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# Bounds tests of the theory of purchasing power parity

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## Abstract

In this paper we test the absolute and relative purchasing power parity (PPP) hypotheses during the recent flexible exchange rate period, using quarterly data for 21 OECD countries. In doing so, we use a new econometric technique developed by M.H. Pesaran et al. [Bounds testing approaches to the analysis of long run relationships. University of Cambridge, Department of Applied Economics, Working Paper #9907]. This approach is particularly interesting as it is capable of testing the existence of long-run relations regardless of whether the underlying variables are stationary, integrated, or mutually cointegrated. © 2002 Elsevier Science B.V. All rights reserved.

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## 1. Introduction

The theory of purchasing power parity (PPP) has attracted a great deal of attention and has been explored extensively in the recent literature using recent advances in the field of applied econometrics. Based on the law of one price,

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PPP asserts that relative goods prices are not affected by exchange rates – or, equivalently, that exchange rate changes will be proportional to relative inflation. The relationship is important not only because it has been a cornerstone of exchange rate models in international economics, but also because of its policy implications – it provides a benchmark exchange rate and hence has some practical appeal for policymakers and exchange rate arbitrageurs.

A sufficient condition for a violation of absolute PPP is that the real exchange rate follows a random walk or, equivalently, that there is no cointegration between the nominal exchange rate and the domestic and foreign price levels. Recent advances in the field of applied econometrics (that pay explicit attention to the integration and cointegration properties of the variables) have facilitated the testing of such hypotheses. Although there is a plethora of studies testing for PPP – see, for example, the recent survey by Rogoff (1996) – the literature, however, provides mixed support for long-run PPP.

There are studies, for example, that investigate long-run purchasing power parity using tests where nonstationarity of the real exchange rate and no cointegration between the nominal exchange rate and the domestic and foreign price levels are the null hypotheses.<sup>1</sup> These studies generally fail to find support for long-run purchasing power parity. For example, the empirical consensus in Mark (1990), Grilli and Kaminsky (1991), Flynn and Boucher (1993), Serletis (1994), Serletis and Zimonopoulos (1997), and Dueker and Serletis (2000) is that purchasing power parity does not hold during the recent floating exchange rate period. But there are also studies, using similar tests, covering different groups of countries (see Phylaktis and Kassimatis, 1994) as well as studies covering periods of long duration (see Lothian and Taylor, 1996; Perron and Vogelsang, 1992) or country pairs experiencing large differentials in price movements (see Frenkel, 1980; Taylor and MacMahon, 1988) that report evidence of mean reversion towards PPP.

Also, studies that investigate long-run PPP using tests (developed by Kwiatkowski et al. (1992) and Shin (1994)) where stationarity and cointegration are the null, rather than the alternative hypotheses, find support of long-run PPP. Culver and Papell (1999), for example, using quarterly data from the current floating exchange rate period for 21 industrialized countries, provide evidence of long-run PPP. In particular, they cannot reject either the null hypothesis of stationarity of the real exchange rate or the null of cointegration between the nominal exchange rate and the domestic and foreign price levels. There are also

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<sup>1</sup> The most commonly used unit root tests are the augmented Dickey–Fuller (ADF) (see Dickey and Fuller, 1981), the nonparametric,  $Z(t_2)$ , test of Phillips (1987) and Phillips and Perron (1988), the Perron (1989) and Perron and Vogelsang (1992) tests, and the fractional unit root test of Sowell (1992). The most commonly used cointegration tests are the Engle and Granger (1987) two-step test, Johansen's (1988) maximum likelihood generalization of the Engle and Granger (1987) test, and the Cheung and Lai (1993) fractional cointegration test.

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