International Economics

Content

Basics

exchange rate 'disconnect'	In the short run exchange rate changes are hardly predictable
'excess volatility'	In the short run nominal exchange rates are too volatile

The long run

Goods market arbitrage conditions that drive relative price and exchange rate adjustment:
- Transport costs
- Inflation
- Productivity (Samuelson-Balassa effect)

Exchange Rate

Nominal Exchange Rate
E (CHF / USD)

Real Exchange Rate

$$\lambda = \frac{EP^*}{P}$$

Absolute purchasing power parity (PPP)

If there are:
- no transport costs
- no tariffs
- no non-traded goods (housing, ...)

$\lambda = 1$
P = EP*

Relative form of PPP:

$$\left(1+\frac{\Delta P}{P}\right) = \left(1+\frac{\Delta E}{E}\right) * \left(1+\frac{\Delta P^*}{P^*}\right)$$

$$\frac{\Delta P}{P} = \frac{\Delta E}{E} + \frac{\Delta P^*}{P^*}$$

In the long-run, countries with higher inflation rates should tend to have depreciating currencies!

Transport Costs

The real exchange rate can float between those two points before the goods markets arbitrage will kick in.

-> its not profitable to export / import goods as long as the transport costs are not covered

$$\frac{1}{1+\tau} < \lambda < (1+\tau)$$

Samuelson-Balassa effect

Countries with relatively higher productivity in traded goods should have higher non-tradable price levels and therefore a stronger real exchange rate.

$$\lambda = \left(\frac{MPL_T^*}{MPL_T}\right)^{1-\alpha}$$

The short run

Uncovered interest rate parity (UIP)

- Risk neutrality
- No impediments to capital mobility

$$(1+i_{t,t+1}) = \mathbf{E}\left(\frac{E_{t+1}}{E_t}\right)(1+i^*_{t,t+1})$$

$$i_{t,t+1} - i^*_{t,t+1} = \mathbf{E}(\Delta e_{t+1})$$

The interest rate differential between UK and German government bonds has to equal the expected rate of appreciation/depreciation of the nominal exchange rate.

Covered interest rate parity (CIP)

$$1+i_t = (1+i_t^*)\frac{F_t}{E_t}$$

in logs:

$$i - i^* = f_t - e_t$$

Ft: Forward rate. Price of one unit of currency that is to be delivered 1 periods into the future
Includes risk premium

International Fisher Equation

Merging UIP and relative PPP to get the real parity condition:

$$\Delta e = \Delta p - \Delta p^*$$

$$\begin{aligned} E(\Delta e_{t+1}) &= E(\Delta p_{t+1}) - E(\Delta p^*_{t+1}) \\ i - i^* &= E(\Delta p_{t+1}) - E(\Delta p^*_{t+1}) \\ i - E(\Delta p_{t+1}) &= i^* - E(\Delta p^*_{t+1}) \end{aligned}$$

In the long-run real ex ante returns on investment should be equalized across countries

Money market equilibrium

$$\frac{M}{P} = L(Y, i) = L(Y, i^* + \mathbf{E}(\Delta e_{t+1}))$$

Summary

- Countries with high inflation rates tend to have depreciating currencies -> rel. PPP

- Countries with rapidly expanding money supplies tend to have depreciating exchange rates vis-a-vis countries with slowly expanding money supplies -> Monetary Model

- Countries with large trade balance deficits tend to have depreciating currencies

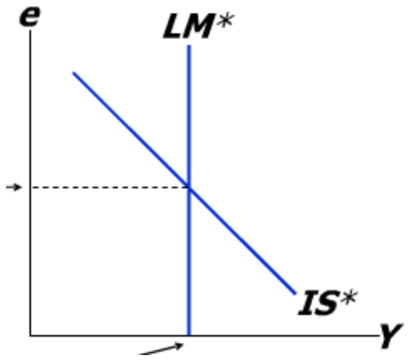
Mundell-Fleming Model

slides from: http://www.docstoc.com/docs/3631714/The-Open-Economy-Revisited-the-Mundell-Fleming-Model-and-the-

