Exchange rate I: the monetary approach in the long run

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Goals

▶ We set out long-run relationships between money, prices and exchange rates.

▶ Two parts of development:

  ▶ Purchasing power, linking exchange rate and prices in different countries.

  ▶ Linking price levels and monetary conditions in each countries.

▶ Combination of the two: the monetary approach to exchange rates.

Purchasing power parity

▶ Since goods can be traded, arbitrage can happen, thus prices can converge in the international market.

▶ Applied to a single good, we call this "law of one price" (LOOP).

▶ Applied to a basket of goods, we call this "purchasing power parity".

▶ We start by assuming a frictionless trade (no trade cost).

LOOP

With competitive market, flexible prices and zero trade cost, prices of identical goods sold in different countries should be the same.

For a good g sold in 2 places:

$$q_{ID/US}^g = E_{Rp/\$} \frac{P_{US}^g}{P_{ID}^g}$$

Where $q_{ID/US}^g$ is the relative price of good g in Indonesia vs the US. Loop is hold if $q_{ID/US}^g = 1$.

LOOP

If LOOP is hold, we can rearrange the equation above to get:

$$E_{Rp/\$}P_{US}^{ID} = P_{US}^{g}$$

which means the exchange rate must be equal to the ratio of prices expressed in two currencies.

$$E_{Rp/\$} = \frac{P_{ID}}{P_{US}}$$

Purchasing power parity

▶ PPP is the macroeconomic version of LOOP. We compute two basket of goods in each location, find their local prices, and compare them.

$$q_{ID/US} = E_{Rp/\$} \frac{P_{US}}{P_{ID}}$$

▶ If there are no arbitrage, then the same basket of goods in two countries should have the same price. i.e., $q_{ID/US} = 1$

▶ PPP thus holds: price levels in two countries are equal when expressed in common currency. This is called absolute PPP.

Real exchange rate

▶ The real exchange rate is the relative price of the baskets.

▶ The Indonesian real exchange rate $q_{ID/US} = E_{Rp/\$}P_{US}/P_{ID}$ tells us how many Indonesian baskets are needed to purchase U.S. basket.

▶ The exchange rate for currencies is a nominal concept. The real exchange rate is the real concept.

▶ The apreciation and depreciation terminology is the same, but add real: real appreciation (if $q \downarrow$) and real depreciation (if $q \uparrow$).

PPP and exchange rate

▶ PPP is holding if $q_{ID/US} = 1$, and no incentive to do arbitrage.

▶ If $q_{ID/US} > 1$, then the Indonesian basket is more expensive than the U.S. basket. This means the Rp is overvalued.

▶ if $q_{ID/US} < 1$, then the Indonesian basket is cheaper than the U.S. basket. This means the Rp is undervalued.

PPP and exchange rate

▶ When $q_{ID/US} = 1$, then:

$$\underbrace{E_{Rp/\$}}_{\text{exchange rate}} = \underbrace{P_{ID}/P_{US}}_{\text{ratio of price levels}} \tag{1}$$

Purchasing power parity implies that the exchange rate at which two currencies trade equals the relative price levels of the two countries.

Long-run relationship

▶ We have established that $E_{Rp/\$} = P_{ID}/P_{US}$

▶ Left-hand side: Let's take a rate of change of the exchange rate (i.e., rate of depreciation/appreciation).

$$\frac{\Delta E_{Rp/\$}}{E_{Rp/\$}} = \frac{\Delta P_{ID}}{P_{ID}} - \frac{\Delta P_{US}}{P_{US}} \qquad (2)$$