Exchange Rate Theories – The Big Mac Index

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Contents

Why do currencies fluctuate?

- 1972: one USD costs 40 British pence
- 1985: one USD costs 90 British pence
- 2008: one USD costs 67 British pence

Understanding those fluctuations is important

- economic policy
- smooth functioning of financial markets
- financial management of many international companies

Examples

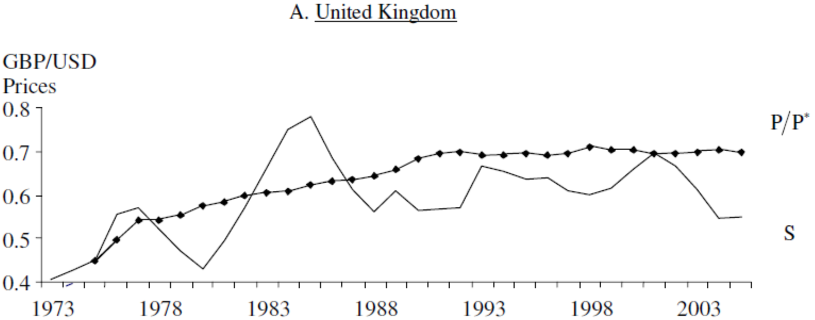

Figure: USD/GBP EXCHANGE RATES AND PRICES, 1973-2007, Source: IMF

Examples

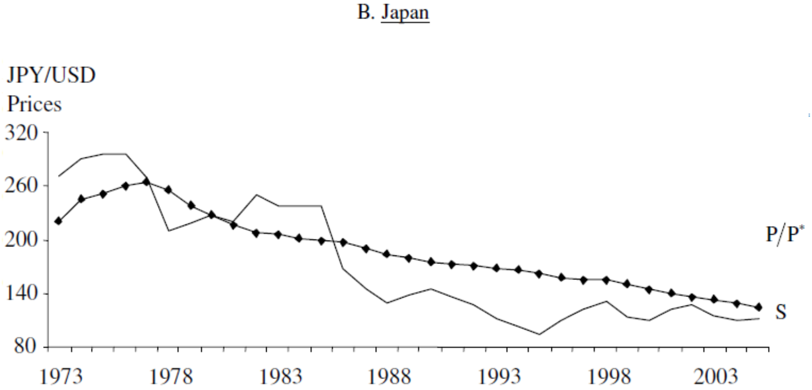

Figure: USD/Yen EXCHANGE RATES AND PRICES, 1973-2007, Source: IMF

Absolute version of PPP

PPP for a single good, *i*

Let P_i denote the domestic price of good i in terms of domestic currency and P_i^* the price of the same good in the foreign country.

With (a) **zero transaction costs** and (b) **no barriers to international trade**, **arbitrage** equalises the cost of the good expressed in terms of a common currency:

$$P_i = SP_i^* \tag{1}$$

where S is the spot exchange rate.

Absolute version of PPP, cont'd

PPP at the economy-level

let w_i and w_i^* denote the share of good i in the economy at home and abroad. Then, multiplying both sides of equation (1) by w_i and summing over goods $i = 1, ..., n$, we obtain

$$\sum_{i=1}^{n} w_i P_i = S \sum_{i=1}^{n} w_i P_i^* \tag{2}$$

under simplifying assumption (c) **foreign and domestic weights coincide**, we have the economy-wide version of condition (1) as

$$P = SP^* \tag{3}$$

Absolute version of PPP, cont'd

The real exchange rate

Expressing equation (3) as $S = P/P^*$, we obtain the **absolute version of PPP**.

Next, we define the home country's **real exchange rate** as

$$q = log \frac{P}{SP^*} \tag{4}$$

Note: according to absolute PPP, the real exchange rate is constant at 0!
Question: What do $q > 0$ and $q < 0$ indicate respectively?

