

## **NBER 2009 Macro Annual – Paper 6**

### **Beaudry, Lucke, *Letting Different Views About Business Cycles Compete***

Bernd Lucke initiated the discussion with several brief responses to the discussants. He agreed with Jonas Fisher that different measures of technology, such as the measure in Basu, Fernald and Kimball (2006), are desirable. He showed that results using that technology measure show the same pattern for hours as the benchmark TFP results. Fisher had also discussed the lack of robustness when allowing two vs. three cointegrating vectors and the challenges of using the Johansen methodology to test for the number of cointegrating vectors. Lucke agreed that there may be size problems with the test. As an alternative, he pointed to the results obtained when estimating a VAR in levels, which will be a consistent estimator of any cointegrating vectors that may be in the system. With this approach, one does not need to specify a certain number of cointegrating vectors and does not use any structural analysis, but rather do a Cholesky decomposition of the reduced form errors. Lucke showed that these results also pointed to the big importance of anticipated vs. surprise shocks.

John Fernald commented that structural VAR long run restrictions have some well-known limitations and unknown sensitivities. In terms of limitations, he highlighted the paper by Erceg, Guerrieri and Gust (2005), which does a Monte Carlo simulation of data from New Keynesian and RBC models. The statistic that those authors find least reliable is the variance decomposition. In their simulations, the 90% confidence interval for the contribution of technology shocks to output fluctuations at business cycle frequencies ranges from 7 to 90 percent. He also pointed out that results are sensitive to low frequency properties of the data, as Fisher had pointed out in his discussion. In light of these challenges, the next step, in his view, is to turn to alternative identification schemes, such as the one pursued in the paper by Basu, Fernald and Kimball (2006). That paper found that technology shocks explained a lot of the variation in employment, though not much variation in output. It also found no evidence that stock prices or consumption Granger-caused TFP shocks. In updated work (Basu, Fernald, Fisher and Kimball, 2009), which extends the sample and breaks it into investment and consumption shocks, Fernald finds that investment technology shocks are incredibly contractionary for hours, output, and investment, while consumption technology shocks are expansionary. However, there is no evidence of Granger causality from stock prices to those shocks. Fernald offered that there is some weak evidence in the quarterly utilization-adjusted TFP series, but the explanatory power is low. All this evidence seems to suggest that there simply is not a lot of news in the stock market about technology innovations. Lucke noted that he would further investigate why the results of Fernald and his co-authors differ from the results of the present paper.

Jennifer La'O wondered why the qualitative properties of the anticipated TFP shocks identified by Eric Sims (2009) differ from the properties shown here. Specifically, she recalled that Sims finds that investment goes down in response to an anticipated TFP shock. Lucke noted that Sims looks for all structural shocks that are orthogonal to TFP shocks and seeks the linear combination of these shocks that best explains future TFP. He found this approach problematic because there is no penalty associated with increasing the number of variables in the system. Using Sims' methodology on simulated data which consists only of independent random walks and no news shocks, Lucke found that the

approach nevertheless identifies a news shock, whose importance becomes larger and larger as one increases the dimension of the system.

Marc Giannoni was intrigued by the authors' finding that there is a permanent effect of monetary shocks on hours. He wondered if that result reflects an omitted variable problem, since there are monetary shocks in the system, but no account for inflation. He noted that in the investment specific shock literature, accounting for inflation becomes important once one adds a news shock. Lucke pointed out that the non-neutrality result arose in the case of two cointegrating vectors, which is why the authors moved away from this specification. The benchmark case with three cointegrating vectors does not have permanent effects of monetary shocks.

Simon Gilchrist agreed with Fisher's discussion that time to build seems incredibly important in a framework that seeks to identify news shocks. He also found very compelling the evidence in Justiniano, Primiceri and Tambalotti (2009) on the link between financial market imperfections and shocks that affect the transformation of consumption into investment goods. In his own work with Egon Zakrajsek (2007), he found that the primary determinant of investment spending from 1973 onwards is the corporate credit spread. When thinking about news shocks and the mechanism through which they might create business cycle fluctuations, Gilchrist thought that it is also interesting to think about the interaction of such shocks with the financial markets. In the model of Bernanke, Gertler and Gilchrist (1999), adding a news shock would yield a big shock to the net worth of the investment sector, which would cause an immediate investment boom. This mechanism raises questions about the identification of news shocks.

Chris Carroll followed up by stressing that he finds it very difficult to believe that financial shocks are something that we can still ignore in thinking about macroeconomic fluctuations. He pointed out that the only interpretation of financial market shocks that exists in this paper is the movement in stock prices, which is seen to reflect perfectly rational knowledge of future changes in knowable technology. He thought that this approach has to change, since it is not a credible description of how the macroeconomy fluctuates. He echoed Ken Rogoff's comment in the discussion of the paper by Angeletos and La'O that it is difficult to understand business cycles without thinking about financial influences. He noted the connection even in the less dramatic downturns, such as the 1990s recession, widely believed to have something to do with the credit crunch, the 2001 recession, following the tech bubble, and, of course, our current circumstances. He seconded Gilchrist that economists need a serious way to model interactions between financial markets imperfections and the apparatus currently used to think about fluctuations.

Stephanie Schmitt-Grohe recalled Cochrane's 1994 paper, which failed to find a significant role for credit frictions in generating business cycle fluctuations between World War II and 1994. She agreed that these frictions are particularly important in the current crisis, but she wondered if this automatically implies that they are also extremely important for the regular "up-and-down" fluctuations at cyclicalities between six and 30 quarters. Lucke added that the shock identified as a news shock in the paper may very well include financial market news, since the only assumption is that it is orthogonal to TFP. However, he pointed out that this shock contributes to TFP but not to the nominal interest rate, which suggests that perhaps financial market conditions do not play a very

significant role at business cycle frequencies. In response, Carroll cited the paper by Gilchrist, Yankov and Zakrajsek (2009), which constructs measures of risk spreads from the bond market and finds that this variable has vastly more predictive power over a long span of macroeconomic history than pretty much anything else.

Gilchrist concluded with a call to arms: just as Fernald and his co-authors are improving our measures of technology, we should significantly improve measurements of the information content of asset prices. He noted that his research shows very clearly that corporate bond spreads are one of the most informative pieces of information available, especially for investment spending, and we should understand why that is the case.