Assumptions

Small open economy with perfect capital mobility

Perfect capital mobility:
- $r = r^*$



Goods market equilibrium (IS):
- $Y = C(Y - T) + I(r^*) + G + NX(e)$
- e = nominal exchange rate (CHF/USD)

for a given value of r*:
$\downarrow e \Rightarrow \uparrow NX \Rightarrow \uparrow Y$

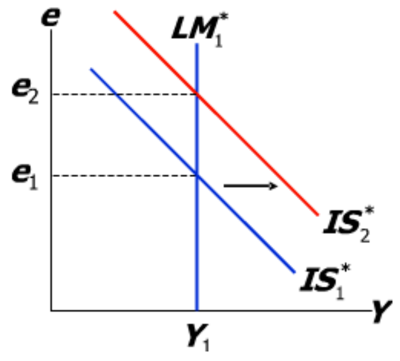
Money market equilibrium (LM):
- $M / P = L(r^*, Y)$

for a given value of r*, the value of e has no effect to the LM curve

Flexible exchange rates

Fiscal Policy:
Fiscal extension increases Y and shifts IS to the right
$\Delta e > 0,\ \Delta Y = 0$
Crowding out:
- Fiscal policy crowds out net exports by causing the exchange rate to appreciate

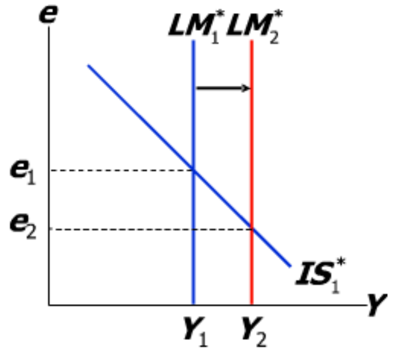
=> ineffective



Monetary Policy:
Increase in M shifts LM to the right because Y must rise
$\Delta e < 0,\ \Delta Y > 0$

$\uparrow M \Rightarrow \downarrow e \Rightarrow \uparrow NX \Rightarrow \uparrow Y$

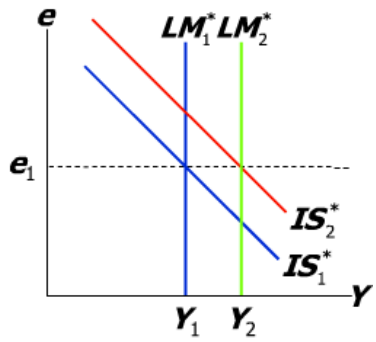
=> effective



Fixed exchange rates

Fiscal Policy:
$\Delta e = 0,\ \ \Delta Y > 0$
=> effective

Monetary Policy:
=> ineffective



Summary Flexible & Fixed Exchange Rates

	type of exchange rate regime:					
	floating			fixed		
	impact on:					
Policy	***Y***	***e***	***NX***	***Y***	***e***	***NX***
fiscal expansion	0	↑	↓	↑	0	0
mon. expansion	↑	↓	↑	0	0	0

Tradeoff between Exchange Rate and Output Volatility

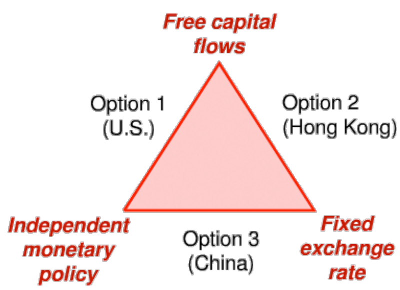
- Under flexible exchange rates, output responds less severely to shifts in the IS curve than under fixed rates.

- Under flexible rates, the monetary authority could use monetary policy to further stabilize output.

Mundells Impossible Trilogy

It‘s impossible to achieve all of these three objectives:
- Capital Mobility
- Fixed exchange rates
- Monetary Policy Independence

Monetary policy independence requires flexible, or at least adjustable exchange rates



Dornbusch Model

slides from: https://www.uniboard.ch/threads/40307-HS09-Dornbusch

Assumptions

- small open economy
- static r* & P*
- sticky prices: fixed in the short run and flexible in the long run
- exchange rates expectations

The Model

Tabelle 4.1. Das Dornbusch-Modell (vereinfachte Version).

