Macroeconomic Research Highlights

Learning About the Effects of Macro Policy

Professor Eric Leeper's research program addresses the age-old question, "What are the effects of monetary and fiscal policy?" in the context of dynamic stochastic general equilibrium models. He wants these models to adhere to the scientific standards of modern macroeconomic theory and to fit well the multivariate time series facts. The insistence on the two criteria springs from a desire to produce models that are useful for real-time policy analysis. Such models must have associated with them easily interpretable and plausible economic behavior and they must have reasonable out-of-sample forecast performance. Ultimately, he sees the program producing econometric models tightly connected to equilibrium theory, as in Leeper and Christopher A. Sims’s article in the NBER Macroeconomics Annual, but containing more sophisticated specifications of policy behavior and delivering superior fits to the data.

Virtually all of Leeper’s research has been designed to move closer toward an answer to the overarching question of his research program. The work can be grouped into two categories: (1) theoretical study of monetary and fiscal policy interactions, and the empirical implications thereof; (2) empirical efforts to identify policy effects.

Theoretical Study of Monetary and Fiscal Policy Interactions. The springboard of this work is that the government issues two sorts of nominal liabilities--high-powered money and debt--and that supply and demand decisions regarding the two liabilities interact atemporally and intertemporally to determine the general price level. The interactions take place through the government budget constraint, where creation of liabilities generates revenues, and through private sector saving behavior, where the two assets are components of wealth. Modern general equilibrium models tend to focus exclusively on either monetary or fiscal policy, relegating the other policy to a supporting role. The implicit behavioral assumptions underlying the study of a single policy in isolation effectively restrict the class of equilibria being considered. Many of the profession’s understandings of policy effects stem from such restricted studies. For example, the belief that contractionary
monetary policy disturbances lower inflation relies on particular sorts of fiscal behavior; different assumptions about fiscal policy deliver different monetary policy effects on inflation. Another examples comes from the deeply held belief that the price level is determined through the supply and demand for money. This belief lies behind that profession’s continuing search for stable empirical money demand functions and the periodic call in policy circles for the adoption of a “nominal anchor” like the monetary base. Again, the determination of prices via money demand hinges on special assumptions about fiscal behavior; different assumptions could leave prices undetermined or make them depend on total nominal liabilities, rather than just money. The Ricardian view that government bonds are not net wealth hinges not only on assumptions about tax policy, but also on assumptions about monetary policy. Throughout his career James Tobin emphasized the role of asset substitutability in determining policy effects. Leeper interprets this recent work as a modern intertemporal generalization of Tobin’s insights. (Published papers along these lines include a 1991 Journal of Monetary Economics paper and a 1993 Atlanta Fed Economic Review article.)

Theoretical work exploring the implications of monetary and fiscal policy interactions has tended to make special assumptions about policy behavior, producing a set of results whose generality is not well understood. In addition, very little empirical work has incorporated the insights of the theory to interpret actual policy effects. Leeper is currently pursuing both of these lines of research.

**Empirical Efforts to Identify Policy Effects.** This line of work is the natural progression from the classic studies of Milton Friedman and his co-authors. Modern time series work employs vector autoregressions to separate behavior into “systematic” parts - often traditional supply and demand functions - and “disturbances” - interpretable as exogenous shifts in decision rules. The endogeneity of policy behavior makes it difficult to mimic the thought experiments conducted in theoretical models. The task involves extracting disturbances that shift the monetary policy function, but do not shift other behavioral relationships contemporaneously. Papers in this literature typically adopt the perspective that the dynamic impacts of monetary policy shocks are well known from theoretical work (much of it Friedman’s), and apply the criterion that one has successfully isolated a monetary policy shock if its dynamic effects conform with widely held beliefs about policy. Just a few years ago it was common to associate one-step-ahead forecast errors - VAR innovations - in policy variables (such as money or interest rates) with shocks to the policy function. Doing so, however, leads to perverse effects of monetary policy on macro variables. Leeper has published several empirical papers about monetary policy. His most recent published effort includes an extensive survey of the literature and some methodological innovations that allow the study of a “large” vector of macro time series, with the aim of obtaining a broader set of results on the effects of monetary policy (Leeper, Sims, and Tao Zha, Brookings Papers on Economic Activity 1996 e.g. David B. Gordan and Leeper, Journal of Political Economy 1994.

Although research area (1) concentrates on monetary and fiscal policy effects, these effects cannot be understood independently of other aspects of the macro economy, such as financial and labor markets, consumption and investment decisions, and institutional features that influence the constraints facing private and public decision makers. Similarly, although the work in area (2) has focused on identifying policy effects, progress cannot be made without thinking carefully about identifying private behavior as well. Identification is the key to understanding macro time series. All interpretations of economic facts make identifying assumptions that separate fluctuations in economic variables into their behavioral sources. A general equilibrium model explicitly maps exogenous behavioral disturbances into times series on endogenous variables. Even if one’s research emphasis is on policy effects, therefore, viewing data through the lens of a general equilibrium model forces one to take a position on non-policy aspects of the economy.

