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The Importance of the Exchange Rate Regime in Limiting Misalignment

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Summary. — This paper explores how the choice of a country's exchange rate regime may affect exchange rate misalignment for developing and developed countries. A measure of misalignment is obtained by using a panel cointegration vector estimator. This paper finds that for developing countries, an intermediate exchange rate regime (a regime falling somewhere between a pure float and a hard peg) is most effective in preventing exchange rate misalignment. Additionally, the choice of an exchange rate regime as a means to limit misalignment matters for developing countries, but does not seem to matter for developed countries.
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Key words — equilibrium exchange rates, exchange rate regime, misalignment, developing countries

1. INTRODUCTION

This paper is a part of the existing literature that studies countries' choice of exchange rate regime—fixed, floating, or managed. Regime choice has been found to be especially important with regard to the potential economic outcomes of developing countries. We look closely at the developing countries that have opened up to international financial flows (at least to some extent). While there may be any number of factors influencing such a choice, we examine the relationship between exchange rate regime choice and over/undervaluation of a country's currency commonly referred to as misalignment. Real exchange rates should (at least in the long-run) be determined by fundamental relationships with certain macroeconomic fundamentals. When real exchange rates diverge from this equilibrium, a country's currency is said to be misaligned. This may bring about a number of deleterious consequences that can hinder economic growth in both the short- and long-run. It follows, then, that policymakers would want to limit misalignment. This paper suggests that the exchange rate regime is a useful tool in doing so.

For developing countries that have relatively thin financial markets, misalignment can be quite a serious issue. If a country chooses a floating exchange rate, it is quite possible that rates are excessively volatile due to speculative bubbles or contagion. The wide swings can inhibit investment decisions due to uncertainty, and undermine growth prospects. Developing countries that fix on the other hand often experience a "hard landing" as their currency appreciates over time due to inflation differentials, productivity changes, or any other number of factors. The overvaluation of pegged currencies is well-established in recent history as Argentina, Mexico, and East Asia all provide examples of fixed and quasi-fixed exchange rate arrangements that ended in crisis. Therefore, even though floats may help eliminate rigidities in an economy and fixes may aid in establishing credibility and combating inflation, intermediate regimes may be a more appropriate choice for developing countries. As for developed countries, this hypothesis may not be as applicable. One possibility is the increased scope for international coordination among these large economies.[1] Additionally these countries have well-developed financial systems and foreign exchange markets that are not prone to as wide swings as developing countries in floating regime settings. They are affected less by capital flows in fixed settings as well.

The analysis consists of 102 countries, 21 of which are OECD countries. The remaining 81 countries are classified as developing countries. The 102 countries are analyzed for the post-Bretton Woods era (1973–2002). A vast majority of recent studies that attempt to capture equilibrium exchange rates do so for a single country, utilizing single-equation cointegration techniques.[2] Here, however, we make use of recent developments in non-stationary panel data econometrics and use a panel cointegration framework to arrive at a measure of effective exchange rate misalignment. The estimation is performed with a Panel Dynamic Ordinary Least Squares (Panel DOLS) model as suggested by Mark and Sul (2003). In order to test sensitivity, a static Least Squares Dummy Variable (LSDV) model is also estimated. This paper employs the standard fundamentals that have been found to drive the long-run equilibrium exchange rate: terms of trade, productivity, openness, government consumption, capital flows, and excess credit. Even with a number of proxies for capital flows, results of the estimations are robust.

After obtaining a measure of misalignment, the paper then links it back to the exchange rate regime. This paper will use the classification according to the International Monetary Fund (IMF) (the *de jure* regime). The paper proceeds to discuss the choice of regime and implications for misalignment in developing *versus* developed countries.

The remainder of this paper is organized as follows: The next section briefly reviews previous work on the measurement of misalignment. Section 3 presents the methodology using PDOLS and presents the results. Section 4 outlines the literature regarding misalignment and how it may relate to the choice of exchange rate regime. Section 5 investigates this link and discusses the results. Section 6 concludes.

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2. EXCHANGE RATE MISALIGNMENT

(a) *Real effective exchange rate*

There has been an enormous quantity of work exploring the long-run determinants of the real exchange rate, and the general findings are useful here as well. The literature has often used a single bilateral exchange rate, but here the effective exchange rate is used.[3] The real effective exchange rate is defined as:

$$REER = \prod_{i=1}^{m} \frac{(E_{fc1})^{\omega_{id}} \times WPI_{g5}}{CPI_1}, \tag{2.1}$$

where $i = 1, 2, \ldots, m$ is the number of trading partners of the home country,[4] E_{fc1} is units of the foreign currency per unit of domestic currency of country 1, WPI_{g5} is a weighted average of the wholesale price index of the G-5 countries (United States, Germany, France, United Kingdom, and Japan),[5] and CPI_1 is the consumer price index for country 1. ω_{id} is the trade weight for each trading partner, and $\sum_{i=1}^{m}\omega = 1$. An increase in the *REER* indicates a currency appreciation.

