Deviations from purchasing power parity under different exchange rate regimes: Do they revert and, if so, how?

Lucio Sarno [a],[*], Giorgio Valente [b]

[a] *Warwick Business School, University of Warwick and Centre for Economic Policy Research (CEPR), United Kingdom*
[b] *Department of Finance, Chinese University of Hong Kong, Hong Kong*

Abstract

We propose an empirical model for deviations from long-run purchasing power parity (PPP) that simultaneously accounts for three key features: (i) adjustment toward PPP may occur via nominal exchange rates and relative prices at different speeds; (ii) different exchange rate regimes may generate regime shifts in the structural dynamics of PPP deviations; (iii) nonlinear reversion toward PPP in response to shocks. This empirical framework encompasses and synthesizes much previous empirical research. Using over a century of data for the G5 countries, we provide evidence that long-run PPP holds, the relative importance of nominal exchange rates and prices in restoring PPP varies over time and across different exchange rate regimes, and reversion to PPP occurs nonlinearly, at a speed that is fairly consistent with the nominal rigidities suggested by conventional open economy models.
© 2006 Elsevier B.V. All rights reserved.

---

[*] Corresponding author. Tel.: +44 2476 528219; fax: +44 2476 572871.
E-mail address: lucio.sarno@warwick.ac.uk (L. Sarno).

1. Introduction

1.1. Overview

The purchasing power parity (PPP) hypothesis states that national price levels should be equal when expressed in a common currency. A large literature in international finance has examined empirically the validity of PPP over the long run either by testing whether nominal exchange rates and relative prices move together in the long run or by testing whether the real exchange rate has a tendency to revert to a stable equilibrium level over time. The latter approach is motivated by the fact that the real exchange rate may be defined as the nominal exchange rate adjusted for relative national price levels, and therefore variations in the real exchange rate represent deviations from PPP, which must be stationary if long-run PPP holds (see the surveys of Froot and Rogoff, 1995; Rogoff, 1996; Sarno and Taylor, 2002; Taylor and Taylor, 2004; Sarno, 2005).

Although long-run PPP is such a simple proposition about exchange rate behavior, it has attracted the attention of researchers for decades because it has important economic implications on several fronts. In particular, the degree of persistence in the real exchange rate can be used to infer what the principal impulses driving exchange rate movements are. For example, if the real exchange rate is highly persistent or close to a random walk, then the shocks are likely to be real-side, principally technology shocks, whereas if it is not very persistent, then the shocks must be principally to aggregate demand, such as, for example, innovations to monetary policy (Rogoff, 1996). Further, from a theoretical perspective, if PPP is not a valid long-run international parity condition, this casts doubts on the predictions of much open economy macroeconomics that is based on the assumption of long-run PPP. Indeed, the implications of open economy dynamic models are very sensitive to the presence or absence of a unit root in the real exchange rate (e.g. Lane, 2001; Sarno, 2001). Finally, estimates of PPP exchange rates are often used for practical purposes such as determining the degree of misalignment of the nominal exchange rate and the appropriate policy response, the setting of exchange rate parities, and the international comparison of national income levels. These practical uses of the PPP concept would obviously be of limited use if PPP deviations contain a unit root.

Regardless of the great interest in this area of research, manifested by the large number of papers on PPP published over the last few decades, and despite the increasing quality of data sets utilized and the econometric techniques employed, the validity of long-run PPP and the properties of PPP deviations remain the subject of ongoing controversies. Specifically, earlier cointegration studies generally reported the absence of significant mean reversion of the real exchange rate for the recent floating experience (e.g. Mark, 1990), but were supportive of reversion toward PPP for the gold standard period (Diebold et al., 1991), for the interwar float (Taylor and McMahon, 1988), for the 1950s US–Canadian float (McNown and Wallace, 1989), and for the exchange rates of high-inflation countries (Choudhry et al., 1991). Some applied work on long-run PPP among the major industrialized economies has, however, been more favorable to the long-run PPP hypothesis for the recent float (e.g. Corbae and Ouliaris, 1988; Cheung and Lai, 1993, 1994, 1998; Frankel and Rose, 1996; Coe and Serletis, 2002; Serletis and Gogas, 2004).

One well-documented explanation for the inability to find evidence of long-run PPP is the low power of conventional unit root and cointegration tests with a sample span corresponding to the length of the recent float (Froot and Rogoff, 1995; Lothian and Taylor,