Report on

Taking a DSGE model to the data meaningfully

1. Summary

The paper addresses a very important issue: How one should empirically test the validity of DSGE models? So far, not much research has been devoted to that issue. The paper by Ireland (2004) is one of a few examples. In contrast to Ireland (2004), the authors do not impose a large number of restrictions derived from the DSGE framework on the empirical model prior to estimation. Instead, they apply and estimate a flexible cointegrated VAR model and translate the DSGE model implications into restrictions on the VAR model parameters. Hence, the restrictions are tested after a general model has been estimated. Thereby, they avoid *spurious acceptance* of the DSGE model which may occur if the data are forced through a set of assumptions underlying the DSGE/RBC framework. Insofar, the paper delivers an important contribution to the problem of adequate testing of DSGE models. Moreover, the paper may help to bring together two lines of research which have separated over the last decades: theoretical macroeconomic research related to (calibrated) DSGE models and macroeconometric research related to (classical) time series analysis.

The derivation of the parameter restriction and the subsequent VAR analysis is very carefully done. Nevertheless, there are a couple of issues I would like to comment on.

2. Detailed Comments

My main concern refers to the capital variable k_t used in the empirical model. First of all, I am not quite sure whether you use investment or the capital stock in your estimated model. On pages nine and ten you say that you use an official measurement of the gross capital stock in contrast to a simulated series due to Ireland (2004). However, the data description names gross capital formation, i.e. investment. In addition, the capital stock series in Figure 2 looks very much like the U.S. real privat investment series. (By the way the labelling for the two series in Figure 2 seems to be wrong. Moreover, the reference to Figure 2 in the first paragraph of page 10 did not work.)

If you use an investment series, then I have two remarks. Data on investment are available back to mid 1940s, so you may extend the sample. The more important question is whether it is justifiable to replace capital by investment. Clearly, investment adds to the capital stock. Thus, investment dynamics also captures the development of the capital stock and just a level difference may occur. However, the measurement of depreciation is a critical issue. Depreciation is not considered in the gross capital formation series. Given, in addition, the different measurement possibilities for depreciation, you have to discuss and justify the replacement of capital by investment in more detail.

The foregoing remarks rely on my perception that you use investment. But maybe, I misunderstood something here. Then, I would like to know which source the capital stock series is from. In any case you may state the sources of the data used.

Finally, you state that the empirical conclusions may not be robust to the choice of the capital stock series. Can you bring forward arguments that your conclusion, that consumption and labour demand shocks generated the business cycle, will survive a different choice of the capital stock? The finding that demand shocks are more relevant than technology shocks will probably be the most important message for many readers of your paper. Hence, robustifying this result is very crucial, also for future theoretical research on DSGE models.

How have the dummy variables been identified? Did you test for significance of possible dummy variables after (graphically) analysing the residual of a VAR model without dummies?

Has the model using H_t been completely respecified or do you apply the structure of your main model?

You may add references to the empirical literature initiated by King, Plosser, Stock & Watson (1991) testing for stationarity of the so-called great ratios. The stationarity implication has been directly derived from an RBC model and tests are often done within a cointegrated VAR model framework. Moreover, you may discuss the relationship to the Bayesian analysis of DSGE models in a bit more detail. An & Schorfheide (2007) could be an additional important reference, especially in terms of their ways to check the model adequacy.

Finally, I had some difficulties in reading Table 5. I do not have a suggestion on how to improve the presentation but maybe you restructure something or add an explanatory note.

References

An, S. & Schorfheide, F. (2007). Bayesian analysis of dsge models, *Econometric Reviews,* **forthcoming**.

Ireland, P. N. (2004). A method for taking models to data, *Journal of Economic Dynamics and Control* **28**: 1205–1226.

King, R. G., Plosser, C. I., Stock, J. H. & Watson, M. W. (1991). Stochastic trends and economic fluctuations, *American Economic Review* **81**: 819–840.