Topics for Today

1.) A Monetary Small Open Economy Model with Flexible Prices
   - Flexible Exchange Rates
   - Fixed Exchange Rates

2.) Money, Inflation + Banking
   - The "Friedman Rule"

A Monetary Open-Economy Model with Flexible Prices

- We've already talked about how Keynesian models operate under flexible and fixed exchange rates. This is the Mundell-Fleming model.

- Now we are going to discuss how economies operate under flexible & fixed exchange rates when prices are flexible and markets clear.

- Since even Keynesians believe that eventually all prices adjust and markets clear, the present discussion could also be interpreted as the long-run outcome in Keynesian models.

- In comparision to the Keynesian model, the analysis is very simple. With all prices flexible, money is neutral, so in terms of real variables, like output, employment, consumption & investment, it simply won't matter whether a country adopts fixed or flexible exchange rates!

- However, alternative ex. rate regimes may influence how the domestic price level responds to various disturbances. So we focus on that.

- As before, we assume a small open economy with no expected changes in the exchange rate, so that capital market equilibrium implies

$$r = r^w \text{ (or } r^*)$$

[Remember Uncovered Interest Parity]

- Now with all prices flexible, it must also be the case that goods & services cost the same domestically as in other countries. This condition is called "Purchasing Power Parity" (or PPP). If we now define e to be nominal ex. rate defined as the price of foreign currency (as opposed to the value of domestic currency), then we can write the PPP condition as follows:

$$P = eP^*$$

} PPP

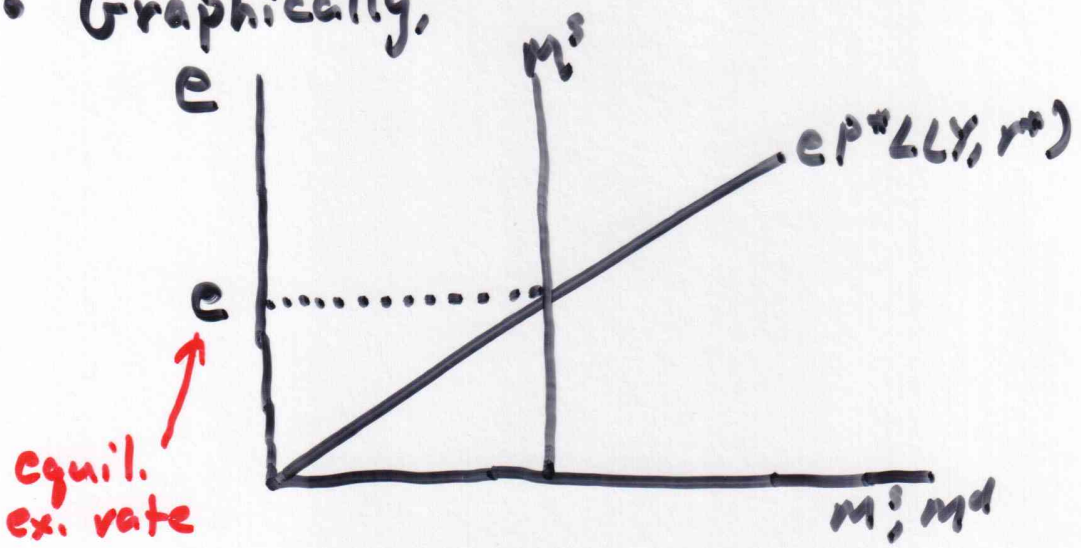
- Note that PPP implies the real ex. rate is constant (and equal to one).

- Empirical evidence suggests that PPP holds in the long-run, but not the short-run.