Gütermarkt

$\dot{p} = \pi(y^d - y)$	Phillipskurve	(4.1)
$y^d = \delta(e - p) + \gamma y + g$	aggregierte Nachfrage	(4.2)

Geldmarkt

$m^d = p + \phi y - \lambda i$	Geldnachfrage	(4.3)
$m^s = m^d = m$	Geldmarktgleichgewicht	(4.4)

Internationaler Kapitalmarkt

$i = i^* + E(\dot{e})$	Kapitalmarktgleichgewicht	(4.5)
$E(\dot{e}) = \theta(\bar{e} - e)$	Erwartungsbildungshypothese	(4.6)

Anmerkungen: Kleinbuchstaben bezeichnen den natürlichen Logarithmus der betreffenden Variablen. (Die einzige Ausnahme betrifft den Zinssatz). Ein Punkt über einer Variablen bezeichnet deren Änderung in der Zeit. Griechische Buchstaben geben positive Modellparameter wieder. $E(.)$ ist der Erwartungsoperator. Die Bedeutung der verwendeten Symbole ist wie folgt:

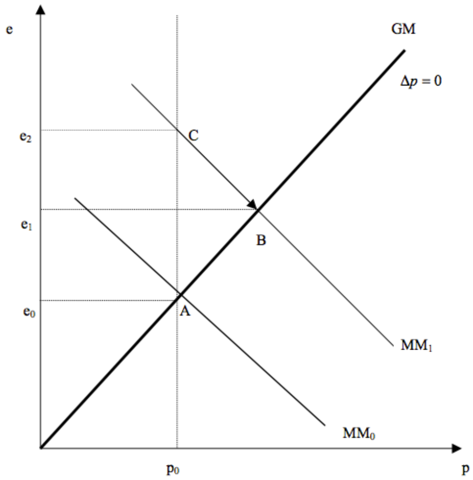
- $\dot{p}$ = inländische Inflationsrate
- y^d = aggregierte Nachfrage nach Inlandsgütern
- y = aggregiertes Angebot an Inlandsgütern (exogen)
- e = Wechselkurs
- p = inländisches Preisniveau
- g = staatliche Nachfrage
- m^d = inländische Geldnachfrage
- i = inländischer Zinssatz
- m^s = inländisches Geldangebot (exogen)
- m = inländische Geldmenge
- i^* = ausländischer Zinssatz (exogen)
- $\dot{e}$ = Änderungsrate des Wechselkurses
- $\bar{e}$ = Gleichgewichtswechselkurs

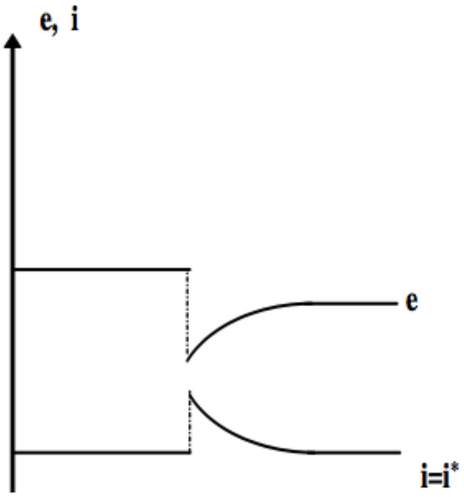
Exchange rate overshooting

An increase in money supply will shift the money market curve MM to MM1.

- In the short run the prices won‘t adjust so the nominal exchange rate will overshoot to point C where UIP will hold and money market equilibrium is restored.

- In the long run the prices slowly appreciate and the exchange rate depreciates to point B.





Optimum Currency Areas (OCA)

A region is an optimum currency area if its use of a single currency does not imply a welfare loss.

Criteria for an successful currency union
- labor mobility across the union
- capital mobility and price / wage flexibility
- risk sharing system for redistributing money from one area to another
- symmetric business cycles (for an effective monetary policy)

Benefits of a single currency:
- Comparability of prices
- No exchange rate risks
- Lower transaction costs

Costs:
- no more independent monetary policy to dampening business cycle fluctuations

Endogenity of the Symmetry Criterion

The symmetry of business cycles from members of an OCA maybe endogenous:
- Countries which enters an OCA trade more with their members which results in more closely correlated business cycles (Frankel, Rose)

Problems with this theory:
- trade linkages and business cycle affiliations are jointly determined -> bias
- endogenity in the long run could be really costly for countries that doesn't fit

International Asset Portfolio

Home Bias

The fact that individuals and institutions in most countries hold modest amounts of foreign equity.
The difference between the actual and optimal share of foreign assets is the home bias.

$$HB_t^k = 1 - \frac{\text{share in period } t \text{ of foreign equity in country } k'\text{sportfolio}}{\text{share in period } t \text{ of foreign equity in world portfolio}}$$

Explanations

- Restrictions to international capital mobility?
- Non-insurable risk
    - human capital
    - domestic inflation
- Tax reasons
- Behavioral biases?
- Are portfolios mismeasured?

