Dean Croushore Blog About Monetary Policy

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Better Models for the Fed

The Fed needs better economic models. The Federal Reserve Board's FRB-US model is a good model for some situations, but is not very consistent over time, as Tetlow (2013) discusses. Like all extant macroeconomic models, it gave no indication of the scope of the financial crisis in 2008. Building a better model requires a major commitment of resources, as suggested by Bullard (2011).

In his 2013 paper, Bob Tetlow, an economist at the Federal Reserve Board who has had a major influence in building and working with the FRB-US model, shows how the model has evolved over time. Models are much simpler than reality, of course, but Tetlow shows that many of the main conclusions that a macroeconomist would reach about the structure of the economy would be different if you looked at the model at different points in time. For example, the sacrifice ratio, which shows how much output loss (or unemployment increase) is required to reduce inflation by one percentage point, has changed over time by a factor of more than 3 between the 1997 version of the model and the 2005 version of the model. So, the relation between inflation and unemployment in the model has clearly changed dramatically over time. Similarly, the impact of a 1 percentage point rise in interest rates on output growth has changed in the model from a decline of 2.2 percent in the model as of 1999 to 1.0 percent in the model as of 2007. That is an alarmingly large difference in the response of the economy to a change in monetary policy.

Tetlow's research reminds us that analysis of the macroeconomy requires a good model, but that the best model of the U.S. economy has changed substantially over time. Different versions of the model lead to very different conclusions about the structure of the economy and how it operates. Further, Tetlow shows that an attempt to find optimal rules for policymakers to follow (as discussed in M&B Chapter 18), is thwarted by the uncertainty about the model's equations and parameters.

So, what can be done to improve this state of affairs? Jim Bullard, president of the Federal Reserve Bank of St. Louis, made some suggestions along these lines in a speech in 2011. He thinks we need macroeconomists to come together to create a much stronger and more robust model of the economy, which would be an order of magnitude larger than any current model. The effort would need to resemble the Manhattan project that developed the nuclear bombs that ended World War II. Such an effort would likely require a large government effort and seems unlikely to happen in an era in which the government debt-GDP ratio is the highest it has been in 60 years. But it would take resources of that magnitude to make a major advance in macroeconomic modelling.

The problem in developing a better model of the macroeconomy is that economic researchers do not operate in large teams. Most economic research is done by single researchers, or sometimes in small teams of two or three, but never in large groups. Many macroeconomists do not think they would want to be part of a large team, but would prefer to do their own research, rather than contributing to a larger effort (based on a small survey of economists with whom I discussed this idea). As a result, most of our models are very small and can answer only a very limited number of questions. The models are thus not very useful for policymakers.

How would a better model help policymakers? We learned after the financial crisis that our models were fairly inaccurate at forecasting, but also they were not useful in helping us understand the potential impact of the Federal Reserve's unconventional policy measures. As a result, the Fed was operating on intuition and hope in setting its policy, once interest rates became close to zero. The hope continues that a huge expansion of the Fed's monetary base (defined in M&B Chapter 16) will not lead to higher inflation; but we do not have a good model that would make such a belief convincing.

Perhaps we will need another crisis to realize the need for an ambitious macroeconomic model-building project. But wouldn't it be better to prevent the next crisis by building a better model, rather than waiting for disaster to strike? Greater knowledge about the macroeconomy should be a top national priority, not an afterthought.

References:

Bullard, James. "Research in Macroeconomics After the Crisis." Speech at Society for Nonlinear Dynamics and Control, March 17, 2011.

Tetlow, Robert. "Real-time Model Uncertainty in the United States: 'Robust' Policies Put to the Test." (Revised January 2013). *International Journal of Central Banking* forthcoming.