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Real exchange rates and real interest differentials: implications of nonlinear adjustment in real exchange rates[☆]

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Abstract

This paper investigates the relationship between real exchange rates and real interest differentials. While sticky-price exchange-rate theories predict a relationship, empirical evidence on the hypothesized link has proved elusive. Our conjecture is that the empirical difficulty is due to a failure to recognize nonlinearity in real exchange rate adjustment. When we introduce threshold nonlinearity into a traditional model to take account of a transaction cost-induced ‘band of inaction’ for price adjustment, only outside the band will the real exchange rate exhibit mean reversion and bear an association with real interest differentials. Our estimated nonlinear models provide evidence supporting this view. © 2002 Elsevier Science B.V. All rights reserved.

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1. Introduction

This paper reexamines the relationship between real exchange rates and real interest differentials. It is widely believed that a link exists between these variables.¹ A number of studies, both theoretical and empirical, have considered the relationship. On the theoretical side, sticky-price theories of exchange-rate determination predict an association between real exchange rates and real interest differentials.² According to this theory, when goods market prices adjust to disturbances more slowly than asset prices, monetary shocks cause temporary differentials in real interest rates across borders and temporary deviations in the real exchange rate from its long-run equilibrium value. The real exchange rate reverts to its equilibrium level and the expected changes in the real exchange rate are matched by international differentials in *ex ante* real interest rates, yielding an association between the real exchange rate and real interest differentials. For instance, when the Fed adopts a tight monetary policy, we would most likely observe higher U.S. real interest rates and a real appreciation of the U.S. dollar: the dollar is pushed above its long-run flexible-price equilibrium level in expectation of real depreciation in the future. This expectation generates today's high U.S. dollar in real terms associated with high *ex ante* U.S. real interest yield vis-à-vis other countries.

On the empirical side, there has been substantial effort to detect the relationship predicted by sticky-price exchange-rate models. Yet, empirical evidence on the hypothesized link has proved elusive. Campbell and Clarida (1987) find that the real dollar exchange rate is so volatile and persistent that only a small fraction of the movement in the real exchange rate can be explained by the movement in expected real interest differentials. Meese and Rogoff (1988) have used both conventional regression analysis and cointegration tests to detect an empirical link, but could not establish a statistically significant relationship between real exchange rates and real interest differentials. Edison and Pauls's (1993) attempt to verify the existence of a long-run relationship by the use of error-correction models yielded little encouraging results. As Baxter (1994) stressed, these studies focused on high-frequency components of real exchange rates rather than on low-frequency components of the data, where she finds some real exchange rate–real interest differentials correlation. She presents evidence that real interest differentials are correlated only with the temporary component of real exchange rates.

In light of these findings, we infer that the difficulty experienced by researchers in finding a statistical association between real exchange rates and real interest differentials probably stems from the fact that movements in the real exchange rate are highly persistent. As a matter of fact, departure from purchasing power parity (PPP) is eliminated extremely slowly; consensus estimates of the half-life of PPP

¹For example, it is often viewed that a tightening of monetary policy causes a real currency appreciation and high real interest rates, as manifested by the U.S. experience in the 1980s, by Chile's situation in the 1990s, etc.

²One of the popular theories of sticky-price exchange-rate determination is represented by Dornbusch's (1976) model, which is a dynamic version of the Mundell–Fleming model developed by Mundell (1963) and Fleming (1962).

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