The purchasing power parity persistence paradigm

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Abstract

Rogoff (Journal of Economic Literature 1996;34:647–668) describes the 'remarkable consensus' of 3–5 year half-lives of purchasing power parity deviations among studies using long-horizon data. These studies, however, focus on rejections of unit roots in real exchange rates and do not use appropriate techniques to measure persistence. Our half-life estimates explicitly account for serial correlation, sampling uncertainty and, most importantly, small sample bias. Calculating confidence intervals as well as point estimates for long-horizon and post-1973 data, we find that, even though most of the point estimates lie within the 3–5 year range, univariate methods provide virtually no information regarding the size of the half-lives. © 2002 Elsevier Science B.V. All rights reserved.

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1. Introduction

In a recent but already celebrated article, Rogoff (1996) describes the 'purchasing power parity puzzle' as the question of how to reconcile high short-term volatility of real exchange rates with extremely slow convergence to purchasing power parity (PPP). Reviewing the empirical literature, he finds a 'remarkable consensus' of 3–5 year half-lives of PPP deviations among studies using long-horizon data, seemingly far too long to be explained by nominal rigidities. Studies

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using panel methods with post-1973 floating real exchange rates, such as Wu (1996) and Papell (1997), find only slightly shorter (2.5 year) half-lives.

There have already been several attempts to 'solve' the PPP puzzle. Taylor and Peel (2000) investigate nonlinear mean reversion. Once allowance is made for nonlinearities, the speed of adjustment to real exchange rate shocks may be much greater than what is found with linear models. Hegwood and Papell (1998) consider structural change. Once the effects of occasional permanent disturbances to real exchange rates are accounted for, the half-lives of PPP deviations in long-horizon data are much reduced. Cheung and Lai (2000) use impulse response analysis and compute confidence intervals, as well as point estimates, of half-lives of PPP deviations for several post-1973 real exchange rates. The lower bounds of the confidence intervals are all less than 1.5 years, apparently low enough to be explained by models with nominal rigidities.

The evidence of 3–5 year half-lives of PPP deviations in the long-horizon studies cited by Rogoff comes primarily from two sources of data. Abuaf and Jorion (1990) use data collected by Lee (1976) on bilateral, WPI based, real exchange rates between the United States and eight countries for 1900–1972 and find average half-lives of 3.3 years. Glen (1992) and Cheung and Lai (1994) find similar results with the data updated through 1987 and 1992. Frankel (1986) uses a 116-year-long data set for the WPI based dollar/pound real exchange rate and reports a half-life of 4.6 years. Lothian and Taylor (1996) use two centuries of data for the dollar–pound rate and find an almost identical half-life of 4.7 years.[1] The evidence of 2.5 year half-lives with post-1973 data in Wu (1996) and Papell (1997) comes from quarterly, CPI based, real exchange rates for industrialized countries with the United States dollar as the numeraire currency.

The papers that attempt to solve the PPP puzzle take the 3–5 year half-life consensus as a starting point for their analysis. The long-horizon evidence that Rogoff cites, however, comes from papers that were primarily concerned with the question of whether unit roots in real exchange rates could be rejected and do not use appropriate techniques to measure persistence. These papers typically conduct Dickey–Fuller (DF) unit root tests, regressing the real exchange rate on a constant and its lagged value. If the coefficient on the lagged real exchange rate is significantly less than one, the unit root null is rejected in favor of the alternative of level stationarity. The half-life, the expected number of years for a PPP deviation to decay by 50%, is calculated from the coefficient on the lagged real exchange rate.

We identify three issues involving the use of these half-lives as evidence of the persistence of PPP deviations: confidence intervals, serial correlation and impulse response functions, and small sample bias.

First, simply reporting the point estimates of the half-lives provides an incomplete picture of the speed of convergence towards PPP. Following Cheung

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[1]Lothian and Taylor (1996) also use the franc–pound rate, and find a half-life of 2.5 years. Diebold et al. (1991), using data for the gold standard period, find average half-lives of 2.8 years.