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# The great appreciation, the great depreciation, and the purchasing power parity hypothesis

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## Abstract

Although there has been much recent work on purchasing power parity (PPP), neither univariate nor panel methods have produced strong rejections of unit roots in US dollar real exchange rates for industrialized countries during the post-1973 period. We investigate the hypothesis that these non-rejections can be explained by one episode, the large appreciation and depreciation of the dollar in the 1980s, by developing unit root tests which account for this event and maintain long-run PPP. Using panel methods, we can strongly reject the unit root null for those countries that adhere to the typical pattern of the dollar's rise and fall. © 2002 Elsevier Science B.V. All rights reserved.

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## 1. Introduction

Purchasing power parity (PPP) is one of the most enduring topics in international economics, and the question of whether PPP holds during the post-Bretton-Woods system of flexible nominal exchange rates has been extensively analyzed. While the failure of PPP to hold in the short run was obvious after the first few years of generalized floating, long-run PPP has been subject to a “mean reversion in economic thought” (Lothian and Taylor, 1997). In the mid-1970s, models such

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as Dornbusch (1976) routinely used PPP as a long-run equilibrium condition. By the mid-1980s, the widespread failure to reject unit roots in real exchange rates led authors such as Stockman (1990) to construct models where long-run PPP did not hold. By the mid-1990s, however, research on both long-horizon data and on panels of post-1973 real exchange rates has led to a renewed belief in the validity of long-run PPP.

All variants of PPP postulate that the real exchange rate reverts to a constant mean. Evidence of long run PPP can be provided by tests of a unit root in the real exchange rate. If the unit root null hypothesis can be rejected in favor of a level stationary alternative, then there is long-run mean reversion and, therefore, long-run PPP.<sup>1</sup> The starting point for research on PPP during the current float is the observation that, using conventional Augmented-Dickey–Fuller (ADF) tests on univariate real exchange rates for industrial countries, the unit root null is rarely rejected. While these findings were initially taken as evidence against PPP, it has become clear that they say more about the low power of unit root tests with short time spans of data than about PPP.<sup>2</sup>

In response to these problems, research on long-run PPP has progressed in two directions. First, univariate techniques have been applied to long-horizon real exchange rates spanning one to two centuries. This data, however, combines periods of fixed and floating nominal exchange regimes, and cannot answer the question of whether evidence of PPP would be found with the same time span of flexible rates.<sup>3</sup> Second, tests for unit roots in panel data, notably those of Levin and Lin (1992) and Im et al. (1997) have been used to test for PPP among industrialized countries in the post-1973 period.<sup>4</sup>

Panel unit root tests have not produced strong evidence of PPP for quarterly post-1973 US dollar based real exchange rates. Papell (1997), using data for 21 industrialized countries from 1973 to 1994, cannot reject the unit root null at the 10% level when serial correlation is taken into account in calculating lag lengths and computing critical values. This result is unchanged when the sample is extended through 1996 in Papell and Theodoridis (1998). O'Connell (1998a),

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<sup>1</sup>Breuer (1994), Froot and Rogoff (1995), and Rogoff (1996) survey various concepts of PPP.

<sup>2</sup>Froot and Rogoff (1995) and Lothian and Taylor (1997) discuss the implications for finding evidence of PPP of the low power of unit root tests with long half-lives and less than a century of data.

<sup>3</sup>In addition, if long-term real exchange rates either, as in Engel (2000), are generated from the sum of a random walk and a very volatile transitory component or, as in Hegwood and Papell (1998), contain permanent structural changes, rejection of the unit root null does not necessarily provide evidence of PPP.

<sup>4</sup>Another direction for research has been to use unit root tests with more power, notably the DF-GLS test of Elliot et al. (1996). Application of these tests to post-1973 real exchange rates by Cheung and Lai (2000), however, produces only weak additional rejections of the unit root null among industrialized countries.

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