Topics for Today

1.) The "Real" Exchange Rate

2.) The Balassa-Samuelson Theory of Real Ex. Rate Determination

3.) A General Model of Long-Run Real Exchange Rates

4.) Real Interest Parity
The Real Exchange Rate

\[ q = \frac{E P^*}{P} = \frac{\text{dom. curr.}}{\text{for. curr.}} \times \frac{\text{for. curr.}}{\text{for. goods}} \]

\[ \frac{\text{dom. curr.}}{\text{dom. goods}} = \frac{\text{domestic goods}}{\text{foreign goods}} = \text{price of foreign goods in terms of domestic goods} \]

\( q \) is called the real exchange rate.

\( q \uparrow \Rightarrow \text{real depreciation} \)

\( q \downarrow \Rightarrow \text{real appreciation} \)

Note, absolute PPP implies \( q \) is constant and \( q = 1 \).

Relative PPP implies \( q \) is constant but allows \( \alpha \neq 1 \).
Now the question becomes, what determines \( q \)?

One leading theory links \( q \) to the relative price of non-traded goods.

\[
P = \alpha (\text{price of non-traded goods}) + \beta (\text{price of traded goods})
\]

Prices of traded goods equal across countries (Law of one price).

However, prices of non-traded goods may differ.

Countries where the price of non-traded goods is high, will have strong, apparently overvalued currencies. Their real exchange rates will be low.
The relative price of NT goods will be higher in countries experiencing relatively rapid productivity growth in the tradeable goods sector.

Rapid prod. growth in tradeables

$\Rightarrow$ wages rise in tradeables sector (prices fixed in world markets)

$\Rightarrow$ wages must rise in non-tradeables sector (labor mobility)

$\Rightarrow$ prices of NT must rise (competition + zero profits)
A higher traded–nontraded productivity growth difference is associated with a higher rate of increase in the relative price of nontradables.
Figure 3. Price Level versus GDP per capita (U.S. = 1) 1990 \( \log(\frac{P_j}{P_{u.s.}}) = 0.035 + 0.366 \log(\frac{Y_j}{Y_{u.s.}}) \) 

Source: The Penn World Table, Aug. 1994
Figure 4. Yen/U.S.\$ CPI and WPI based real exchange rates: Jan. 1960–Apr. 1995

Source: International Financial Statistics
Figure 1: Japan

Ex rate

Rel. price level

70 72 74 76 78 80 82 84 86 88 90 92 94

Figure 2: Germany

Ex rate

Rel. price level

70 72 74 76 78 80 82 84 86 88 90 92 94

Avg. Nominal depr.

Japan

4.9%

Germany

3.2%

TT - \(\Pi^t\)

0.9%

1.9%

Rel. prod. growth

Japan

2.1%

60% accounted for

Germany

1.1%

90+% accounted for
A General Model of Long-Run Real Ex. Rates

Remember, \( q \) is the relative price of foreign goods. Like all prices, it is determined by the interaction of supply and demand, in this case, by the supply and demand of overall national outputs.

\[ \begin{align*}
\text{Equi} & \text{value of } q \\
\text{RS (relative supply)} & \text{RD (relative demand)}
\end{align*} \]

1. \( q \uparrow \Rightarrow \text{Domestic goods become relatively cheaper} \Rightarrow RD \uparrow \text{ (movement along the curve)} \)

2. To a first approximation, RS does not depend on \( q \). It is determined by relative factor supplies + relative productivities. Of course, causation could run the other way, i.e., RS can influence \( q \).
Case 1: Increased Demand for Domestic Output

Result: Real Ex. Rate Appreciates

Case 2: Increased Supply of Domestic Output

Result: Real Ex. Rate Depreciates

(Why the difference compared to Balassa-Samuelson?)
What are the implications for nominal exchange rate determination?

By definition,

\[ q = \frac{E}{p} \]

Therefore,

\[ E = q \times \frac{p}{p^*} \]

We need to distinguish between two general kinds of factors:

1.) Monetary: Shifts in relative money supplies and money demands

2.) Real: Shifts in relative output supplies and output demands

- Purely monetary changes do not change \( q \) (i.e., PPP holds). Equal movements in \( E \) and \( P/p^* \)

- Real disturbances generally change \( q \), and in that way can also change \( E \).
Example 1: Increased demand for Domestic Output

From before, we know $q \downarrow$.

Therefore, since the demand shift has no direct effects on relative price levels, we know $E \downarrow$ as well.

Example 2: Increased supply of Domestic output

From before, we know $q \uparrow$.

All else equal, this would cause $E \uparrow$ also.

However, in this case, when $Y \uparrow$ domestic money demand $\uparrow$, and with no change in $M^s$, this causes $P \downarrow$.

Overall then, the effect on $E$ is ambiguous.
Real Interest Parity

1. \( q_t = \frac{E P^*}{P} \)

2. \( \frac{q^e - q}{q} = \frac{E^e - E}{E} - (\pi^e - \pi^{*e}) \)

2. UIP \( \Rightarrow \frac{E^e - E}{E} = R - R^* \)

3. Fisher \( \Rightarrow R - R^* = (\pi^e - \pi^{*e}) + (r^e - r^{*e}) \)

Put them all together,

\( \frac{q^e - q}{q} = r^e - r^{*e} \)

or,

\( r^e = r^{*e} + \frac{q^e - q}{q} \quad \Rightarrow \quad \text{Real Interest Parity} \)