Intertemporal Current Account

Utility function:
$U(C_1, C_2) = u(c_1) + \beta u(c_2)$

Intertemporal budget constraint:
$$C_1 + \frac{C_2}{1+r} = (Y_1 - I_1) + \frac{Y_2 - I_2}{1+r}$$

Production function:
$Y_t = F(K_t)$

C	consume	Y	income	ß	time preference
I	investment	r	real interest rate	K	capital stock

Closed Economy

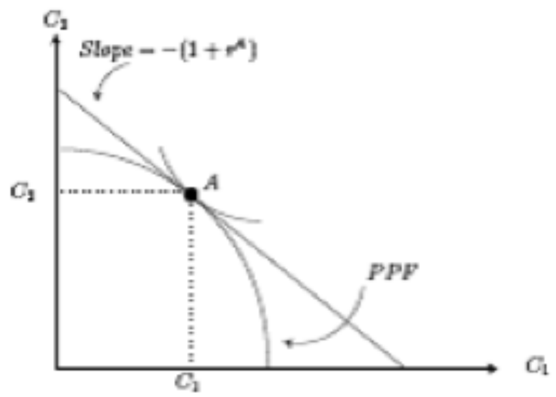
- output is either consumed or invested (NO = net output): $NO_t = Y_t - I_t = C_t$
- In the two-period model there will be no positive investment in period 2: $I_2 = -K_2$

Production-possibilities-frontier (PPF)

Solving the budget constraint for C_2:

$C_2 =$
$$\begin{aligned} &= F(K_1 + F(K_1) - C_1) + K_1 + (F(K_1) - C_1) \\ &= PPF(C_1) \end{aligned}$$

$$\frac{\partial NO_2}{\partial NO_1} = \frac{\partial C_2}{\partial C_1} = -\frac{u'(C_1)}{\beta u'(C_2)} = -(1 + r^A)$$



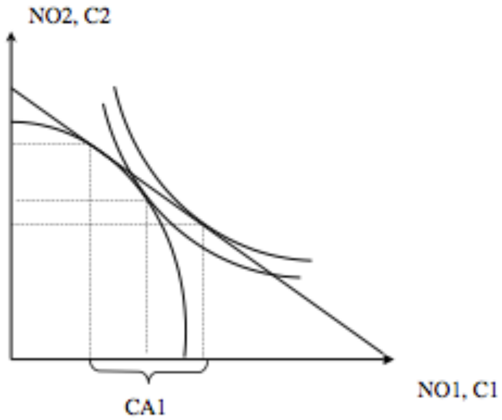
r^A: real interest rate in autarky

Open Economy

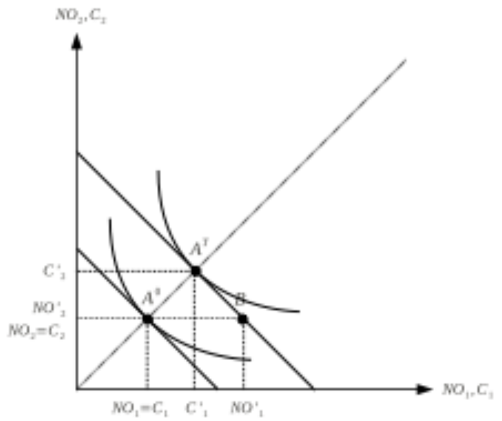
Same as in closed economy except:

- the fixed world real interest rate (r) matters
- current account:

$$\begin{aligned} CA_t &= NO_t - C_t + rB_{t-1} \\ &= NX_t + rB_{t-1} \end{aligned}$$

