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Persistent real misalignments and the role of the exchange rate regime

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HIGHLIGHTS

- We assess the impact of exchange rate regimes on the real exchange rate dynamics.
- Fixed exchange rate regimes reduce the speed of real exchange rate convergence.
- Fixed exchange rate regimes increase the average real appreciation rate.
- Previous findings hold in the case of developing countries.
- The real exchange rate dynamics is inelastic to the regime in developed countries.

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ABSTRACT

We assess, for a sample of 54 economies, the impact of *de facto* exchange rate regimes on both the persistence of real exchange misalignments and the average rate of real appreciation. We find that a fixed exchange rate regime reduces the speed of the real exchange rate's convergence to its equilibrium level. It also increases the average appreciation rate, but only in the case of developing economies. In developed countries, the real exchange rate dynamics is inelastic to the exchange rate regime.

1. Introduction

There is no consensus about the economic implications of real effective exchange rate (REER) misalignments. On the one hand, some argue that sustained REER overvaluations are an early warning indicator of possible currency crashes (Krugman, 1979; Frankel and Rose, 1996; Kaminsky and Reinhart, 1999). Furthermore, there is evidence that large and medium-sized REER overvaluations end abruptly, with nominal devaluations that lead to a drastic adjustment of relative prices and to a decline in the aggregate growth rate of the economy (Goldfajn and Valdés, 1999). On the other hand, Rodrik (2008) argues that in the presence of institutional and market failures, sustained REER undervaluations increase the relative profitability of investing in tradables and act, in second-best fashion, to alleviate the economic cost of these distortions. In the same line, Glüzmann et al. (2012) find that undervaluations have positive effects on savings and investment, as well as on employment. In this case, depreciations, which erode real labor income, represent a transfer from low-income households to high-income households with a greater propensity to save, enhancing the economy's investment capacity.

The objective of this paper is to assess the impact of the exchange rate regime on both the persistence of REER misalignments and the average rate of REER variation. The evidence suggests that in developing countries less flexible exchange rate regimes are associated with slower growth, as well as with greater output volatility. For industrialized countries, regimes do not appear to have any significant impact on growth (Levy-Yeyati and Sturzenegger,

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2003). There is, however, not much evidence on the relationship between the exchange rate regime and the degree of REER misalignment.

The choice of the currency regime should not affect the REER in the long-run, as this is a relative price that reacts to real variables. However, if domestic prices adjust slowly, the REER dynamics could be affected in the short-run by non-fundamental variables, including the currency regime in place.

We estimate a Behavioral Equilibrium Real Exchange Rate (BEER) model, in which the REER is related, in the long-run, to a specific set of fundamental variables suggested by theory.[1] From this estimation we are able to compute the equilibrium REER level, as well as the degree of REER misalignment. In the context of an error correction model (ECM), we assess the impact of the exchange rate regime over the speed of adjustment of the REER towards its equilibrium level. In this way, we can determine to what extent the exchange rate regime induces more persistent REER misalignments. Furthermore, we can assess the extent to which the average rate of REER variation differs across regimes.

In a recent contribution, Holtemöller and Mallick (2013), analyze the effect of the official (*de jure*) currency regime choice on the degree of real exchange rate misalignment. They estimate a reduced-form fundamental equilibrium exchange rate (FEER) model,[2] and conclude that the current account balance has a lower impact on the REER misalignment in countries with more rigid exchange rate regimes.

Our contribution differs in several dimensions from that of Holtemöller and Mallick (2013).

First, we use a BEER approach instead of a FEER model. As noted by Clark and MacDonald (1999), under the FEER approach the exchange rate remains unchanged as long as the positions of external and internal balance are undisturbed. However, the FEER approach does not reflect the influence of factors that determine the REER over the medium term. In particular, under the FEER approach only two fundamental variables are considered; namely the terms of trade and the degree of openness in the economy. Under the BEER approach additional variables are considered: the relative productivity between the tradable and non-tradable sector (Balassa–Samuelson effect), government expenditure over GDP, and a stock variable, the net foreign asset position of the economy. In addition, as in Ricci et al. (2013) and Daude et al. (2014), we estimate the relationship between the fundamental variables and the REER using cointegration techniques, and do not impose ad-hoc values for those relationships.

