Exchange rates and individual good's price misalignment: Evidence of long-horizon predictability[☆]

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ABSTRACT

Although purchasing-power-parity fundamentals, in general, have only weak predictability, currency misalignment may be indicated by price differentials for some individual goods, which could then have predictive power for subsequent re-evaluation of the nominal exchange rate. We collect good-level price data to construct deviations from the law of one price and examine the resulting price-misalignment model's predictive power for the nominal exchange rates between the U.S. dollar and two other currencies: the Japanese yen and the U.K. pound. We find that the slope coefficients and *R*-squares of in-sample forecasting regressions for almost all goods in our data increase with the forecast horizon for the bilateral exchange rates between the U.S. dollar and the Japanese yen and the U.S. dollar and the U.K. pound. The results of tests for out-of-sample superior predictive ability suggest that our price-misalignment model outperforms a random walk model either with or without drift for the U.S. dollar vis-à-vis the Japanese yen at the 5 percent level of significance over long horizons.

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1. Introduction

Understanding the connection between nominal exchange rates and macroeconomic fundamentals has been one of the central challenges in international macroeconomics since the early 1970s. Although exchange rates are highly volatile, they should reflect basic macroeconomic fundamentals such as interest rates, output, purchasing power and trade balances. As such, international economists have long held out hope that they could explain exchange rates with these fundamentals. Unfortunately, in practice, the performance of structural exchange rate models has not been very satisfying. As first shown by Meese and Rogoff (1983), such economic models of exchange rate determination can hardly beat random walk forecasts when it comes to out-of-sample forecasting.

Recently, some studies have found certain forecasting power in monetary models at horizons of two to four years (Mark, 1995; Engel et al., 2007). Other attempts to forecast at more policy-relevant shorter horizons have also reported positive forecasting results (Gourinchas and Rey, 2007; Engel et al., 2007; Molodtsova and Papell, 2009). However, when these positive results are re-examined for their econometric approaches and alternative time windows, they do not hold over both long horizons (Kilian, 1999; Berkowitz and Giorgianni, 2001) and short horizons (Rogoff and Stavrakeva, 2008). As a result, despite notable methodological improvements, we are not much closer to being able to forecast exchange rates. In this paper, we examine out-of-sample exchange rate predictability based on good-level price deviations from the law of one price (LOOP) and conclude that, after accounting for the econometric concerns of the bootstrap method and small-sample bias, there is an evidence of exchange rate predictability with disaggregate price-misalignment fundamentals over long horizons.

Most nominal exchange rate movements in the short run reflect changes in expectations about future monetary or real fundamentals (Engel and West, 2005). On the other hand, when prices of goods are sticky, movements in the nominal exchange rate have a direct impact on international relative prices. For some goods, however, the relative prices across countries should reflect the current levels of their demand and supply, rather than expectations about the future, and therefore changes in the nominal exchange rate may have undesirable allocation effects. In other words, since changes in the nominal exchange rate are primarily forward looking, the relative prices would be forced to incorporate these expectation effects, and the terms of trade or other international relative prices may be badly misaligned in the short run.

The relative price misalignment caused by the dual role of the nominal exchange rate in goods and asset markets would trigger adjustments in consumption and employment, and might help to predict future movements in the nominal exchange rate. For example, if the prices of certain goods are more expensive in Japan than in the United States, consumers in both Japan and the United States would prefer to purchase more U.S. goods. The increased demand for U.S. goods will drive the U.S. dollar to appreciate with respect to the Japanese yen. In the absence of transportation and other transactions costs, competitive markets will equalize the price of an identical good in two countries when the prices are expressed in the same currency. Therefore, purchasing power parity (PPP) may serve as an anchor for long-run real exchange rates, and price misalignments may help to predict subsequent re-evaluation of the nominal exchange rate. Based on this reasoning, PPP models of exchange rate determination naturally lend themselves to determining whether a currency is overvalued or under-valued. However, when it comes to forecasting future movements in the exchange rate, many other structural models outperform PPP in terms of exchange rate predictability; for example, monetary models and Taylor rule models. This may be because, although real exchange rates may converge to parity in the long run, the rate at which this happens is so slow that it is at best of little practical relevance over horizons of concern to the forecasting of exchange rates.

Although it may seem as if PPP and the LOOP are the same, they do in fact differ: PPP applies to the aggregate price level and the LOOP applies to prices of individual goods. First, there is a great amount of heterogeneity for prices at the individual good level. In fact, it is hard to think of reasons why all relative prices comprising the consumption-basket real exchange rate should converge to parity at the same speed. Failure to allow for the heterogeneity in price-adjustment dynamics at the good level may even induce an aggregation bias in persistence estimates of aggregate real exchange rates (Imbs et al., 2005). Thus, although PPP as a fundamental does not generally work well in predicting exchange rates, the LOOP for some goods may. Second, for certain goods, currency misalignments may be indicated by