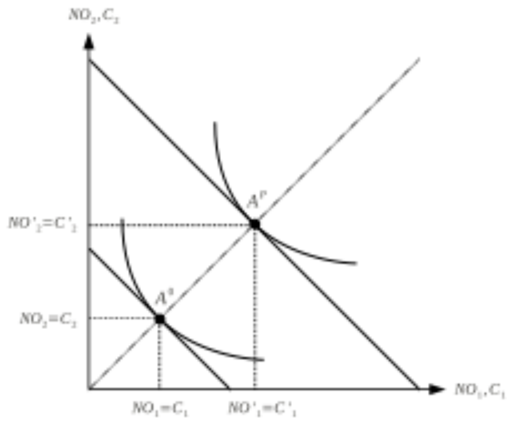


Shocks



transitory shock to net output (NO)

Transitory shock:
current account acts as buffer



permanent shock to net output (NO)

Permanent shock: CA unchanged

Feldstein-Horioka Puzzle

High empirical correlation between saving and investment even in periods of high capital mobility (which points against any correlation between I and S in the short run).

Ricardian Equivalence

Constraints:
- $r_G = r$
- no borrowing constraints for private sector
- people & government have the same time horizon

People should be indifferent between taxes or government deficits because today's deficits are just tomorrow's taxes.

private sector:

$$C_1 + \frac{C_2}{1+r} = Y_1 - T_1 + \frac{Y_2 - T_2}{1+r}$$

public sector:

$$G_1 + \frac{G_2}{1+r_G} = T_1 + \frac{T_2}{1+r_G}$$

For $r_G = r$ taxes are no longer anticipated:

$$C_1 + \frac{C_2}{1+r} = Y_1 + \frac{Y_2}{1+r} - \left(G_1 + \frac{G_2}{1+r}\right)$$

What matters for private-sector choices is not the intertemporal structure of government deficits or surpluses but only the present value of all government expenditure.

Inflationary Government Budget Deficits

public sectors budget constraint:

$$T_1 - G_1 = -\frac{T_2 - G_2}{1 + r}$$

only way to balance the budget is via r (fixed taxes & gov spending).

$$P_1 (T_1 - G_1) = -\frac{P_2 (T_2 - G_2)}{1 + i}$$

$$(T_1 - G_1) = -\frac{1 + \pi}{1 + i} (T_2 - G_2) = -\frac{(T_2 - G_2)}{1 + r}$$

Fiscal Theory of the Price Level

The equilibrium price level is the price level that brings the nominal level of debt in line with future surpluses of the government.

Opposite of Ricardian Equivalence.

Pros
- Over the inflation the government could adjust the price levels to lower its real debts.
- Government activity in most countries has a big share of economic activity

Cons
- This would mean that the price level is exclusively predicted by government activity
- This would mean that Inflation is a fiscal and not a monetary phenomenon

Sargent's and Wallace's Unpleasant Monetarist Arithmetic

$$\begin{aligned}\Delta(PB) + \Delta M_0 &= PG - PT + iPB \\ &= \text{primary deficit} + \text{debt service}\end{aligned}$$

$$\frac{\Delta PB}{PY} + \frac{\Delta M_0}{PY} = \frac{PG - PT}{PY} + i\frac{PB}{PY}$$

$$\begin{aligned}\Delta\left(\frac{PB}{PY}\right) &= \frac{\Delta(PB)}{PY} - \frac{PB}{PY}\frac{\Delta YP + \Delta PY}{PY} \\ &= \frac{\Delta(PB)}{PY} - \frac{PB}{PY}(g + \pi)\end{aligned}$$

$$\Delta\left(\frac{B}{Y}\right) + \frac{\Delta M_0}{PY} = \frac{G - T}{Y} + (i - \pi - g)\frac{B}{Y}$$

PB	Nominal Bonds
M	Money Supply
dM_0/PY	Money printing / seignorage
B/Y	% gov. debt
(G-T)/Y	gov. deficit

$$\Delta\left(\frac{B}{Y}\right) + \frac{\Delta M_0}{PY} = \frac{G - T}{Y} + (r^e - (\pi - \pi^e) - g)\frac{B}{Y}$$

unpleasant: if you wait it gets worse: dB/Y > 0 ⇒ B/Y⬆