Second, to determine the nature of the exchange rate regime we use a *de facto* classification. As noted by Shambaugh (2004) and Obstfeld et al. (2005) a country's actual exchange rate regime choice often departs from its self-reported status as published by the International Monetary Fund (IMF). Hence, the preferred approach in the literature[3] is to examine what countries do, not what they say.

Third, we consider the impact of the exchange regime across two different groups of countries: developed and developing economies.

We find a long-run relationship between the fundamental variables suggested by the theory and the REER. Based on the ECM representation of our model, we find that the REER fluctuates in order to correct nearly 25% of past misalignments in the case of developed economies and nearly 20% in the case of developing ones. Countries that, *de facto*, fix the nominal exchange rate reduce the speed of REER adjustment by half and have, on average, a more appreciated REER, but only in the case of developing countries. In developed economies, the exchange rate regime affects neither the speed of adjustment nor the average rate of REER variation.

2. Behavioral Equilibrium Exchange Rate (BEER) model

Following Edwards (1989), Froot and Rogoff (1995), Obstfeld and Rogoff (1995) and Faruqee (1994) among others, we specify a panel version of a BEER model. This relates the REER to a set of fundamental variables:

$$LREER_{t,i} = \beta_{0,i} + \beta_1 LTNT_{t,i} + \beta_2 LToT_{t,i} + \beta_3 \left(\frac{NFA}{GDP}\right)_{t,i} + \beta_4 \left(\frac{G}{GDP}\right)_{t,i} + \mu_{t,i} \tag{2.1}$$

where i is an index for country and t is an index for the time period. L denotes the natural logarithm operator and $\beta_{0,i}$ is a country fixed effect. We consider three flow variables: the relative productivity between the traded and non traded sector, denoted by TNT; the terms of trade, ToT, and the share of fiscal spending over GDP, G/GDP. The three variables tend to appreciate the REER.[4] The stock variable we consider is the net foreign asset position of the economy as a percentage of GDP, NFA/GDP. This stock variable should influence the real exchange rate because owning more assets has a counterpart in larger revenues earned (a surplus in factor payments), which in turn can finance a larger sustainable commercial deficit in steady state. This larger commercial deficit is coherent only with a more appreciated real exchange rate.

From the estimation of the long-run elasticities in (2.1) we can construct the contemporaneous misalignment as:

$$\mu_{t,i} = LREER_{t,i} - \left(\hat{\beta}_{0i} + \hat{\beta} X_{t,i}\right) \tag{2.2}$$

where $\hat{\beta}$ represents the long-run elasticities in (2.1) and $X_{t,i}$ is the vector of fundamental variables. The exchange rate regime does not affect, in the long run, the REER. It can have, however, a short run impact on the REER dynamics. In order to understand the role of the exchange rate regime, we specify an Error Correction Model (ECM) as follows:

$$\Delta LREER_{t,i} = \lambda_i + \phi PEG_{t,i} + \gamma PEG_{t,i}\mu_{t-1,i} + \theta \mu_{t-1,i} + \sum_{j=1}^{J} \delta_j \Delta Z_{t-j,i} + \xi_{t,i}. \tag{2.3}$$

We define PEG as a dummy variable that takes the value 1 if the country has a fixed exchange rate regime and 0 otherwise. The Z vector, on the other hand, contains other non-fundamental variables. The PEG is defined according to the methodology suggested by Shambaugh (2004) in which a PEG is equal to 1 if, over

[1] This approach has a long tradition in international finance and has been extensively used in empirical applications. The most recent contributions are due to Ricci et al. (2013), Coudert et al. (2013) and Daude et al. (2014), among others. This approach, which in essence relates the REER to stock and flow variables, was pioneered by Faruqee (1994) and MacDonald and Clark (1998), and is based on various landmark contributions. Among them, Samuelson (1964), Balassa (1964), Canzoneri et al. (1999) and Cheung et al. (2009) that show a direct relationship between productivity and the REER. Lane and Milesi-Ferretti (2004) highlight net foreign assets as a fundamental variable for the real exchange rate, whereas (Chinn, 1997) highlights the importance of government spending.

[2] This approach implies a flow-equilibrium, not a stock equilibrium.

[3] See, among others, Calvo and Reinhart (2000) and Levy-Yeyati and Sturzenegger (2005).

[4] See Caputo and Fuentes (2012) for more detailed description of the model.