

Testing for absolute purchasing power parity

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Purchasing power parity (PPP) is an equilibrium condition equating the nominal exchange rate between two countries with the relative price of an identical bundle of goods in each country. Previous time-series researchers use price indices to study PPP, so they test *relative* PPP. We use new data that measures price levels, so we test *absolute* PPP. Price levels provide a test of absolute PPP because, unlike price indices, price levels do not contain a base period in which the nominal exchange rate equals the price ratio by construction. We find support for absolute PPP. (JEL F31). Copyright © 1996 Elsevier Science Ltd

Purchasing power parity (PPP) is an equilibrium condition equating the nominal exchange rate between two countries with the price ratio of an identical bundle of goods in each country. If the price ratio between the two countries differs from the nominal exchange rate and arbitrage opportunities exist, the resulting trade in goods equates the price ratio with the nominal exchange rate. Because there are costs to trade, the nominal exchange rate rarely equals the price ratio in a given period. Therefore tests for PPP are tests for the tendency of the nominal exchange rate to equal the price ratio. Previous researchers have used price *indices*, so they test for *relative* PPP. We use new data that measures price *levels*, so we test for *absolute* PPP. Relative PPP is a condition

equating changes in the nominal exchange rate to changes in the price ratio. Absolute PPP is a condition equating the level of the nominal exchange rate with the level of the price ratio. Because relative PPP does not imply absolute PPP, previous research supporting relative PPP does not address the validity of absolute PPP.

Because nominal exchange rates and the ratio of prices may contain unit roots, recent research tests for persistence in the deviation of the nominal exchange rate from the price ratio. To do so, researchers test for a unit root in the difference between the nominal exchange rate and the ratio of the price indices.¹ If a unit root is not rejected, there is evidence that arbitrage does not eliminate the difference between the nominal exchange rate and the ratio of price indices, which in turn provides evidence against relative PPP. Earlier researchers who used short spans of data usually found evidence against relative PPP.² Because the power of tests for unit roots increases with the span for the data, more recent researchers who use long spans of data generally find evidence supporting relative PPP.³ Several recent researchers find evidence supporting relative PPP even with short spans of data.⁴

Of course, a finding that the difference between the nominal exchange rate and the ratio of the price indices does not contain a unit root is only a necessary and not a sufficient condition for relative PPP. Given the bulk of evidence rejecting a unit root in this difference, some researchers have taken the additional step of testing the estimated coefficient that measures the relation of changes in the nominal exchange rate to changes in the price ratio. Relative PPP implies that the coefficient equals one. Interestingly, the results are inconclusive.⁵ Unfortunately, several of these researchers have based test statistics on least squares estimators. As is explained in detail below, these test statistics may not be valid. We test the estimated coefficients that measure the relation between the level of nominal exchange rates and the ratio of prices. Because our tests are based on modified least squares estimators, described in more detail below, our test statistics are valid. We find support for absolute PPP for nearly one-third of the country pairs that we study, and we find support for relative PPP for nearly two-thirds of the country pairs that we study.

In the next section we discuss absolute and relative PPP and clarify how we use the terms in our paper. Because our data have not been studied extensively, we describe the data in some detail in Section II. In Section III, we describe our estimators and present results, and Section IV concludes.

I. Absolute and relative PPP

To define symbolically absolute and relative PPP, let the price of a bundle of commodities in country i in period t be P_t^i .⁶ The commodity bundle can contain both traded and non-traded goods, but it is assumed that the weights used to construct the price levels P_t^i and P_t^j are identical for both countries. The nominal exchange rate in period t between country i and country j (that is, the number of units of country i 's currency required to buy one unit of

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