International Monetary Economics

Lecture Note 5: Exchange rates, Exchange rate regimes

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MUNDELL-FLEMMING

Main emphasis: How the policy mix affects the exchange rate,international trade competitiveness and aggregate economic activity

Model: Standard IS-LM; The IS curve now includes net exports, NX (exports minus imports).

$Y = C + I + G + NX$

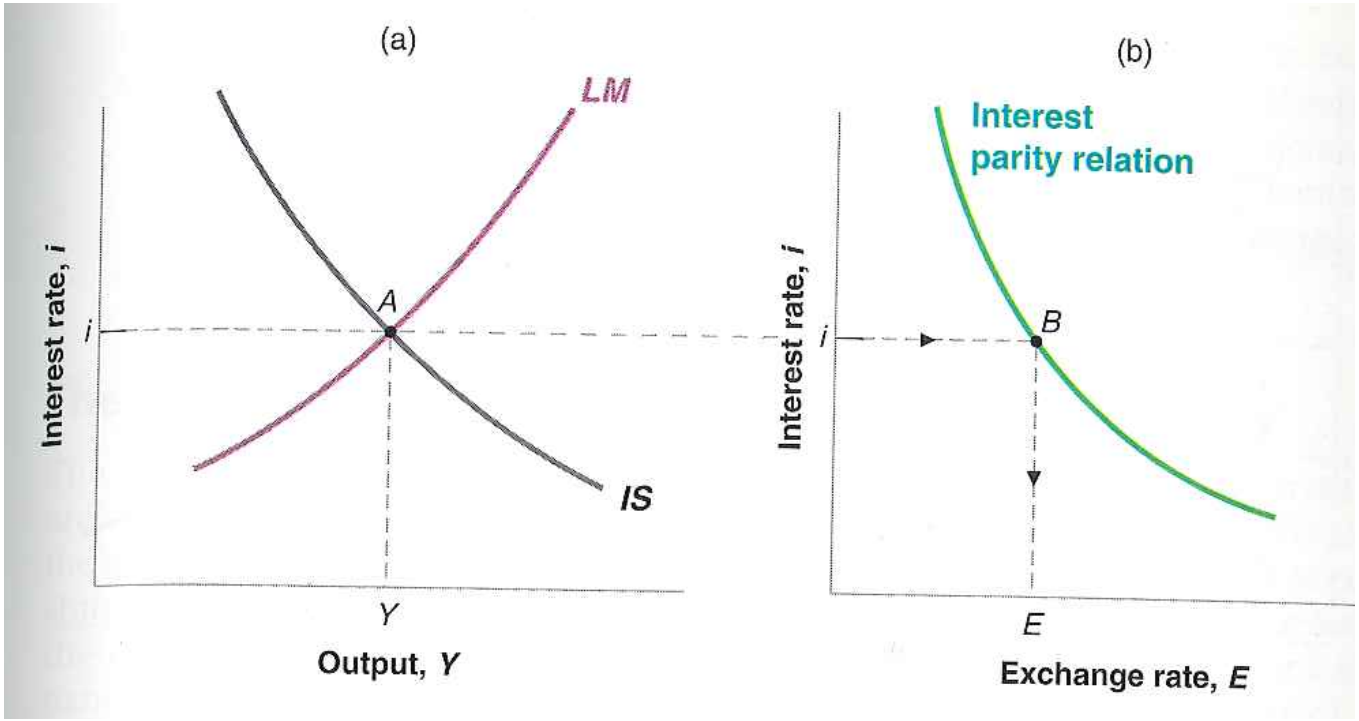
Monetary and fiscal policy affect the exchange rate through their effects on the domestic real interest rate relative to the foreign interest rate (thru IRP).

Uncovered Interest Rate Parity (UIRP)

$\frac{1+i(t)}{1+i_t^\star} = \frac{E_t S(t+1)}{S(t)}$ or in logs $i - i^\star = E_t s(t+1) - s(t)$

Position of the IRP curve in i,s space (figure 1): higher $E_t s(t+1)$ or $i^\star$ shift the curve out

FIGURE : Equilibrium in the IS-LM



Short term effects of fiscal and monetary policy

- Temporary monetary expansion: Lower interest rates, domestic currency depreciation, output expansion
- Temporary fiscal expansion: Higher interest rates, domestic currency appreciation, output expansion

THE MONETARY APPROACH

The demand for and supply of foreign currency are derived from the demand for and supply of domestic and foreign money (s is the relative price of monies).

$s(t) : M(t)/p(t) = F(i(t), y(t)), M^{\star}(t)/p^{\star}(t) = F(i^{\star}(t), y^{\star}(t)$

The relevant fundamentals are the determinants of the supply of and demand for money

Important assumptions:

- All prices are flexible (Aggregate Supply is vertical).
- Domestic and foreign goods are perfect substitutes (PPP):$p(t) = s(t)p^{\star}(t)$ holds
- Domestic and foreign assets are perfect substitutes (UIRP): $\frac{1+i(t)}{1+i_t^{\star}} = \frac{E_t S(t+1)}{S(t)}$

Implications:

- $M \uparrow S \uparrow$ (depreciation)
- $i \uparrow S \uparrow$(depreciation)
- $y \uparrow S \downarrow$ (appreciation)

Comparison to the predictions of the Keynesian model (IS-LM).

