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Stabilization bias for a small open economy: The case of New Zealand

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ABSTRACT

Using a fully specified DSGE model, this paper investigates the relationship between a central bank's policy objectives and the stabilization bias. The model is estimated using data from New Zealand. Results indicate that the size of the stabilization bias is nearly twice as large for a small open economy relative to that of closed economies. The results also indicate that the size of the stabilization bias is increasing with respect to the policymaker's preference for exchange rate stabilization.

1. Introduction

Romer (1993) highlights an important empirical regularity that the average rate of inflation is a decreasing function with respect to its trade openness. Romer attributes this finding to the higher cost of discretionary monetary policy in a more open economy. Since then, the study of commitment versus discretionary monetary policy has moved beyond the static framework to incorporate realistic persistence in output, inflation and other nominal rigidities. In a dynamic framework, tradeoffs between minimizing the variance of key macroeconomic variables can lead to a stabilization bias even though average inflation and output is around the policy target. This paper investigates the links between the central bank's policy objectives and the size of stabilization bias for a small open economy (SOE).

This is interesting for several reasons. The analysis uses an estimated dynamic stochastic general equilibrium (DSGE) model to provide a realistic estimate of the size of stabilization bias for an actual economy, and the results from the policy experiments can help explain why many SOE had chosen to adopt inflation targeting.[1] Insights from the analysis is also linked to the influential work by Rogoff (1985) that concludes appointing a conservative central banker can help overcome or minimize the stabilization bias problem.

While the literature had largely focused on closed economy settings, the stabilization problem faced by a SOE central bank can differ in two important dimensions. First, in addition to domestic supply and demand shocks, the SOE is also

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[1] Since the 1990s many SOE have adopted an institutional framework that emphasizes inflation targeting. No country that has adopted it has abandoned it (Truman (2003)), and the numbers are expected to grow.

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subject to various foreign disturbances. Second, the exchange rate provides an additional transmission channel for monetary policy as well as an indirect channel for the transmission of foreign shocks to the domestic economy.

Clarida et al. (2001) use a simple canonical New Keynesian model to show that the SOE's optimal monetary policy design problem is isomorphic to that of a closed economy. That is, the nature of the underlying output and inflation tradeoff remains the same. Monacelli (2005) points out this is no longer true once incomplete pass-through in import prices is incorporated into the model. Allowing for incomplete pass-through bears important implications for the design of the optimal monetary policy problem. Deviations from the law of one price (or purchasing power parity) generates an additional endogenous short-run tradeoff between stabilizing inflation and the output gap. In order to further understand the nature of this policy tradeoff, two key questions are studied in this paper: (i) the empirical importance of the size of the stabilization bias for a SOE; and (ii) the relationship between the stabilization bias and policy objectives of the central bank.

A number of empirical studies have examined the size of the stabilization bias as a proxy for the costs of discretionary policy relative to the commitment case (pre-commitment).[2] Dennis (2004) measures the improvement from pre-commitment using Clarida et al.'s (1999) closed economy model to be between 0% and 11%; Ehrmann and Smets (2003) use a New Keynesian model calibrated to the Euro area and measure the gains from commitment to be between 17% and 31%. Dennis and Söderström (2006) consider four models estimated on US data and find the size of bias is equivalent to 0.05–3.6 percentage point of inflation. Dennis and Söderström also stress the size of the stabilization bias depends critically on the model as well as the underlying parameters describing the economy. Lees (2007) estimates the size of the stabilization bias for New Zealand to be around 1 percentage point of inflation.

Open economy empirical findings so far, such as Lees (2007), are based on models that lack micro-foundations. The micro-foundations embedded in DSGE models are likely to be more stable which is crucial for the types of counterfactual policy experiments conducted in this paper. In addition, Lees (2007) looks at the role of optimal delegation in the absence of commitment whereas the analysis here assumes full commitment policy. In a theoretical model, Guender (2005) also explores the role of the exchange rate in explaining the size of the stabilization bias for a SOE. This paper contributes to these studies using a fully specified DSGE model estimated on New Zealand data to help quantify the importance of the stabilization bias. As a point of departure, this paper computes the empirical distribution for the size of the stabilization bias as opposed to just a point estimate reported in previous studies.

Two interesting results emerge from the analysis. First, the estimated size of the stabilization bias for a SOE is nearly twice as large relative to that is usually found in the closed economy studies. Simulation experiments show that the more open the economy is, the higher the cost of discretionary policy will be relative to the commitment equilibrium. This offers an explanation for the trend towards inflation targeting in many SOE. Second, the size of the stabilization bias is increasing with respect to the policymaker's preference for exchange rate stabilization. The ability of the central bank to fully commit to preannounced policies is viewed as an important mechanism in achieving a stable exchange rate along side of its other policy objectives.

The paper is organized as follows. Section (2) outlines the small open economy model. Section (3) discusses the estimation methodology and describes the data. Section (4) presents the parameter estimation results. Section (5) estimates the size of the stabilization bias together with some policy discussions. Finally, Section (6) contains concluding remarks.

2. A small open economy model

This section describes the key structural equations implied by the model proposed by Gali and Monacelli (2005) and Monacelli (2005). The model's dynamic is enriched by assuming external habit formation and indexation of prices as in Smets and Wouters (2003), and Christiano et al. (2005).

2.1. Households

The economy is inhabited by a representative household who seeks to maximize:

$$E_0 \sum_{t=0}^{\infty} \beta^t \{U(C_t) - V(N_t)\} \tag{1}$$

$$U(C_t) = \frac{(C_t - hC_{t-1})^{1-\sigma}}{1-\sigma} \quad \text{and} \quad V(N_t) = \frac{N_t^{1+\varphi}}{1+\varphi}$$

where β is the rate of time preference, σ is the inverse elasticity of intertemporal substitution, and φ is the inverse elasticity of labor supply. N_t denotes hours of labor, and hC_{t-1} represents habit formation for the optimizing household, for $h \in [0,1]$. C_t is a composite consumption index of foreign $(C_{F,t})$ and domestically $(C_{H,t})$ produced goods defined as:

$$C_t \equiv \left((1-\alpha)^{\frac{1}{\eta}} C_{H,t}^{\frac{\eta-1}{\eta}} + \alpha^{\frac{1}{\eta}} C_{F,t}^{\frac{\eta-1}{\eta}} \right)^{\frac{\eta}{\eta-1}} \tag{2}$$

[2] The terms "stabilization bias" and "gains from pre-commitment", measured as the difference in the loss function between commitment and discretion equilibrium, are used inter-changeably.