

## **DISSERTATION SYNOPSIS**

My dissertation is comprised of three related papers. The first paper is my job market paper. In it, I investigate the role of systematic U.S. monetary policy in the presence of oil price shocks. The second paper compares different approaches to modeling oil demand. The third paper studies the empirical performance of Laplace type estimators for estimation of macroeconomic models.

### **Optimal Monetary Policy and Oil Price Shocks (Job Market Paper)**

In an influential paper, Bernanke, Gertler, and Watson (1997) and (2004) argue that systematic monetary policy exacerbated the recessions the U.S. economy experienced in the aftermath of post World War II oil price shocks. In my job market paper, I critically evaluate this claim in the context of an estimated medium-scale model of the U.S. business cycle. Specifically, I solve for the Ramsey optimal monetary policy in the medium-scale dynamic stochastic general equilibrium model (henceforth DSGE) of Schmitt-Grohé and Uribe (2005). To model the demand for oil, I use the approach of Finn (2000). According to this approach, the utilization of capital services requires oil usage.

In the related literature on the macroeconomic effects of oil price shocks, it is common to calibrate structural parameters of the model. In contrast to this literature, I estimate the parameters of my DSGE model. The estimation strategy involves matching the impulse responses from the theoretical model to responses predicted by an empirical model. For estimation, I use the alternative to the classical Laplace type estimator proposed by Chernozhukov and Hong (2003). To obtain the empirical impulse responses, I identify an oil price shock in a structural VAR (SVAR) model of the U.S. business cycle. The SVAR model predicts that, in response to an oil price increase, GDP, investment, hours, capital utilization, and the real wage fall, while the nominal interest rate and inflation rise. These findings are economically intuitive and in line with the existing empirical evidence.

Comparing the actual and the Ramsey optimal monetary policy response to an oil price shock, I find that the optimal policy allows for more inflation, a larger drop in wages, and a rise in hours compared to those actually observed. The central finding of this paper is that the optimal policy is associated with a smaller drop in GDP and other macroeconomic variables. The latter results therefore confirm the claim of Bernanke, Gertler and Watson that monetary policy was to a large extent responsible for the recessions that followed the oil price shocks. However, under the optimal policy, interest rates are tightened even more than what is predicted by the empirical model. This result contrasts sharply with the claim of Bernanke, Gertler, and Watson that the Federal Reserve exacerbated recessions by the excessive tightening of interest rates in response to the oil price increases. In contrast to related studies that focus on output stabilization, I find that eliminating the negative response of GDP to an oil price shock is not desirable.

### **Comparing Different Ways to Introduce Energy (Work in Progress)**

The existing literature adopts different strategies to introduce energy demand into a theoretical model. In this paper, I compare how the extant approaches to modeling energy demand change the predictions of the models and policy advice. First, I compare basic models of energy demand. As the next step, I study DSGE models where nominal and real rigidities are combined with different assumptions about energy demand. I show that to provide realistic predictions about the dynamic response of macroeconomic variables, it is crucial to properly calibrate these models. I find that policy recommendations are sensitive to the choice of the model parameters.

### **Classical Extremum and Laplace Type Estimators: a Comparison for the Estimation of Macroeconomic Models – with Riccardo DiCecio (Work in Progress)**

Estimation of economic models with a large parameter space is often complicated because of highly nonlinear criterion functions used for estimation. Standard estimation techniques, such as classical extremum estimators, are time-consuming and do not guarantee that the estimates are global extrema. A new estimator, the Laplace type estimator, has been recently proposed as an alternative. This estimator is computationally more attractive and has the same asymptotic properties as its classical minimum distance counterpart. In this paper, we compare the performance of the classical minimum distance estimator with the Laplace type estimator as it applies to the estimation of macroeconomic models. The criterion function is derived from the distance of impulse responses of macroeconomic variables in the model from the corresponding responses in structural VAR representations of the data. We compare the two estimation techniques using a simple RBC economy, subject to neutral and embodied technology shocks. We also compare the performance of the two techniques by estimating a medium scale Dynamic Stochastic General Equilibrium model routinely used to study the effect of monetary policy shocks.