Referee report on "*DSGE models and central banks*"

by Camilo E. Tovar

The paper reviews the main issues related to the use of dynamic stochastic general equilibrium (DSGE) models at central banks. Although they can be useful along several dimensions, among which predicting the effects of shocks on the main macroeconomic variables, they still need to incorporate several channels of the transmission mechanism of shocks (e.g. financial and credit markets). Many issues concerning their estimation and empirical validation must be still addressed.

The paper is interesting and very useful as it provides an overview of the main problems related to the use of DSGE models as tools at central banks. I will organize my comments in three points: *i*) what I consider it is missing; (*ii*) estimation and identification; (*iii*) models with imperfect information.

1. Relevant references

In my opinion there are some important contributions on the literature on DSGE models that might be worth including in the paper. Concerning the analysis of **fiscal policy**, I would suggest adding reference to the paper by Libero, Monteforte and Sessa (Journal of Public Economics, 2008 *forthcoming*). In the paper the authors find, on the

basis of a DSGE model with non-Ricardian agents estimated for the euro area, mild Keynesian effects of public expenditures in the.

Concerning the introduction of **financial frictions** in DSGE models, Arce and Andrés (2008, Banco de España *mimeo*) embed a banking sector in an otherwise standard neo-keynesian model with collateral constraints. Banks compete in imperfect lending markets and set an optimal lending/deposit rate margin that affects their market share and the amount of funds available for lending. They find that lower banking competition reduces output and consumption over the long run. Moreover, the model generates a trade-off between steady-state efficiency and business cycle stability.

Finally, Iacoviello and Neri (2008) extend the model in Iacoviello (AER, 2005) to include a housing investment sector. The model is used to analyze the contribution of fluctuations in housing market variables to the broader economy.

Of course many other important contributions are available in the literature and space constraints do not allow considering all of them in the survey. The above papers I have briefly mentioned are indicative of directions to which researchers at central banks are heading in terms of use of DSGE models.

2. Estimation and identification of DSGE models

With respect to the estimation I do not share all the criticism that has been raised concerning the estimation of DSGE models. Although I recognize the problems related with the estimation (misspecification and identification) I think that all available models, including GMM ones, are affected by possible misspecification with different degrees.

Whether DSGE models represent or not the correct DGP, or the extent to which they are misspecified, are still open questions that, according to me, also applies to more traditional macroeconometric models. DSGE models differ, for example, from Structural VARs in that they impose cross-equation restrictions that arise from theory. Structural VAR models differ from traditional macroeconometric models as they do not impose "incredible" restrictions. The observation that DSGE models are misspecified should not be considered as a limit to their use but rather as suggesting that further analysis and additional investigation is needed.

Misspecification is an issue for all methods of estimation as Ruge-Murcia (JEDC, 2007) has shown. He finds that GMM and SMM are generally more robust to misspecification than ML. However, by that adding measurement errors and using informative priors one can limit the effects of misspecification on the parameter estimates.

Concerning the choice of priors, the fact that the data are not enough informative for some parameters (it remains to see whether identification is a matter of data or something rooted in the model, see Iskrev, 2007) should not be seen as a problem. One way to get around it is to show that the main implications of the model, such as forecasts, impulse responses, do not depend "too much" on the prior. I personally had this problem in the past and ask once to Chris Sims what to do in these types of situations. The answer he gave me was exactly the suggestion I gave above: test the robustness of your main results to different prior distributions.

Finally, concerning the identification of the structural parameters, Iskrev (University of Michigan, *mimeo* 2007) finds that identification of parameters in DSGE models is generally weak and that the problem is largely embedded in the structure of the model. He concludes by stating that policy analysis should be done with caution since, when parameters are weakly indentified, policy prescriptions might be strongly dependent on the researcher's priors.

References

L. Forni, L. Monteforte and L. Sessa, 2008. “The general equilibrium effects of fiscal policy: Estimates for the Euro area”, *Journal of Public Economics*, forthcoming.

J. Andrés ands O. Arce, 2008. “Macroeconomic Effects of Imperfect Banking Competition”, mimeo, Banco de España.

M. Iacoviello and S. Neri, 2008. “Housing Market Spillovers: Evidence from an Estimated DSGE Model”, Banca d’Italia Discussion paper, No. 659.

M. Iacoviello, 2005. “House Prices, Borrowi*ng Constraints, and Monetary Policy in the Business Cycle”,* American Economic Review, Vol. 95, No. 3, pp. 739-764.

F. J. Ruge-Murcia, 2007. “Methods to estimate dynamic stochastic general equilibrium models”, *Journal of Economic Dynamics & Control*, Vol. 31, pp. 2599–2636.

N. Iskrev, 2008. “How much do we learn from the estimation of DSGE models? A case study of identification issues in a New Keynesian business”, mimeo, University of Michigan.