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Exchange rate intervention in small open economies: The role of risk premium and commodity price shocks

Carlos J. García [a,*], Wildo D. González [b]

[a] ILADES Georgetown University and Universidad Alberto Hurtado, Erasmo Escala 1835, Santiago, 8340539, Chile
[b] Central Bank of Chile, Agustinas 1180, Santiago, 8340454, Chile

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ABSTRACT

We study the effect of country risk premium and commodity price shocks on monetary policy in small open economies. Risk premium shocks not only can explain most of the variance in the exchange rate, but also can expand GDP. Our estimations indicate that the impact of a real depreciation on exports far exceeds not only the balance sheet effect, but also the effect of an increase in the cost of imported inputs. However, in a more complex environment, where the changes in exports are offset by negative shocks to commodity prices, the contraction stemming from the balance sheet effect reappears.

> "Central banks in small open economies should openly recognize that exchange rate stability is part of their objective function."International Monetary Fund[1]

1. Introduction

The design of monetary policy in small open economies poses important challenges that are not present in developed countries. Small open economies must continuously deal with volatility in international financial markets and international trade, especially from the high variability of country risk premiums and commodity prices, which could push the central bank to change its monetary stance. In this study, we also include other shocks that have been proposed as determinants of the exchange rate (such as productive and monetary shocks).[2]

The real exchange rate is one of the key variables through which fluctuations in international markets are transmitted to domestic economies. For example, unexpected external shocks that alter the exchange rate may increase the cost of the external debt service, the value of income from commodity exports, the cost of imported inputs, and so on. Thus, the change in the real exchange rate may alter the expected path of inflation, forcing central banks to adjust their monetary policy.

Much of the literature on monetary policy in open economies has focused on whether central banks respond to the real exchange rate. The evidence from empirical studies indicates that many countries include the real exchange rate in their policy reaction function. The evidence is not conclusive, however: countries like Australia and New Zealand do not incorporate the exchange rate in their policy reaction function (Lubik & Schorfheide, 2007).

* Corresponding author. Tel.: +56 2 8897368.
E-mail addresses: cgarcia@uahurtado.cl (C.J. García), wgonzale@bcentral.cl (W.D. González).

[1] Quoted in Blanchard, Dell'Ariccia, and Mauro (2010).

[2] In Appendix A, we define all the shocks considered in this study.

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On the other hand, welfare analysis has produced contradictory results depending on the model proposed (Bergin, Shin, & Tchakarov, 2007). For example, Ball (1999), Svensson (2000), and Batini, Harrison, and Millard (2003) find that including the real exchange rate marginally improves the macroeconomic performance of central banks. In contrast, studies such as Wollmershauser (2006), Morón and Winkelried (2005), and Cavoli (2009) show that defending the exchange rate may be useful in a context of financial instability or as a response to fear of floating.

Our first goal is to estimate a simple model that is sufficiently general to incorporate a rich variety of shocks for explaining the real exchange. We build a dynamic stochastic general equilibrium (DSGE) model for a group of small open economies (namely, Australia, New Zealand, Chile, Colombia, and Peru). We consider this group of countries because they are all small open economies, inflation targeters, and commodity exporters, and they have frequently been hit by shocks that change the conditions for accessing international financial markets and the prices of their main exports (commodities).

The model considers imperfect capital markets (in which the country risk premium depends on the ratio of external debt over GDP), restricted consumers, the balance sheet effect of exchange rate devaluations, imported inputs, commodity exports, imperfect pass-through of the exchange rate, and wage indexation. Finally, we use Bayesian techniques so that we can estimate all the equations and shocks simultaneously.

Our second target is to establish whether further exchange rate intervention is necessary in these small open economies. To do so, we use the allocations of the Ramsey problem as a benchmark. We obtain this by minimizing an arbitrary loss function in term of the variance of the inflation rate, output gap, and monetary policy rate. This assumption is for the sake of simplicity, since we do not want to characterize optimal monetary policy given a specified utility function. Instead, we explore the more empirical question of how central banks can improve their reaction to a risk premium shock in the face of any objective function that incorporates inflation and output gap fluctuations.

