On the purchasing power parity puzzle

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Abstract

A puzzle concerning purchasing power parity is examined: Although the immense exchange rate volatility suggests a likely major role of nominal shocks under sticky prices, the observed half-life persistence of the real exchange rate seems excessively high to be rationalized by price stickiness. This study analyzes carefully the adjustment dynamics of real exchange rates through impulse response analysis. Half-life estimates are found to have substantial imprecision. Moreover, the dynamic response pattern suggests that the shock response is initially amplified before dissipating and that such non-monotonic dynamics can contribute to more than one-third of the observed persistence of real exchange rates. © 2000 Elsevier Science B.V. All rights reserved.

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1. Introduction

The purchasing power parity (PPP) theory has had its ebbs and flows over the years. Enormous interest in the theory has emerged since the advent of flexible exchange rates in the early 1970s. The recent floating experience has not been too reassuring, however. Early studies generally fail to uncover parity reversion. With

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the aid of improved statistical methods, some recent studies are able to unveil PPP reversion (Frankel and Rose, 1996; Wu, 1996; Papell, 1997; Cheung and Lai, 1998; Taylor and Sarno, 1998). The speed of parity reversion seems torpid, nonetheless, with reported half-life estimates mostly between 3 and 5 years (Rogoff, 1996). This half-life range implies a slow reversion rate of about 13 to 20 percent per year.

Rogoff (1996) points out the difficulty in reconciling the perplexedly high persistence of real exchange rates with their immense short-term volatility. Although slow reversion can be rationalized if real shocks are predominant, real shocks are not volatile enough over the short term to account for the vast exchange rate volatility. On the other hand, short-term exchange rate volatility can be caused by monetary shocks under sticky prices, but the estimated half-lives of PPP reversion reported in prior studies seem far too long to be explained by price stickiness. Specifically, if nominal stickiness is really responsible for short-run PPP deviations, ''one would expect substantial convergence to PPP over one to two years, as wages and prices adjust to a shock'' (Rogoff, 1996, p. 654). This poses a puzzle. No existing model seems able to consistently explain both the tremendous short-term volatility and the ''excessive'' persistence in the real exchange rate. Clarida and Gali (1994) and Rogers (1999) identify the relevance of multiple shocks in explaining the variability of real exchange rates, but their results still do not fully resolve the PPP puzzle. Instead of examining the nature of shocks, the present study explores the dynamic structure of the parity-reverting process itself and identifies its role in explaining the high persistence of the real exchange rate.

Using impulse response analysis, this study analyzes the adjustment dynamics of real exchange rates by evaluating both the sample half-life measure and its estimation accuracy. Since reporting merely point estimates does not convey the inevitable imprecision with which the adjustment speed is measured, confidence interval estimates are computed. Empirical results show that the confidence intervals for half-life estimates are generally wide, suggesting a high level of imprecision in half-life estimation. The results underline the potential deficiency in relying on point estimates of half-lives and highlight the significant uncertainty in measuring the speed of parity reversion.[1]

The impulse response analysis also shows that the shock impact tends to amplify first before it dissipates. The full impact of a shock is not felt immediately but until a few periods after the initial shock. Hence, following the shock, the real

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[1]Instead of analyzing half-life estimates for countries individually, Cheung and Lai (1999) investigate whether systematic differences in half-lives exist across country groups using nonparametric tests of group medians, which require no assumptions on the precision of individual estimates in each group. While this recent study identifies considerable cross-sectional variability in the reversion speed, the study here examines the sampling variability of the speed estimates from individual time series themselves.