Geometry of absolute PPP

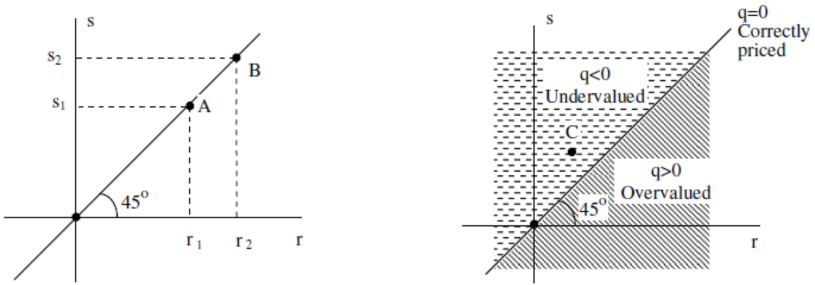

Figure: Absolute PPP, Source: Clements et al. (2010)

The Big Mac Index

The [Big Mac] Index was first served up in September 1986 as a relatively simple way to calculate the over- and under-valuation of currencies against the dollar. It soon caught on. Such was its popularity that it was updated the following January, and has now become the best-known regular feature in The Economist.

in The Economist: "Ten Years of the Big Mac Index".

Research on the BMI

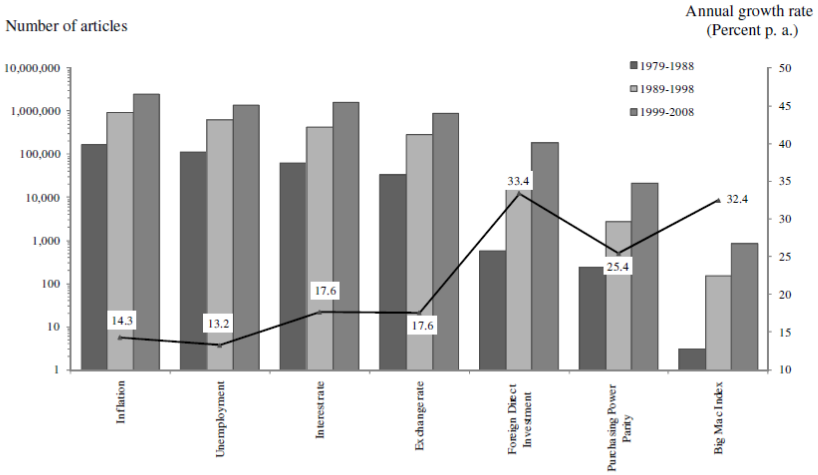

Figure: THE GROWTH OF ECONOMIC RESEARCH, Source: Factiva

Recap: PPP assumptions

(a) zero transaction costs
(b) no barriers to trade
(c) foreign and domestic weights in market basket coincide

The Big Mac recipe

Ingredient	Cost share (%)	
Tradable		
Beef	9.0	
Cheese	9.4	
Bread	12.1	30.5
Nontradable		
Labour	45.6	
Rent	4.6	
Electricity	5.1	55.3
Other		14.2
Total		100.0

Figure: The Big Mac recipe in "broad" basket form, Source: Parsley and Wei (2007)

Recap: PPP assumptions, cont'd

foreign and domestic weights in market basket coincide

- cost of a Big Mac is equivalent to a basket of goods

zero transaction costs, no barriers to trade

- but what can be done about the non-tradeable ingredients in the Big Mac?
  1. via substitution of traded and non-traded goods in production and consumption
  2. via expectations:
     "An example is the plumber in Buenos Aires who puts up his prices as soon as the peso falls." (Clements et al., 2010, p.12)
- aside: relative PPP allows to take transaction costs into account

In conclusion

Clemens et al. (2010) find that

- the BMI predicts future currency values at least as good as the standard model in the industry
- as the cost of the Economist magazine is less than USD 10, the index seems to be good value for money

What is your opinion?

- can you think of any limitations of the theory underlying the BMI?
- does the data confirm the absolute PPP theory underlying the BMI?