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Titre: Combining structural and reduced-form models for macroeconomic forecasting and policy analysis.
Directeurs: Domenico Giannone et Philippe Weil

Short Summary:
This Ph.D. dissertation addresses two of the challenges raised by the emergence of dynamic stochastic general equilibrium (DSGE) models as tools for policy analysis and forecasting. First, I investigate the problem of taking DSGE models to the data in a policy environment, where expert input and other information that is not explicitly modelled in the DSGE play a crucial role. The first two papers of my thesis focus on this topic. Second, I study the issue of misspecification in DSGE models: this is the topic for the third and fourth Chapters. In the first paper of my dissertation, “Forecast with Judgment and Models,” I address the issue of incorporating judgment in DSGE models; in particular, I propose a method for combining judgmental and model-based forecasts in a parsimonious and model-consistent way. The combined forecasts are model-based, and therefore disciplined by the rigor of the economic model, but can also incorporate judgmental information. Moreover, the proposed method also allows interpreting the judgmental forecasts through the lens of the model.

The second paper, entitled “Incorporating Conjunctural Analysis in Structural Models” and written jointly with Domenico Giannone and Lucrezia Reichlin, takes a different approach. Here, rather than extracting information from the judgmental forecasters, we directly link the model with a large panel of timely indicators. More specifically, we combine statistical models developed for the analysis of the monthly data-flow, which are based on the scrutiny of a large number of indicators dealing with different aspects of the economy, with structural micro-founded models, which typically are quarterly and focus on few key macroeconomic indicators. This procedure allows obtaining real-time estimates of unobserved key variables, such as total factor productivity or the natural interest rate.

A feature of the methodologies proposed is that at the end of the quarter, the DSGE combined with the statistical model for monthly variables and the quarterly DSGE model with no extra information produce the same results. This amounts to assuming that the model is well-specified. In the third and fourth Chapters of this dissertation I relax this assumption and allow the panel of variables not explicitly modelled within the DSGE to interact with the model in order to investigate the properties of its driving processes. In particular I aim to identify not only the presence but also the sources of misspecification, and to understand what these driving processes are proxying. First, I run an extensive battery of bivariate Granger-causality tests relating the states of the DSGE model to a wide range of relevant macro-series. I then propose a methodology that takes into account the joint dynamics of the variables and tests, jointly and in a more formal framework, the exogeneity of the variables of the DSGE with respect to some auxiliary variables. I apply the methodology to the new neo-classical synthesis model with a stochastic trend presented in Justiniano Primiceri and Tambalotti (2010) using a panel of the 20 most relevant macro-series. The key idea is to test jointly whether the additional macro variables Granger-cause the driving processes of a model.