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Tests of Purchasing Power Parity via cointegration analysis of heterogeneous panels with consumer price indices

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Abstract

There has been significant interest in the empirical performance of the Purchasing Power Parity (PPP) hypothesis. Initial studies were, in general, unfavorable for PPP. These results led researchers into two directions. One branch of the literature employed price data for a limited range or goods (e.g., fruits or clothing). A second branch has reevaluated the performance of PPP with more powerful methods. In this paper we combine these two branches of the literature. We use consumer price sub-indices data and recently developed panel cointegration techniques to test weak PPP. Our results are suggestive that the failure of PPP can be attributed to inclusion of non-traded goods in the overall index.
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1. Introduction

It has been well documented that the power of traditional unit root and cointegration tests is dependent on the span of data series being tested, see for example Shiller and Perron (1985) or Pierse and Snell (1995). This is problematic when limited data are available or when the data stretch across distinct regimes. Panel unit root and cointegration tests evolved specifically to address this problem of the low power of standard unit roots tests to distinguish between unit roots and near unit roots. This paper uses panel cointegration techniques developed by Pedroni (2002) to conduct disaggregated tests of the weak version of Purchasing Power Parity (PPP). Weak PPP implies that while price ratios and exchange rates move together over long periods, they may not move in direct proportion and therefore would be cointegrated but not necessarily with a cointegrating coefficient of 1.0.

Pedroni's tests allow for heterogeneous slope coefficients and for differences in the short run dynamics of the individual members of the panels. Imposing a homogeneous cointegrating vector across the individual members of the panel when this is not the true relationship will result in a component of the error term from the cointegrating relationship being integrated of order one. This will be true even if cointegration represents the true relationship and the residual should therefore be stationary.

Employing Pedroni's tests on both aggregate and disaggregate price indices, we find support in our sample for the non-traded goods explanation of the failure of weak PPP in the post-Bretton Woods era. While PPP fails to hold (we fail to reject the null hypothesis of no cointegration) for the relative consumer price index as a whole, we find evidence that cointegration does exist between the price indices of traded goods and exchange rates but not for those goods that are non-traded. Thus, we combine two approaches that have heretofore been treated separately in the literature to address the failure of PPP in the post-Bretton Woods era: application of more powerful and appropriate statistical tests and an analysis of consumer price sub-indices data.

2. Summary of relevant literature

Taylor (2002) notes that studies on PPP "have appeared in abundance" recently. This contrasts with Froot and Rogoff's (1995) comment that as recently as the 1980s PPP was a "fairly dull research topic." While there is a good deal of debate on a number of issues regarding PPP, it is widely accepted that large deviations from PPP exist over the short to medium term. With sample periods usually confined to the post-Bretton Woods era, results suggest either a unit root in the real exchange rate or a lack of cointegration between the nominal exchange rate and prices.[1] Thus, PPP is considered to be at best a long-run phenomenon. Indeed, evidence on PPP in

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[1] See Rogoff (1996) and Froot and Rogoff (1995) for surveys of the literature on the empirical performance of PPP.