The results of the paper are the following. First, the risk premium shocks cannot only explain most of the variances of the exchange rate but can also cause important reallocation of resources across sectors in the short run: a positive risk premium shock expands GDP. Other shocks, such as the commodity price shock, play only a minor role. We define risk premium shocks as unanticipated changes in credit risk conditions related to external debt. This type of shock directly reduces the resources that families have to smooth consumption across time because they must pay a higher interest rate. In other words, in our study a positive risk premium produces a credit spread between the real cost of foreign borrowing and the foreign interest rate. Nevertheless, the real depreciation increases exports and therefore GDP.

This last result is controversial. The Mundell–Fleming–Dornbusch model indicates that a greater devaluation of the domestic currency is necessary to adjust the economy in response to a negative external shock. However, this is at odds with the balance sheet effect or the so-called original sin. Our model estimation indicates that the impact of a depreciation of the domestic currency on exports far exceeds not only the balance sheet effect, but also the effect of an increase in the cost of imported inputs that could cause a *J* curve in the short run.

Second, from the perspective of welfare analysis, our results do not support the prescription of the Mundell–Fleming–Dornbusch model. In the case of a risk premium shock, the impulse response function shows that both the inflation rate and the growth rate increase simultaneously as a result of a real depreciation. Central banks can thus avoid this excess volatility by raising the interest rate. We show by solving the Ramsey problem that if the central banks in these countries want to reduce the observed volatility of inflation and the output gap, they will need to increase their exchange rate intervention. We conclude that risk premium shocks do not produce a significant trade-off between inflation and growth. A central bank can substantially reduce the observed volatility of inflation and the output gap by changing the interest rate when the exchange rate is fluctuating in response to these shocks.

Third, whether there is a trade-off for the central bank after a real depreciation depends crucially on the mix of shocks hitting the economy. In a more complex environment with more shocks hitting the economy simultaneously (for example, if the changes in exports are offset by negative shocks to commodity prices), the overall result of a real depreciation could still be a contraction in GDP caused by the balance sheet effect. Therefore, the central bank should accentuate the output contraction if it wants to keep inflation under control. This last result is in line with the evidence that many central banks would like to postpone a currency depreciation so as to delay, first, the contraction caused by the balance sheet effect and, second, the additional contraction that the central banks need to enact in order to control the inflation rate.

The paper is organized as follows. Section 2 provides a detailed description of the model. In Section 3, we present the empirical strategy. The estimation results, parameters, variance decompositions, and impulse response functions are presented in Section 4. In Section 5 we implement the Ramsey approach. Section 6 discusses the caveats and scope of this paper. Finally, Section 7 concludes.

2. The structural model

Our model resembles others found in the recent literature, but we have adapted it to capture the essentials of small open economies and facilitate estimation. General references for this type of models include Woodford (2003), Clarida, Galí, and Gertler (1999, 2002), Galí and Monacelli (2005), and Galí, López-Salido, and Vallés (2007). More specifically, the model is similar to the one proposed by Smets and Wouters (2002). Our model also includes restricted consumers (Galí et al., 2007), raw materials, consumer habits, wage indexation, the balance sheet effect of exchange rate changes (Céspedes et al., 2004), and the country risk premium, which depends on the external debt–GDP ratio (Schmitt-Grohé & Uribe, 2003). Our structure is also similar to the one proposed by Laxton and Pesenti (2003), since all imports are intermediate inputs. The model thus incorporates imperfect pass-through of exchange rate changes to domestic prices. Previously, the model has been used for analyzing inflation-targeting regimes and fiscal policies in open economies (García, Restrepo, & Roger, 2011; García, Restrepo, & Tanner, 2011).