

Do central banks respond to exchange rate movements? A structural investigation[☆]

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Abstract

We estimate a small-scale, structural general equilibrium model of a small open economy using Bayesian methods. Our main focus is the conduct of monetary policy in Australia, Canada, New Zealand and the UK. We consider generic Taylor-type rules, where the monetary authority reacts in response to output, inflation, and exchange-rate movements. We perform posterior odds tests to investigate the hypothesis whether central banks do target exchange rates. The main result of this paper is that the central banks of Australia and New Zealand do not, whereas the Bank of Canada and the Bank of England do include the nominal exchange rate in its policy rule. This result is robust for various specification of the policy rule. We also find that terms-of-trade movements do not contribute significantly to domestic business cycles.

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1. Introduction

The New Keynesian framework has been the focus of much recent research on the theory and practice of monetary policy. While not an unqualified empirical success, its parsimony and theoretical consistency lends itself easily to theoretical and empirical policy analysis. Recently, this framework has been applied to study monetary policy in the open economy. An important question in this area is to what extent central banks respond to exchange rate movements when setting monetary policy (see Taylor, 2001). We address this issue by estimating a dynamic stochastic general equilibrium (DSGE) model of a small open economy (SOE) for several countries that potentially differ in their approaches to and experiences with monetary policy.

Our theoretical framework is based on Galí and Monacelli (2005) who extend the benchmark New Keynesian DSGE model described, for instance, in Woodford (2003) to a SOE setting. Open economies can engage in intertemporal as well as intratemporal trade for the purposes of smoothing consumption above and beyond what is possible in a closed economy. At the same time, foreign shocks, such as the terms of trade, can alter domestic business cycle fluctuations which may lead the monetary authority to explicitly take into account international variables. Like its closed-economy counterpart, the model consists of a forward-looking (open economy) IS-equation and a Phillips curve relationship. The former is derived from a consumption Euler equation taking into account that households consume not only domestically produced but also imported goods. The latter is obtained from the optimal price setting decisions of domestic producers. Monetary policy is described by an interest rate rule, while the exchange rate is introduced via the definition of the consumer price index (CPI) and under the assumption of purchasing power parity (PPP).

Rather than estimating policy reaction functions in a univariate setting we pursue a multivariate approach by estimating the entire structural model. The full-information likelihood-based approach optimally adjusts the estimation of the policy rule coefficients for the endogeneity of the right-hand-side variables. Moreover, we are able to exploit cross-equation restrictions that link agents' decision rules to the policy parameters. We assign prior distributions to reaction function specifications and the remaining model parameters and conduct Bayesian inference. Posterior probabilities are used to assess the adequacy of various policy rules. While this methodology has been applied to various economic questions before, we believe that our paper is the first to address the issue of open economy policy rules. Consequently, our paper presents a departure from—and a fairly straightforward alternative to—the single equation approach prevalent in the literature. To illustrate the information gain due to the DSGE model's restrictions we compare our model-based estimates to Bayesian instrumental variable estimates.

We apply our estimation technique to four small open economies, Australia, Canada, New Zealand and the UK and focus on the estimates of the monetary policy rule. Australia and Canada are both large natural resource exporters (as is the UK, but to a smaller degree) so that domestic business cycle fluctuations likely to have a substantial international relative price component. Central banks in these countries therefore may have a specific interest in explicitly reacting to and smoothing exchange rate movements as a predictor of domestic volatility. The Bank of Canada specifically acknowledged this point in that it developed a monetary condition index (MCI) that encompasses both interest rate and exchange rate information as a more comprehensive indicator of the monetary stance.

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