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A note on interest rate defense policy and exchange rate volatility ☆

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Abstract

In this paper, the effectiveness of an interest rate defense policy is investigated theoretically. Chen [Chen, Shiu-Sheng, 2006. Revisiting the interest rate–exchange rate nexus: a Markov switching approach. Journal of Development Economics 79 (1), 208–224] has documented an empirical regularity that higher interest rates are associated with higher exchange rate volatility. In order to account for the empirical findings, a simple theoretical model by incorporating interest rate rules in a noise trader model is proposed.

JEL classification: F30; F31; F41; G15

Keywords: Exchange rates; Interest rates; Noise traders

1. Introduction

There are debates of whether a higher interest rate stabilizes exchange rates. A number of studies have empirically investigated the effectiveness of interest rate defense, but failed to find a systematic relationship between interest rates and exchange rates. Using a nonlinear Markov-switching framework, a recent paper by Chen (2006) has addressed an empirical regularity that higher interest rates are associated with higher exchange rate volatility. The paper concludes that high interest rate policy is unable to defend the exchange rate.

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In order to explain the empirical regularity, I developed a simple theoretical model that modifies the framework of microstructural theory of exchange rates in Jeanne and Rose (2002). Their model mixes elements from two disparate branches of economic theory: the macroeconomic theory of exchange rate determination and the noise trading approach to asset price volatility. Instead of using a conventional monetary model of the exchange rate on the macroeconomic side, I assume that an interest rate rule is adopted to defend the exchange rate in my modification. To the best of my knowledge, this is the first paper to investigate theoretically the relationship between interest rate defense policy and exchange rate volatility.

This modified model has the features of multiple equilibria, which consequently imply a possible switching between the regimes of high and low volatility of the exchange rates, in other words, a shift between “crisis” and “tranquil” regimes. Furthermore, incorporating an interest rate rule in the model helps me to investigate the effects of monetary policy, especially when the government intends to raise nominal interest rates to stabilize exchange rates. It will be shown that under plausible conditions, higher exchange rate volatility is associated with higher interest rates. In this simple, stylized model, a tightened monetary policy induces capital inflow as predicted by conventional wisdom. However, tightened monetary policy attracts more noise trading thus increasing exchange rate volatility when noise traders are present in the financial market.

The paper is structured as follows. Section 2 presents a model of exchange rates determination. The concluding remarks are offered in Section 3.

2. A model of exchange rates determination

In this section, I present a modified version of Jeanne and Rose’s (2002) model which contains a microstructural theory of exchange rates. In the microstructure theory, I introduce the presence of noise trading in the foreign exchange rate market by following Jeanne and Rose (2002) closely.[1] In addition, I incorporate an interest rate rule as the monetary policy of the central bank. The main results of multiple equilibria are still reached as in Jeanne and Rose (2002), however, according to an interest rate rule in the model, I can further study the effectiveness of interest rate defense. This modified model has shown the existence of multiple regimes in exchange rates with low to high volatility. Further, high interest rate policy could be destabilizing since raising interest rates to defend the currency may push the currency into a highly variable exchange rate regime.

There are two countries, “domestic” and “foreign”, moreover, it is assumed that international traders locate around the world. In order to focus on the domestic country, I assume that the foreign country is in the steady state with constant price level. Therefore, anything measured in foreign currency can be interpreted as in real terms. Two kinds of bonds are issued, by domestic and foreign countries respectively. In the bond market, the international investors can hold bonds denominated in domestic currency (I will call them Peso bonds thereafter) and in foreign currency (I will call them Dollar bonds).[2]

Assume that the international traders care about the return of their portfolio measured in real terms, i.e., the returns are in terms of the foreign currency noting that the foreign price level is constant. As argued in Jeanne and Rose (2002), we may imagine that the foreign country is the center of the international financial system, and the domestic country is a small economy, thus the Dollar bonds is in perfectly elastic supply. Investors require a risk premium to hold bonds

[1] Their model is in the spirit of the well-known model of noise trading developed by DeLong, Shleifer, Summers, and Waldmann (1990).

[2] Using the names, “Peso bond” and “Dollar bond”, is just for convenience as in Jeanne and Rose (2002).