. Model estimation indicates a close similarity between the term structure factors from the macro-finance model and from the canonical latent-factor model, suggesting that the macro-finance model explains the dynamics of the latent factors in terms of macro variables quite well.

The macro-finance model also facilitates incorporating term structure information into the analysis of macroeconomic dynamics. The authors look into macroeconomic issues hotly debated among macroeconomists and find that: (1) there is little term structure evidence suggesting "interest rate smoothing" in the Federal Reserve's policy actions and (2) while forward-looking elements are important determinants of inflation dynamics, they are almost negligible determinants of output.

Regime shifts and changing risk

Dai, Singleton, and Yang establish a term structure model with two regimes: in one regime, interest rate volatility is high, and in the other, it is low. The authors also assume that the probabilities of regime switches vary as the state of the economy changes over time, and bond traders demand compensation for the risk inherent in such regime switches. This model outperforms other regime-switching term structure models in the literature in matching both the empirical dynamics of expected bond returns and the relationship between the shape of the term structure and business cycle fluctuations.

Model estimation reveals that the high-volatility regime tends to be associated with economic downturns and on average is less persistent than the low-volatility regime. This prediction is consistent with the well-documented asymmetry in the U.S. business cycles that recoveries tend to last longer than contractions. Another interesting implication of the model is that the risk premium for a regime switch changes over business cycle. In particular, bond investors are more willing to hedge against an economic downturn than against an economic expansion. This implication is consistent with the economic intuition that agents tend to have low marginal rates of substitution of consumption during economic expansions and high ones during recessions; therefore they are willing to pay more to avoid a sharp income decline during recessions.

Futures prices and monetary policy

In recent years, federal funds futures rates have been widely used as measures of financial markets' expectations of future monetary policy. However, these measures can be distorted, because futures rates reflect not only those expectations but also the uncertainty surrounding them, as reflected in the risk premiums on the futures contracts. In this paper Piazzesi and Swanson examine the properties of such risk premiums and their implications for monetary policy.

By examining data on federal funds futures rates from 1989 to 2003, the authors conclude that the risk premiums on futures contracts are positive on average and strongly countercyclical. Therefore, using the futures rates as predictions of future federal funds rates would tend to lead to overestimating the actual funds rates. However, it turns out that nonfarm payroll employment growth is able to predict the risk premiums reasonably well, implying that such biases could be reduced if the forecaster used nonfarm payroll employment growth to predict the risk premiums and adjusted the estimates accordingly.

Permanent and transitory policy shocks

Kozicki and Tinsley develop a model for monetary policy in which the Federal Reserve is described as having an implicit inflation target that evolves over time, changing in response to shocks. Their model also assumes that this implicit inflation target is known only to policymakers, and that everyone else has to form an educated guess at its value. The model's structure allows both the changing implicit inflation target and the perceived target to be estimated and compared. Estimating their model over 1960–2001, the authors find that the implicit inflation target is very sensitive to supply shocks, as 75% of their impact on inflation passes permanently into the target. The surge in inflation that occurred in the 1970s, then, is described in terms of a rising implicit inflation target, pushed higher and higher by successive oil price shocks.

At the same time, the perceived inflation target differs substantially from the actual inflation target, especially when the actual target is changing rapidly. These differences arise because people have a tough time distilling movements in the actual inflation target from movements in observed inflation. In

fact, the model estimates suggest that learning only cuts the gap between the perceived target and the actual target by 4% each quarter. Comparing the properties of their model with those of a model with a fixed inflation target, they show that time-variation associated with movements in the perceived inflation target has contributed importantly to historical fluctuations in inflation and long-term interest rates.

Policy performance of a macro model

While much of the literature on monetary policy rules simply assumes that central banks dislike variability in inflation and output and uses this assumption as an ad hoc description of central bank objectives, Onatski and Williams observe that an alternative approach is to assume that policymakers try to maximize economic welfare. In general, these two descriptions of the goals motivating monetary policy need not produce similar policies. In fact, the authors show that the economy behaves very differently depending on what policymakers are trying to achieve when they formulate policy, and, moreover, that the ad hoc description of how monetary policy is formulated produces outcomes that are more in keeping with observed policy behavior. Echoing other results in the literature, they also show that simple rules, which depend on only a few macroeconomic variables, perform nearly as well as rules that depend on many variables, while being more robust to model uncertainty.

The model they use for constructing and evaluating monetary policy rules is the dynamic New Keynesian model studied in Smets and Wouters (2004). The model allows for price and wage rigidities and assumes an environment in which firms face costs to installing new plant and machinery. Because wages and prices are not fully flexible, an appropriately designed monetary policy can usefully stabilize economic fluctuations; an important question, then, is how to design such a policy.

When estimating the model, the authors explore the sensitivity of the estimation in Smets and Wouters (2004). The approach that Smets and Wouters took was to use methods that combine "prior" information about model parameters with information about these parameters contained in actual data. Onatski and Williams find that the model's estimates, but not its qualitative implications, are sensitive to the nature of this prior information.

Richard Dennis
Economist

Tao Wu
Economist

Conference Papers

Papers are available in pdf format at http://www.frbsf.org/economics/conferences/0403/index.html

Ang, Andrew, and Geert Bekaert. "The Term Structure of Real Rates and Expected Inflation."

Dai, Qiang, Kenneth Singleton, and Wei Yang. "Regime Shifts in a Dynamic Term Structure Model of U.S. Treasury Bond Yields."

Kozicki, Sharon, and Peter Tinsley. "Permanent and Transitory Policy Shocks in an Empirical Macro Model with Asymmetric Information."

Onatski, Alexei, and Noah Williams. "Empirical and Policy Performance of a Forward-Looking Monetary Model."

Piazzesi, Monica, and Eric Swanson. "Futures Prices as Risk-Adjusted Forecasts of Monetary Policy."

Rudebusch, Glenn, and Tao Wu. "A Macro-Finance Model of the Term Structure, Monetary Policy, and the Economy."

Reference

Smets, Frank, and Raf Wouters. 2004. "An Estimated Stochastic Dynamic General Equilibrium Model of the Euro Area." *Journal of the European Economic Association,* forthcoming.

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