$i \uparrow S \downarrow$ (appreciation)

Understand the source of disagreement:
i: Fisher equation: $i = r + E\pi$
Sources of variation in i. Real vs nominal. The role of inflation and inflationary expectations

Derivation of a –forward looking– expression for S(t).

$$m(t) - p(t) = \alpha y(t) - bi(t), m^{\star}(t) - p^{\star}(t) = \alpha y^{\star}(t) = bi^{\star}(t)$$

$$s(t) = p(t) - p^{\star}(t), i(t) - i(t)^{\star} = E_t s(t+1) - s(t)$$

$$(1+b)s(t) - bE_t s(t+1) = k(t), \quad k(t) = m(t) - m^{\star}(t) - \alpha(y(t) - y^{\star}(t))$$

TWO solutions

Solving first order difference equations

a) Bubble: the solution to the homogeneous part

$(1+b)s(t) - bE_t s(t+1) = 0$

In general, any current exchange rate that satisfies the condition

$$s(t) = \frac{b}{1+b} E_t s(t+1) \Rightarrow s(t) = A(0)(\frac{b}{1+b})^t$$

is a valid solution

Price bubble: If the only reason that today's price is high is because the future price is expected to be high (and not because of fundamentals) then we have a bubble. We typically set the initial condition of this difference equation to eliminate the bubble, $A(0) = 0$

To gain a better understanding of bubbles consider the IRP

$$\frac{1+i(t)}{1+i^{\star}(t)} = \frac{E_t S(t+1)}{S(t)}$$

For any i(t) and i*(t), the value of the current exchange rate is undetermined unless we fix a value for the future exchange rate. For an arbitrary expectation, we get an arbitrary current spot rate!

b) Particular solution (fundamentals) Postulate that the current spot rate is determined by its fundamentals, k(t), so that $s(t) = A + Bk(t)$ or, equivalently,

$$s(t) = \frac{1}{1+b} E_t \sum_{j=0}^{\infty} \left(\frac{1}{1+b} \right)^j k(t+j)$$

Two ways of testing the model
1. Estimation of this equation together with the stochastic equation (process) for the fundamentals For instance,
$k(t) = c * k(t) + u(t)$
Test the model using cross equation restrictions.
2. Variance bounds test: conditional variance of s(t) should be bounded above by conditional variance of k(t)

Policy implications:
1. Monetary policy affects the nominal exchange rate but not int'l trade competitiveness (q).
2. Both current and expected future developments matter
Main shortcoming: a) The real exchange rate ($q = Sp^{\star}/p$) is not constant (PPP does not hold) in the short run.
b) IRP does not seem to hold either.

Figure : PPPb

Figure 7.1: Dollar-Sterling PPP Over Two Centuries

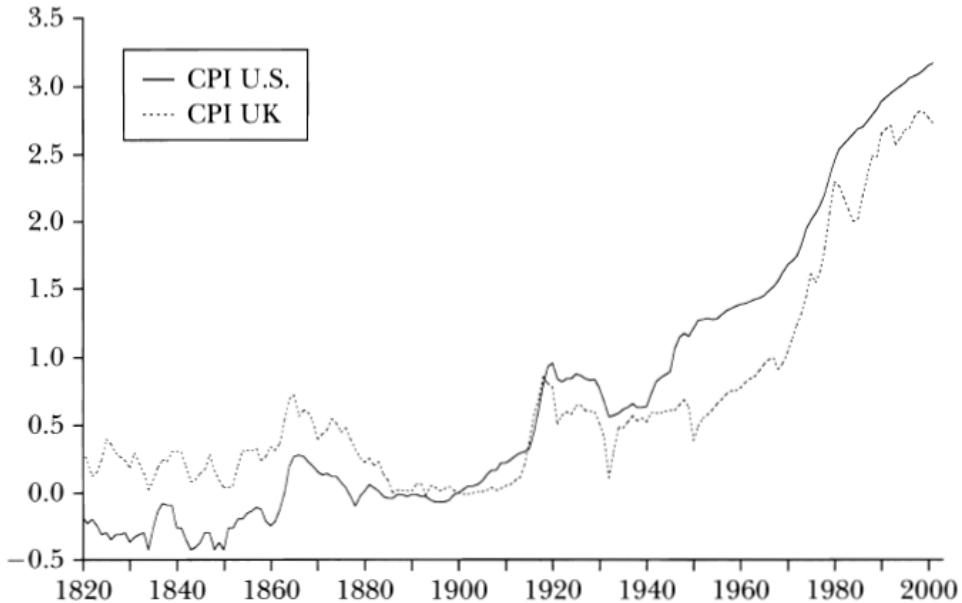
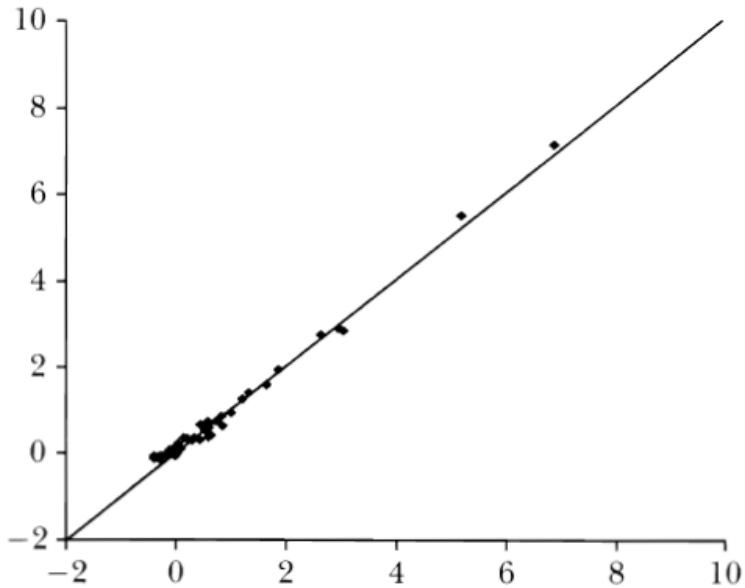