- To incorporate ex. rates into our model, we can now just use PPP to sub out P in the money market equilibrium condition:

$$M = eP^*L(Y, r^*)$$

- Graphically,

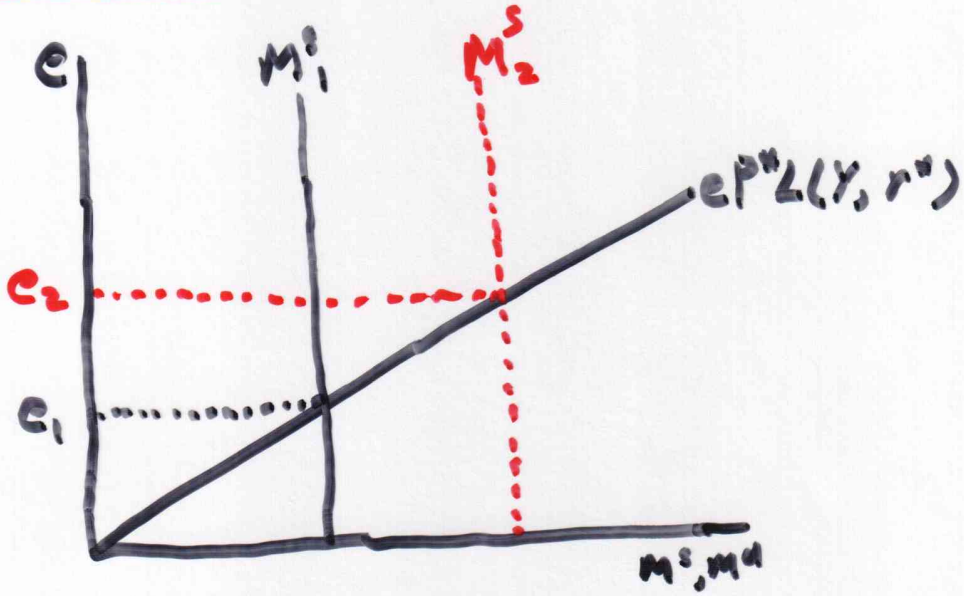


Flexible Exchange Rates

- Suppose the govt. lets the market set the ex. rate. How is the ex. rate determined?

- Basically, anything that causes the equilibrium price level to change will cause an equiproportionate change in the ex. rate. So the analysis from Chpt. 10 can be applied directly to study ex. rate determination.

Example 1 : A (one-time) Money Supply Increase



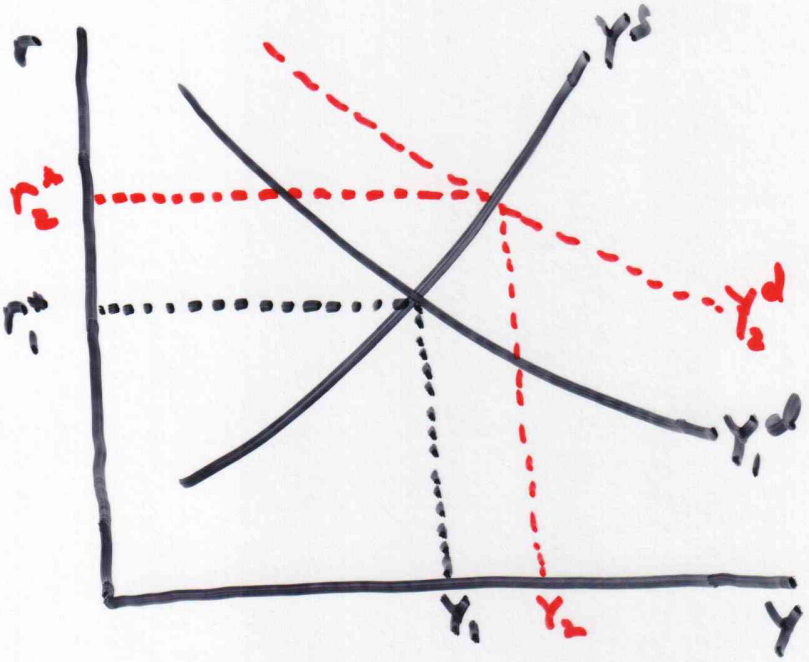
An increase in the money supply causes the ex. rate to depreciate from e_1 to e_2.

