

## 6.4: Problems and Extensions of PPP

### Learning objectives

1. Identify the reasons why the PPP condition is rarely satisfied between two countries.
2. Learn the dynamic version of PPP.

The main problem with the purchasing power parity (PPP) theory is that the PPP condition is rarely satisfied within a country. There are quite a few reasons that can explain this and so, given the logic of the theory, which makes sense, economists have been reluctant to discard the theory on the basis of lack of supporting evidence. Below we consider some of the reasons PPP may not hold.

*Transportation costs and trade restrictions.* Since the PPP theory is derived from the law of one price, the same assumptions are needed for both theories. The law of one price assumes that there are no transportation costs and no differential taxes applied between the two markets. These mean that there can be no tariffs on imports or other types of restrictions on trade. Since transport costs and trade restrictions do exist in the real world, this would tend to drive prices for similar goods apart. Transport costs should make a good cheaper in the exporting market and more expensive in the importing market. Similarly, an import tariff would drive a wedge between the prices of an identical good in two trading countries' markets, raising it in the import market relative to the export market price. Thus the greater transportation costs and trade restrictions are between countries, the less likely for the costs of market baskets to be equalized.

*Costs of nontradable inputs.* Many items that are homogeneous nevertheless sell for different prices because they require a nontradable input in the production process. As an example, consider why the price of a McDonald's Big Mac hamburger sold in downtown New York City is higher than the price of the same product in the New York suburbs. Because the rent for restaurant space is much higher in the city center, the restaurant will pass along its higher costs in the form of higher prices. Substitute products in the city center (other fast food restaurants) will face the same high rental costs and thus will charge higher prices as well. Because it would be impractical (i.e., costly) to produce the burgers at a cheaper suburban location and then transport them for sale in the city, competition would not drive the prices together in the two locations.

*Perfect information.* The law of one price assumes that individuals have good, even perfect, information about the prices of goods in other markets. Only with this knowledge will profit seekers begin to export goods to the high price market and import goods from the low-priced market. Consider a case in which there is imperfect information. Perhaps some price deviations are known to traders but other deviations are not known, or maybe only a small group of traders know about a price discrepancy and that group is unable to achieve the scale of trade needed to equalize the prices for that product. (Perhaps they face capital constraints and can't borrow enough money to finance the scale of trade needed to equalize prices.) In either case, traders without information about price differences will not respond to the profit opportunities and thus prices will not be equalized. Thus the law of one price may not hold for some products, which would imply that PPP would not hold either.

*Other market participants.* Notice that in the PPP equilibrium stories, it is the behavior of profit-seeking importers and exporters that forces the exchange rate to adjust to the PPP level. These activities would be recorded on the current account of a country's balance of payments. Thus it is reasonable to say that the PPP theory is based on current account transactions. This contrasts with the interest rate parity theory in which the behavior of investors seeking the highest rates of return on investments motivates adjustments in the exchange rate. Since investors are trading assets, these transactions would appear on a country's capital account of its balance of payments. Thus the interest rate parity theory is based on capital account transactions.

It is estimated that there are approximately \$1–2 trillion dollars worth of currency exchanged every day on international foreign exchange (Forex) markets. That's one-eighth of U.S. GDP, which is the value of production in the United States in an entire year. In addition, the \$1–2 trillion estimate is made by counting only one side of each currency trade. Thus that's an enormous amount of trade. If one considers the total amount of world trade each year and then divides by 365, one can get the average amount of goods and services traded daily. This number is less than \$100 billion dollars. This means that the amount of daily currency transactions is more than ten times the amount of daily trade. This fact would seem to suggest that the primary effect on the daily exchange rate must be caused by the actions of investors rather than importers and exporters. Thus the participation of other traders in the Forex market, who are motivated by other concerns, may lead the exchange rate to a value that is not consistent with PPP.

## Relative PPP

There is an alternative version of the PPP theory called the “**relative PPP theory**.” In essence this is a dynamic version of the absolute PPP theory. Since absolute PPP suggests that the exchange rate may respond to inflation, we can imagine that the exchange rate would change in a systematic way given that a continual change in the price level (inflation) is occurring.

In the relative PPP theory, exchange rate changes over time are assumed to be dependent on inflation rate differentials between countries according to the following formula:

Here the percentage change in the dollar value between the first period and the second period is given on the left side. The right side gives the differences in the inflation rates between Mexico and the United States that were evaluated over the same time period. The implication of relative PPP is that if the Mexican inflation rate exceeds the U.S. inflation rate, then the dollar will appreciate by that differential over the same period. The logic of this theory is the same as in absolute PPP. Importers and exporters respond to variations in the relative costs of market baskets so as to maintain the law of one price, at least on average. If prices continue to rise faster in Mexico than in the United States, for example, price differences between the two countries would grow and the only way to keep up with PPP is for the dollar to appreciate continually versus the peso.

### Key takeaways

- Purchasing power parity (PPP) will not be satisfied between countries when there are transportation costs, trade barriers (e.g., tariffs), differences in prices of nontradable inputs (e.g., rental space), imperfect information about current market conditions, and when other Forex market participants, such as investors, trade currencies for other reasons.
- Relative PPP is a dynamic version of the theory that relates currency appreciation or depreciation to differences in country inflation rates.

### exercise

1. **Jeopardy Questions.** As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is “a tax on imports,” then the correct question is “What is a tariff?”
  - The name for the PPP theory based on relative inflation rates between countries.
  - A type of trade cost whose presence is likely to cause deviations in the law of one price and PPP.
  - The term used to describe a kind of production input, of which office rental is one type.
  - Traders need to have information about this in other markets in order to take advantage of arbitrage opportunities.

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