International Economics: Lecture 21

Monetary approach to exchange rate determination

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Money, prices, and exchange rate in the long-run

PPP asserts that in the long run exchange rate is determined by the ratio of price levels in two countries.

\[ S_{\text{AMD/RUB}} = \frac{P_{\text{ARM}}}{P_{\text{RUS}}} \]

But how are the price levels themselves determined?
Money market

Money demand and supply

Money performs 3 basic functions:

1. Store of value.
2. Unit of account (in principle cucumbers may function as a unit of account, but they will be a poor store of value).
3. Medium of exchange (money is the most liquid asset of all).

MONEY SUPPLY is determined by the Central Bank.
By “money” we mean the stock of liquid assets that are normally used to finance transactions (basically that is the currency in circulation plus demand deposits).

MONEY DEMAND

✓ We do not ask - “How much money do you want?
✓ Instead we ask - “Which part of your financial assets do you want to keep in the form of money?”
Money demand and supply

MONEY DEMAND
- There is a benefit from holding money (you may conduct your transactions).
- There is a cost to holding money (you lose the interest rate of interest bearing assets).

\[ M^d = L(r) \times P \times Y \]

Therefore:
- A rise in national nominal income will increase transactions and aggregate demand for money.
  - More income, more transactions, more demand for money

- A rise in nominal interest rate will decrease the aggregate demand for money.
  - Higher interest rate, higher foregone interest income, lower demand for money
Long-run equilibrium in the money market

\[ \frac{M^s}{P} = L(r)Y \]

Money demand
\[ M^d = L(r)PY \]
Real money demand
\[ M^d/P = L(r)Y \]

Real money supply is determined by the Central Bank

Real money demand is determined by the nominal interest rate and real income

In the long-run prices are
- flexible and
- adjust to ensure money market equilibrium.
But how nominal interest rates are determined in the long-run?

**Relative PPP**

\[
\%\Delta S^e_{\text{AMD/RUB}} = \pi^e_{\text{ARM}} - \pi^e_{\text{RUS}}
\]

- Expected exchange rate depreciation
- Expected inflation differential

**UIP**

\[
\%\Delta S^e_{\text{AMD/RUB}} = r_{\text{ARM}} - r_{\text{RUS}}
\]

- Expected exchange rate depreciation
- Interest rate differential

Traders are indifferent to higher dram interest rate only if it is offset by an expected dram depreciation.

\[ r \text{ – interest rate} \]

\[ \pi \text{ – inflation rate} \]
Fisher effect

For example

\[ r_{\text{ARM}} - r_{\text{RUS}} = \pi^{e}_{\text{ARM}} - \pi^{e}_{\text{RUS}} \]

Nominal Interest rate differential
Expected nominal inflation rate differential

For example

? - 4%  
8% - 2%  
if +1% = 9%  
then \( r_{\text{ARM}} = 10\% \)
then \( r_{\text{ARM}} = 11\% \)

All else equal, a rise in the expected inflation rate increases the nominal interest rate (Fisher effect).

Fisher effect: Under flexible prices (in the long-run) if inflation ↑, then \( r \) ↑

Thus, for given real income, if inflation ↑, then \( r \) ↑, then real money demand ↓

Real money demand
\[ M^{d}/P = L(r)Y \]
Fisher effect

\[ r_{\text{ARM}} - r_{\text{RUS}} = \pi_{\text{ARM}}^{e} - \pi_{\text{RUS}}^{e} \]

Rearrange

\[ r_{\text{ARM}} - \pi_{\text{ARM}}^{e} = r_{\text{RUS}} - \pi_{\text{RUS}}^{e} \]

Nominal interest rate – Inflation = Real interest rate

\[ i_{\text{ARM}}^{e} = i_{\text{RUS}}^{e} \]

If PPP and UIP hold, then expected real interest rates are equalized across countries.

Arbitrage in goods and financial markets alone is sufficient, in the long run, to cause the equalization of real interest rates across all countries.

\[ r_{\text{ARM}} = i^{*} + \pi_{\text{ARM}}^{e} \quad r_{\text{RUS}} = i^{*} + \pi_{\text{RUS}}^{e} \]

Long-run expected nominal interest rate = long-run world real interest rate PLUS country’s expected long-run inflation rate
Fundamental equation of the monetary approach

Long-run equilibrium in the money market

\[ \frac{M^s}{P} = L(r)Y \]

Real money supply \quad Real money demand

\[ P = \frac{M^s}{L(r)Y} \]

PPP

\[ S_{\text{AMD/RUB}} = \frac{P_{\text{ARM}}}{P_{\text{RUS}}} = \frac{M^s_{\text{ARM}}}{L(r)_{\text{ARM}}Y_{\text{ARM}}} = \frac{M^s_{\text{ARM}}/M^s_{\text{RUS}}}{L(r)_{\text{ARM}}Y_{\text{ARM}} / L(r)_{\text{RUS}}Y_{\text{RUS}}} \]

Relative nominal money supplies

Relative real money demands
China’s Gamble: How a Crusade to Prop Up the Yuan Imperils Other Pressing Mandates

Defending the currency is the central bank’s top priority as it aims to stem capital flight and offer a defense against Trump’s trade rhetoric, but the shift threatens to shortchange the bank’s tasks of safeguarding economic growth.

Forecasters Trim U.S. Growth Outlook as Hopes for Quick Stimulus Fade

More forecasters are reconsidering their bullish outlooks for the U.S. economy as doubts grow over the extent to which President Donald Trump will be able to implement his agenda, the latest WSJ economic survey found.

- WSJ Survey: Most Economists Expect Fed to Start Shrinking Balance Sheet This Year
- IMF Hails Global Momentum

White House Budget Director Says ‘Shutdown Is Not a Strategy’ As Funding Deadline Looms

White House budget director Mick Mulvaney said Wednesday the Trump administration is looking to avoid a partial government shutdown in two weeks but that the White House would insist on securing concessions from Congress on security funding and immigration policy.
Fundamental equation of the monetary approach

\[ \frac{S_{\text{AMD/RUB}}}{P_{\text{RUS}}} = \frac{P_{\text{ARM}}}{P_{\text{RUS}}} = \frac{\frac{M_{s_{\text{ARM}}}}{L(r)_{\text{ARM}}Y_{\text{ARM}}}}{\frac{M_{s_{\text{RUS}}}}{L(r)_{\text{RUS}}Y_{\text{RUS}}}} = \frac{M_{s_{\text{ARM}}}/M_{s_{\text{RUS}}}}{L(r)_{\text{ARM}}Y_{\text{ARM}}/L(r)_{\text{RUS}}Y_{\text{RUS}}} \]

**Relative nominal money supplies**

**Relative real money demands**

In the long-run, ceteris paribus:
if Armenian money supply ↑, price level ↑, dram depreciates,

if Armenian real income ↑, real demand for money ↑, price level ↓, dram appreciates.
Connections

Future price levels, $P, P^*$

Expected future spot rate, $S^e$

Interest rates, $r$, $r^*$

Purchasing power parity
Monetary approach

Spot market model: Uncovered interest parity

Forward market model: Covered interest parity

$S = S^e(1+r^*)/(1+r)$

$F = S(1+r)/(1+r^*)$
Thank you and take care,
but remember
People think of education as something they can finish.
Isaac Asimov