Example 2 : An increase in the Foreign Price Level

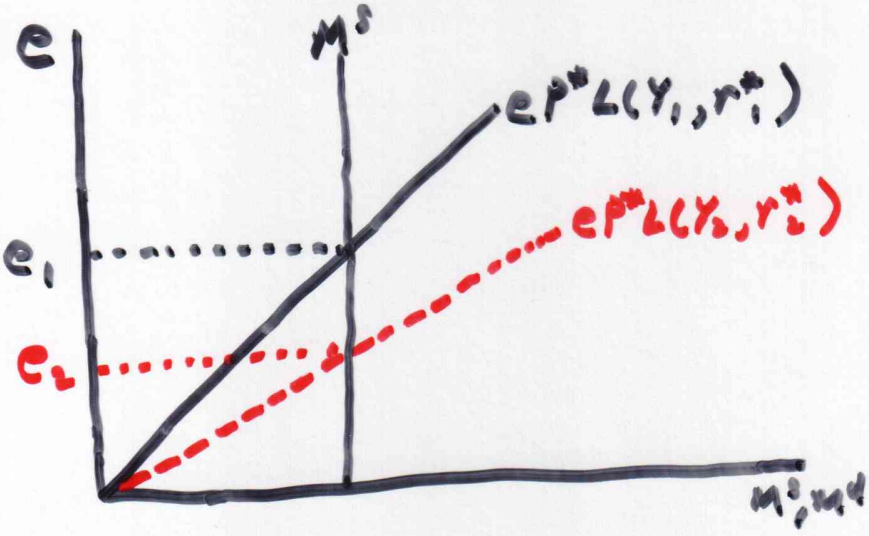
An increase in the Foreign price level causes the ex. rate to appreciate from e_1 to e_2.

Note: e↓ by the same (percentage) amount that P^*↑, so that the domestic price level remains unchanged ($P = eP^*$).

Example 3: An increase in the world interest rate



An increase in r^* causes the CA surplus to increase, which shifts the Y^d curve to the right



Assuming the income effect on money demand dominates the interest rate effect, money demand increases and the ex. rate appreciates from e_1 to e_2

Note, since P^* is constant, and e falls, we know the domestic price level also falls.

Conclusion

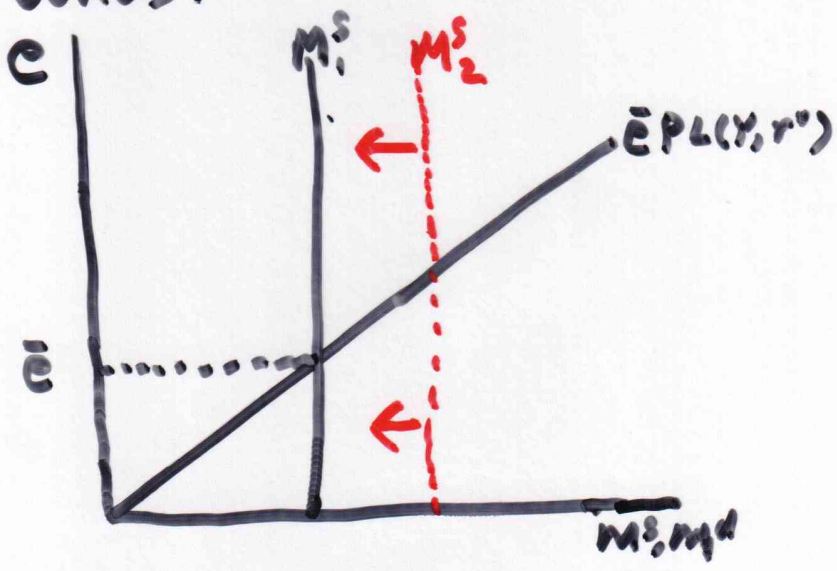
Flexible ex. rates insulate the domestic price level from foreign nominal shocks, but not from foreign real shocks.

Fixed Exchange Rates

- First, when a country fixes its ex. rate, it gives up control over its own money supply!
- The money supply must be consistent with the pegged ex. rate.
- Consiaen the Central Bank's Balance Sheet

Assets		Liabilities	
Foreign Reserves	20	Currency	100
Domestic Govt. Bonds	80		

- Now suppose the CB attempts to increase the money supply via an open market purchase of govt. bonds.