Leeper has organized a conference on measuring the effects of monetary policy, which is to be held this fall and is
sponsored by the Carnegie-Rochester Conference Series on Public Policy. The purpose of the conference is to bring together a collection of new research, critiques, and survey papers focused on models for the effects of monetary policy on the economy that insist on closely matching the aggregate multivariate times series facts. The proceedings of the conference will be published in a volume of the Carnegie-Rochester Conference Series guest edited by Leeper and Sims.

**Monetary Economics: Theory and Institutional Design**

Professor Christopher Waller is currently engaged in two distinct areas of research in monetary economics. The first research program entails using search theoretic models of money to study dual currency economies. The second concentrates on the optimal design of central bank institutions to protect against undesirable political and partisan influences on monetary policy.

**Search Theoretic Models of Money**

In many developing and transitional economies, individuals use the domestic currency and a foreign currency to conduct trade amongst themselves. For example, in Ukraine, you can pay for a cab ride with either the local currency or with dollars. Based on this observation, several interesting questions arise: How does the foreign currency achieve acceptability as a medium of exchange in internal trade? How does an increase in the purchasing power of the domestic currency affect the purchasing power and use of the foreign currency? What can the domestic government do to drive out the foreign currency?

Waller and IU Ph.D. Elisabeth Soller of Drexel University address these questions in a series of working papers based on Professor Soller’s Ph.D. thesis. In their paper “A Search Theoretic Model of Legal and Illegal Currency” they point out that a key feature of many dual currency economies is that it is typically illegal to use foreign currencies for internal trade. This makes using the foreign currency ‘risky’ relative to the domestic currency and thus affects its relative value in trade. Yet, despite the risk, foreign currency is still used. One reason for this that Waller and Soller point out is that individuals may still be willing to bear the risk of using foreign currency if the expected benefits from doing so exceed the benefits of using the ‘safe’, but potentially lower valued (due to high domestic inflation) domestic currency. Furthermore, the foreign currency will carry a risk premium, in terms of increased purchasing power, to compensate for the risk thereby ensuring acceptability. They then examine how greater enforcement of the law, the penalty associated with being caught with the foreign currency and changes in the domestic inflation rate affect the relative values and acceptabilities of the two currencies. In a second working paper, “Heterogeneous Risk Preferences in a Dual Currency Economy”, Waller and Soller examine how differing attitudes towards the risk affect domestic resident’s willingness to use the illegal foreign currency. They show that by introducing heterogeneous risk preference several counter-factual theoretical results of standard search theoretic monetary models are reversed. Most importantly, they study how government policies affect the real exchange rate between the two currencies. In addition to his work with Soller, Waller is conducting research with Ben Craig of the Federal Reserve Bank of Cleveland (formerly at Indiana University) on how domestic residents choose a portfolio of currencies to conduct trade given the different transactions costs associate with each currency. The models used to address this issue cannot be solved analytically and require cutting-edge computer simulation work to study the equilibrium behavior of the economy.

**Optimal Design of Central Bank Institutions**

Waller’s second line of research focuses on the political economy of monetary policy, in particular the desirability of central bank independence. Independence is ‘good’ because it protects monetary policy from undesirable
political and partisan influences that, left unabated, would generate sub-optimal macroeconomic outcomes. Unfortunately, independence requires that the central bank be shielded from the democratic process which is unappealing since it implies unaccountability to the electorate. Hence the key question is how to design the central bank such that it has sufficient independence to conduct policy free of political interference but is still held accountable to the general public?

In his 1992 *American Economic Review* paper, Waller shows that society will benefit from delegating monetary policy to an independent, ‘conservative’ banker who does not share society's policy preferences. Conservative refers to the idea that the central banker dislikes inflation relatively more than the rest of society. However, due to heterogeneity in the structure of the economy, sub-groups within society (represented by political parties) differ as to how ‘conservative’ the central banker should be. This creates a partisan conflict over the inflationary attitudes of the central bank. How to resolve partisan conflict in the appointment of central bankers is the subject of Waller's 1992 *Journal of Monetary Economics* paper “A Bargaining Model of Partisan Appointments to the Central Bank”. In that paper, Waller points out that the nomination-confirmation process between the president and the senate is similar to a non-cooperative bargaining model. He then shows that due to this bargaining structure and the timing of elections that appointees to the central bank will be more moderate the closer the appointment is to the next election. If moderation leads to less volatile monetary policy, then he suggests the Federal Reserve Chairman should be appointed right before a presidential election rather than right after an election in order to minimize partisanship.

With regard to accountability, in his 1996 *American Economic Review* article (co-authored with Carl Walsh of University of California–Santa Cruz) entitled “Central Bank Independence Economic Behavior and Optimal Term Lengths,” Waller shows how the use of reappointment and the length of the central banker’s term in office ensures both accountability and independence in monetary policy. In his 1997 *Economic Inquiry* paper, “Central Banking as a Political Principal-Agent Problem,” (co-authored with Michele Fratianni and Jurgen von Hagen of Indiana University) Waller explores the use of performance contracts and reappointment for central bankers as a means of minimizing political influence on monetary policy while maintaining accountability. Performance contracts give the central banker financial incentives to produce the optimal monetary policy and provide a transparent vehicle for accountability. Long terms in office with reappointment for the central banker allows monetary policy to be independent of current political pressures but still makes him accountable to the electorate in the long run.