Purchasing Power Parity

One of the most enduring exchange rate theories is based on the foreign exchange rate's role in balancing international trade. This theory is known as the purchasing power parity (PPP) theory. The PPP theory is the oldest exchange rate theory, and one economist who has done some of the best research on this theory, Lawrence Officer, claims that it was already well developed in the 1500s by scholars at the University of Salamanca in Spain. The PPP theory draws on the law of one price, which says that arbitrage will lead to prices of the same products becoming equal everywhere. You no doubt recall the concept of arbitrage from the discussion of the foreign exchange markets. The PPP theory assumes that arbitrage in goods and services will lead to an equalization of prices across countries, provided of course that there is free trade. But because different currencies circulate in different countries, goods arbitrage cannot equalize prices denominated in different currencies; it can, however, ensure that the exchange rate between the two currencies reflects the differences in nominal prices expressed for each good in each currency.

The law of one price suggests that if the price of a widget at home in the domestic currency is $p$, and the price abroad in the foreign currency is $p^*$, then the exchange rate will serve to equalize the two prices:

\[ p = ep^*. \]  
Or,  
\[ e = p/p^*. \]

For example, if a widget in the U. S. costs $1.00 and that identical same widget costs Fr5.00 in France, then the exchange rate must be $e = .20$ for the real price to be the same in both countries. If the exchange rate is greater than .20, say .25, then widgets will flow from the U.S. to France because U.S. widgets will only end up costing Fr4.00 in France. This arbitrage in widgets will increase the demand for U.S. dollars and the supply of French francs, and the exchange rate will tend to appreciate, or a will decline.

The PPP theory actually assumes the overall price levels in each country are reflected in the exchange rate. Some individual products will tend to be cheaper in one country than in another; indeed, the principle of comparative advantage tells us that the relative prices of goods will differ from country to country. But for trade to balance, average price levels must approximately be reflected in the exchange rate. Specifically, if $P$ is the overall price index at home, such as the well-known wholesale price index, and $P^*$ is the general price index overseas, then the PPP theory says that

\[ P = eP^*. \]

or,
(6) \[ e = \frac{P}{P^*}. \]

If the exchange rate did not reflect the relative price levels, arbitrage would cause large amounts of goods to flow in one direction, which would cause the exchange rate to change up to the point where trade flows were again balanced.

The PPP theory suggests that if there is inflation in one country while average prices remain constant in another, then the exchange rate between the two countries' currencies should reflect the changing relative price levels. The high inflation country's currency should depreciate (its a should rise) and the constant-price country's currency should appreciate. The PPP theory has been thoroughly tested using actual data on exchange rates and price levels across many different countries and over different time periods. The evidence is mixed.\(^1\)

- In the short run, there is virtually no correlation between price movements and exchange rate movements.
- In the long run, real exchange rates do reflect purchasing power parity.
- The adjustment of exchange rates toward their purchasing power parities is very slow, however.

That is, relative inflation rates are not helpful in explaining how an exchange rate will move during the next week or month. But, relative inflation rates very nicely explain exchange rate movements over longer periods such as 5 or 10 years. And over the course of a century, price levels explain most of the variation in exchange rates. For example, James R. Lothian and Mark P. Taylor found that over the past 200 years purchasing power parity very closely explains the long-run exchange rates between the U.S. dollar, French franc, and British pound.\(^2\) And in his well-known book on PPP, Lawrence Officer finds that relative price levels explain nearly all the variation in exchange rates from the time of the gold standard in the late nineteenth century through the floating exchange rates of the 1970s.\(^3\) More recently, Alan Taylor has used more sophisticated time-series statistical methods and confirms earlier studies and finds that PPP held over four different exchange rate systems beginning with the gold standard in 1870 and ending with floating rates in 1996.\(^4\)

---


\(^3\)Lawrence H. Officer (1982), Purchasing Power Parity and Exchange Rates: Theory, Evidence and Relevance, Greenwich, CT: JAI Press.