The open mkt. purchase creates pressure for the domestic currency to depreciate. To support its currency, the CB sells fx reserves, this shifts M^s back to M^s_1

- At the end of the day, all that's happened is that the CB ends up holding more domestic assets and fewer foreign assets. Its liabilities (which is the money supply) doesn't change.

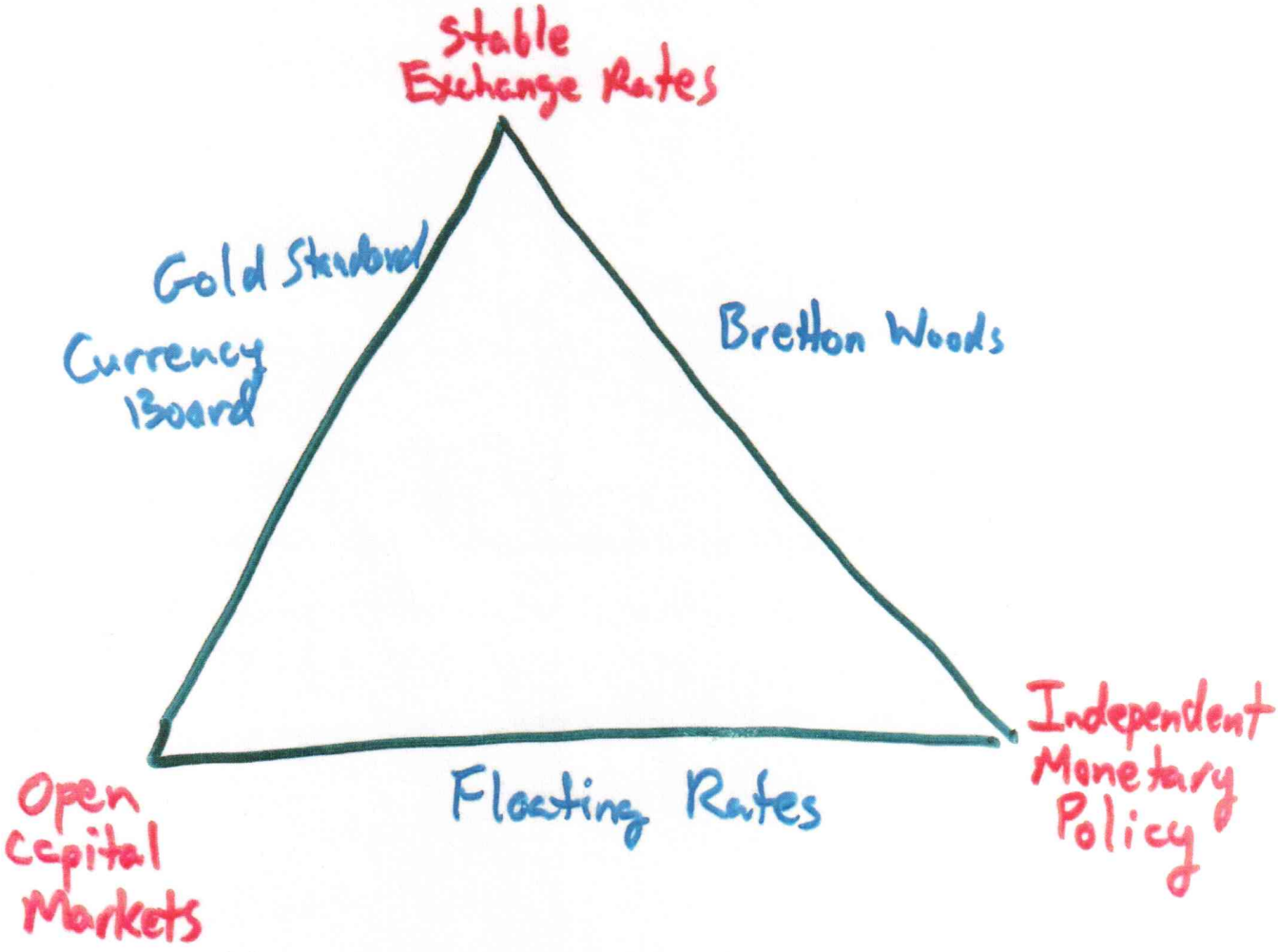
- For example, suppose the open mkt. purchase was for 10 dom. govt. bonds. Then, after intervening to support the ex. rate, the CB's balance sheet would look like:

Assets		Liabilities	
Foreign Reserves	10	Currency	100
Domestic Govt. Bonds	90		

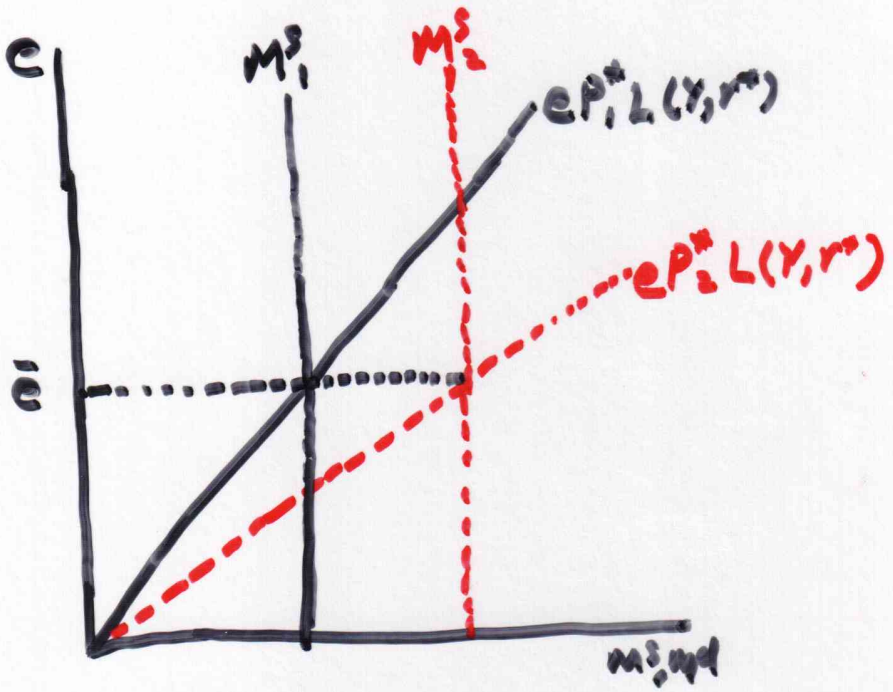
- Note, there has been no change in the money supply.

Open-Economy "Trilemma"

or, the "Impossible Trinity"

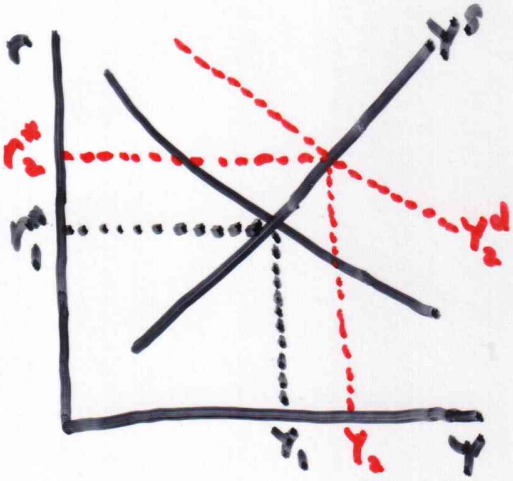


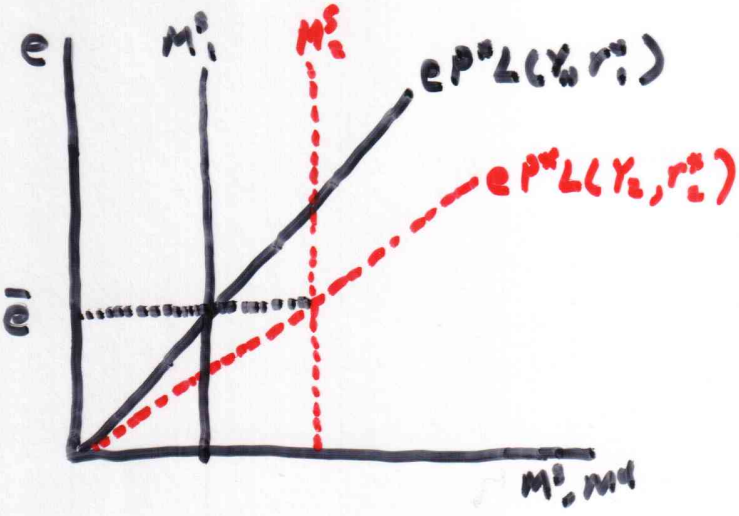
Example 1: An Increase in the Foreign Price Level



