# Multilateral adjustment, regime switching and real exchange rate dynamics

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### ARTICLE INFO

### ABSTRACT

The purpose of this paper is to examine the role of multilateral adjustment to U.S. external imbalances in driving bilateral real exchange rate movements by developing a new regime-switching model that consists of a Markov-switching model with a time-varying transition matrix that depends on a threshold variable. Consequently, the dynamics of the real exchange rate can be modeled in the context of two regimes: one in which multilateral adjustment to large U.S. external imbalances is an important factor driving movements in the real exchange rate and the second in which the real exchange rate is driven mainly by country-specific macroeconomic fundamentals. We apply this model to the bilateral real Canada–U.S. dollar exchange rate and compare its performance to several other alternative models. All of the models are estimated using a Bayesian approach. Our findings suggest that during periods of large U.S. imbalances, an exchange rate model for the real Canada–U.S. dollar exchange rate should allow for multilateral adjustment effects.

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  [1] Deceased. Died on 26 June 2012, while this paper was in process. His premature death tragically cut short a productive research career. He will be remembered by the other co-authors and all who knew him as a fine scholar, generous colleague and warm friend.

## 1. Introduction

An important aspect of the ongoing debate on global imbalances and the U.S. current account deficit is the role of exchange rate dynamics in the adjustment process. Many observers, such as Obstfeld and Rogoff (2000, 2005), contend that the U.S. current account deficit is on an unsustainable trajectory and that its inevitable unwinding will be accompanied by a significant real depreciation of the U.S. dollar. Understanding the implications of the unwinding of large U.S. external imbalances for the behavior of exchange rates in the $N - 1$ other countries is important because disorderly adjustment to these imbalances could trigger large and abrupt movements in the currencies of America's trading partners. These resulting exchange rate movements could pose a challenge for monetary policy in these economies because they would imply a dramatic change in the relative price of domestic goods and thus could have a substantial impact on aggregate demand. In addition, these exchange rate fluctuations could put pressure on inflation, to varying degrees depending on the extent of exchange rate pass-through. Understanding the causes of these exchange rate movements is, therefore, critical for determining the appropriate monetary policy response.

The purpose of this paper is to examine the role of multilateral adjustment to U.S. external imbalances in driving real bilateral exchange rate movements. Because the U.S. economy occupies a predominant position in the world economy, we would expect the bilateral exchange rates of U.S. trading partners to appreciate or depreciate relative to the U.S. dollar in order to facilitate global adjustment to large U.S. external imbalances, especially deficits that are may be difficult to sustain if allowed to persist for an extended period. We describe this exchange rate adjustment process as "multilateral adjustment" because it involves a sizable movement of the U.S. dollar against most, if not all, of its trading partners.

In modeling the link between real exchange rates and multilateral adjustment, it is important to account for the non-linear nature of this relationship. Indeed, as we discuss in more detail in Section 2, the stylized evidence for the post-Bretton Woods period suggests that the U.S. current account balance and the U.S. real effective exchange rate are correlated but only during episodes when the U.S. current account deficit is large and coincides with the occurrence of a fiscal deficit. Not surprisingly, in other periods, movements in the U.S. current account do not appear to influence exchange rates. This is consistent with evidence that suggests the presence of threshold effects in current account adjustment.[2]

To examine the relationship between real exchange rates and multilateral adjustment, we develop a new regime-switching model that generalizes a standard Markov-switching model with a time-varying transition matrix that depends on a threshold variable. This model is thus characterized by an unobservable state of the economy which stochastically shifts between two regimes based on a time-varying transition probability matrix. Consequently, the dynamics of the real bilateral exchange rate can be modeled in the context of two regimes: one in which multilateral adjustment to large U.S. external imbalances is an important factor driving movements in the real exchange rate and the second in which there are no significant U.S. external imbalances (and hence the real exchange rate is driven mainly by country-specific macroeconomic fundamentals). Our threshold variable is the U.S. fiscal balance-to-GDP ratio. Our choice of threshold variable is motivated by the stylized evidence that suggests that multilateral exchange rate adjustment is more likely to occur when U.S. external imbalances are caused in part by fiscal imbalances, most likely because they are perceived as being less sustainable. The time-varying transition matrix is constructed such that if the U.S. fiscal balance-to-GDP ratio is below the threshold value, the probability of the first regime occurring is larger than the probability of the second regime and vice-versa if the threshold variable is above the threshold value.

This new Markov-switching model with a threshold variable is a generalization of the traditional threshold model because movements between regimes are assumed to be stochastic rather than deterministic. We apply this model to the bilateral real Canada–U.S. dollar exchange rate. We compare

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[2] For example, Clarida, Goretti, and Taylor (2006) find significant evidence of threshold effects in current account adjustment for the G7 countries.