Implicitly, the real effective exchange rate is the weighted average of nominal exchange rates, multiplied by the ratio of price of non-tradables to price of tradables, $P_{\mathrm{nt}}/P_{\mathrm{t}}$. The proxy to be used for the price of tradables is the average wholesale price index of the G-5 countries (WPI). As a small open economy, the assumption is that the price of tradable goods will be equal to the world price. Edwards (1988) uses this measure (although using only the United States WPI) and argues that the WPI will contain a relatively large share of traded goods, and I follow accordingly. The advantage of using the weighted average is that these five countries make up a bulk of world trade, and thus these price indices are indicative of world trade prices.

According to the literature, the usual variables that may affect the *REER* are: terms of trade, productivity/technological progress, openness, capital flows, government consumption, and excess money growth. The terms of trade (*TOT*, measured as ratio of export prices to import prices) will have an ambiguous effect on the *REER* (Edwards, 1988). An improvement in the *TOT* by definition is an increase in the price of tradables (real depreciation). The income effect associated with higher export prices will itself lead to an increase in non-tradable prices, bringing about an appreciation. So, *a priori*, there is no clear effect. However, empirical work normally finds that an improvement will in fact lead to an appreciation.[6] Productivity or technological progress (*PROD*, measured as ratio of GDP *per capita* of home country to GDP *per capita* of world) attempts to capture the Balassa–Samuelson hypothesis. According to Balassa–Samuelson, productivity gains tend to be concentrated more heavily in the tradable sectors, pushing up wages in both the tradable and non-tradable sectors. Of course, demand tends to increase for non-tradables, pushing up prices in that sector, while prices of tradables are world prices, thus causing a *REER* appreciation. Openness (*OPEN*, measured as imports plus exports relative to GDP) acts as a proxy for trade policy, and will tend to decrease the price of tradable goods (by eliminating taxes on imports or subsidies on exports) and will result in an equilibrium depreciation. Capital flows (KFLOW) will tend to put pressure on non-tradable prices to rise if KFLOW is increasing, thus leading to an appreciation of the currency.[7] Government consumption (*GOVCONS*, measured as government spending relative to GDP) is an imperfect measure of government consumption on non-tradables so that an increase in this variable tends to appreciate the *REER* as the price of non-tradables rise with the increased demand.[8] Money growth (*EXCR*, measured as ratio of money to GDP) is a proxy for monetary policy and creates a demand effect again on the price of non-tradables, breeding an appreciation (assuming non-neutrality in the short-run at least). The data sources and proxies used are given in the Appendix.

(b) *Measuring exchange rate misalignment*

Given a measure of the real effective exchange rate at any point in time, the question is how this differs from what the fundamentals may suggest. The estimation of exchange rate misalignment has been a practice for some time, yet there is still no consensus as to the best approach for estimation. It is extremely difficult to obtain the precise degree of misalignment of a currency.

The most widely utilized approach has been the Purchasing Power Parity (PPP) method, due in part to its simplicity. The relative PPP methodology assumes that the *REER* is constant over the long-run (whereas absolute PPP assumes *REER* to be unity).[9] A serious issue with this methodology is the fact that a specific year in which the *REER* was in equilibrium must be identified. Additionally, the fundamental determinants of the *REER* are assumed to be constant at a particular level over time, and if there is a structural change in the fundamental variables, the estimates are not very useful. The approach employed in this paper does not rely on such assumptions or requirements.

The trade equations-elasticities estimation is another technique that has been used recently. As a starting point, trade elasticities are estimated to establish a relationship between the *REER* and exports and imports as well as the resource balance (Ahlers & Hinkle, 1999). Then, the resource balance is compared to some notion of a sustainable resource balance, and the elasticities are used to determine how the *REER* would need to change in order to return the resource balance to such a sustainable level. This approach relies heavily on researcher judgment of sustainable levels, which is an important limitation.

Another approach has been a general-equilibrium modeling methodology. Data frequency and availability become issues in this setting, invalidating the use of general equilibrium models for the purposes of this paper. Since the focus is on a large cross-section with primarily developing countries, a more appropriate technique involves single-equation estimation. Some of the studies in this vein depend heavily on assumptions of sustainable levels of the fundamentals,[10] depending on the approach (FEERs, BEER, NATREX). Fundamental equilibrium exchange rates (FEERs) and the natural real exchange rate (NATREX) rely on estimates of the real exchange rate that would simultaneously achieve internal and external balance in an economy. Behavioral equilibrium exchange rates (BEERs) are estimated such that the equilibrium real exchange rate is determined by estimating the relationship between the real exchange rate and a set of fundamental determinants, and only *permanent* changes in those fundamentals drive the equilibrium real exchange rate.[11]

The panel dynamic OLS (PDOLS) approach marks an improvement over other approaches since it does not require specific judgments about these issues. It does not address the specific cause of misalignment, but instead captures movements away from the long-run equilibrium as implied by changes in the permanent components of the fundamental determinants. The approach does not explicitly run the fundamentals through a filter (such as Hodrick–Prescott filter,

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