The rise in the foreign Price Level creates pressure for the domestic currency to appreciate. To offset this, the CB must purchase foreign exchange reserves, which shifts the M^s from M^s_1 to M^s_2

Example 2: An Increase in the World interest rate





Assuming the income effect on Money Demand dominates the interest rate effect the higher world interest rate increases domestic money demand. To prevent the domestic currency from appreciating, the CB must buy foreign ex. reserves, which increases the money supply from M^s_1 to M^s_2. Since $P = eP^*$, domestic price remains unchanged.

Conclusions

Fixed ex. rates insulate the domestic price level from domestic monetary shocks and foreign real shocks, but not from foreign nominal shocks.

Fixed or Flexible?

1.) Remember, in terms of real variables, it doesn't matter in this model whether ex. rates are fixed or flexible. However, the choice might matter for price level stability.

2.) If most shocks are foreign nominal shocks then flexible ex. rates lead to a more stable domestic price level.

3.) If most shocks are domestic nominal shocks, or foreign real shocks, then fixed ex. rates lead to a more stable domestic price level.

Caveat

This analysis presumes a fixed ex. rate is credible. If markets doubt the sustainability of a peg, this can produce a currency crisis, and cause a lot of instability.

The Friedman Rule

- We have repeatedly relied on the idea that "money is neutral".
- It is important to keep in mind that this neutrality result refers to a one-time change in the level of the money supply. It does not refer to changes in the growth rate of money.
- Changes in the growth rate of the money supply cause corresponding changes in the inflation rate, and changes in inflation are not neutral.
- Inflation is a tax on money use (since inflation erodes the purchasing power of money). As a result, it discourages money use, and causes people to substitute away from consumption toward leisure.
- This is inefficient from society's standpoint. Since money is (nearly) costless to produce, it should be costless to hold.

- To see how this works, suppose wages cannot be instantaneously used to buy goods. Suppose they cannot be spent until next period.

- Then the relevant optimality condition becomes

$$\frac{U_{l'}}{U_{c'}} = \frac{P_t w_t}{P_{t+1}}$$

- As before, we have the usual intertemporal optimality condition,

$$\frac{U_c}{U_{c'}} = 1+r$$

- Combining these two,

$$\frac{U_{l'}}{U_c} = \frac{U_{l'}}{U_{c'}} \cdot \frac{U_{c'}}{U_c} = \frac{P_t w_t}{P_{t+1}(1+r)}$$

- Then, since $P_t/P_{t+1} = \frac{1}{1+i}$, where i = inflation rate and from the Fisher Eq. we have $(1+i)(1+r) \equiv 1+R$, where R = nominal interest rate we get

$$\frac{U_{l'}}{U_c} = \frac{w_t}{1+R}$$

- Note, this produces an inefficiency, since

$$MRS = \frac{w}{1+R} < w = MPL = MRT$$

- The only way to recover efficiency is for $R = 0$.

- What money growth rate leads to $R=0$? Since $R \approx r + i$, money growth must produce a deflation of $r\%$ (i.e., $i = -r$)!

- Since in the long-run the inflation rate equals the money growth rate (assume output growth is zero), the Central Bank must actually contract the money supply by $r\%$ per period!

- The policy $R=0$ (or money growth $= -r\%$) is called the "Friedman Rule."

- Although inflation does not influence the growth rate of the economy, by discouraging consumption & labor supply it can adversely affect the level of output.

Effects of an Increase in Money Growth & Inflation