[Can a data-rich environment help identify the sources of model misspecification]

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In recent years dynamic stochastic general equilibrium (DSGE) models have emerged as important tools for forecasting and policy analysis, thanks to their attractive theoretical features and their improved forecasting ability. As these models become more relevant in policy applications, diagnosing their fit becomes crucial.

The recent crisis has brought new relevance to this question: key causes of the crisis and its protraction, such as the housing market, financial markets, the labour market and the fiscal sector, are often very stylised or missing in most policy macro-models. And maybe rightly so, if the model can represent the data well without them. If instead the model misses some crucial aspects of the economy's dynamics, then we must expand the model to include those features. We therefore need tools to assess which of these channels and transmission mechanisms are relevant at various points in the conjuncture. This paper aims to make progress in this direction.

I propose to exploit a data-rich environment and focus on the interaction between large number of macroeconomic variables and the model to capture the likely sources and magnitude of the model misspecification. If a model is well specified, then it should represent the data well and off-model variables should not help predict the driving forces of the model, which are generally assumed to evolve in an exogenous fashion. Finding that variables that are not explicitly in the model can help predict the model's dynamics then is an indication that some channel is missing. Forecast error variance decompositions, which indicate how much of the overall dynamics of the model's variables in driven by external off-model information, can help assess how big the misspecification is. By looking at which variables help predict the driving processes of the model, we can also gather information about which specific channels are missing.

The paper puts the proposed methodology to work the test in a controlled experiment and using a state-of-the-art model and US data up to 2011. I find that, despite the richness of model's structure, the auxiliary off-model information can account for a sizable portion of the forecast error variance decomposition of its driving processes. I also find that the investment shock, which affects the transformation of consumption goods to installed capital, appears to be the most misspecified. I confirm the conjecture that the investment specific shock picks up unmodeled aspects of the financial markets and can be seen as a proxy for overall health of the financial system, by extending the model to include financial frictions.