Figure : PPP

Figure 7.2: Consumer Price Inflation Relative to the U.S. Versus Dollar Exchange Rate Depreciation, 29-Year Average, 1970-1998



DISEQUILIBRIUM MONETARY MODEL (Overshooting model of Dornbusch)
Assumptions same as above with an important exception: Goods prices sticky in the short and flexible in the long run. Effects of monetary expansion:

$M(t)/P(t) = F(i(t)),\ \frac{1+i(t)}{1+i^{\star}(t)} = \frac{E_t S(t+1)}{S(t)}$
$M(t) \uparrow, P(t) \rightarrow, i(t) \downarrow, i^{\star}(t) \rightarrow, E_t S(t+1) \uparrow (\text{as} P(t+1) \uparrow)$

- Exchange rate overshooting. The short run exchange rate jumps above its long run value.
- "Excessive" nominal and real exchange rate volatility as a result of monetary shocks.
- In the short run, the real exchange rate (the terms of trade) moves in tandem with s because of short term price stickiness (P and $P^{\star}$).
- In the long run good prices are flexible so q returns to its earlier value.

Interesting implications:

- a) The policymakers can use monetary policy to induce temporary change in international trade competitiveness (q) by manipulating the nominal exchange rate, S.
- b) An increase in the nominal interest rate is associated with a currency appreciation.
- c) Unlike the IS-LM (Mundell-Fleming) model, the effects of monetary policy are short lived.

Strengths: It matches the stylized fact that almost all of the short run variation in real exchange rates is due to variation in the nominal rate.

EQUILIBRIUM MONETARY MODEL (Stockman, 1980)
Everything as in the monetary model except for the fact that domestic and foreign goods are not perfect substitutes. The emphasis is on real -mostly supply -(rather than monetary) shocks
FOC: $q(t) = \frac{S(t)p(t)}{p(t)^\star} = \frac{u_H(t)}{u_F(t)}$
Equilibrium in the money market:
$M(t)/P(t) = F(i(t), Y(t))$

$$S(t) = \frac{M(t)}{M(^\star(t)} \frac{G(i^\star(t), Y^\star(t))}{G(i(t), Y(t))} \frac{u_F(t)}{u_H(t)}$$

The implications of the model with regard to the effects of changes in M, and i are the same as in the monetary model. The effects of Y on S are ambiguous: Income effect (money market) pushes S(t) down; The elasticity of substitution between domestic and foreign goods effect pushes s(t) up.

Interesting points:

- There is no concept of international competitiveness.
- The correlation between changes in the nominal and real exchange rate is not unique. Its sign depends on the type of shock that hits the various markets. Various examples.
- In any case, correlation does not imply causality.
- Nevertheless, we know that this correlation has on average been strongly positive.
- Government expenditure (or taste) shocks: Expansionary fiscal policy leads to appreciation

Evaluation: Can account for high persistence in real exchange rates with supply shocks. However, in order to account for greater volatility of nominal exchange rate relative to inflation rates with supply shocks, $var(p) < var(s)$, it needs a large elasticity of substitution compared to the elasticity of the demand for money with regard to income.

- But this requires $Cov(s, output) > 0$ which does not seem plausible.
- Nontradeables do not help to account for these failures.
- The model does a better job when demand shocks (preferences or government expenditure shocks) are introduced.

PORTFOLIO BALANCE

- Assumption: Domestic and foreign assets are imperfect substitutes (differences in riskiness). IRP does not hold
- The demand for and supply of foreign currency are derived from the demand for and supply of all domestic and foreign assets (not just money); S is now the relative price of assets
- The effectiveness of official intervention: **Non sterilized** intervention: involves change in the money supply; **Sterilized** intervention: involves swap of domestic + foreign bonds with no change in money
- If assets denominated in different currencies are imperfect substitutes then sterilized intervention ought to work
- It usually does not
- Sterilized intervention as a signal of future intentions
- Credibility