

ECON 3510 - INTERMEDIATE MACROECONOMIC THEORY

Fall 2015

Mankiw, *Macroeconomics, 8th ed.*, Chapter 13

Chapter 13: The Open Economy Revisited

Key points:

- The Mundell-Fleming Model
- Types of exchange rate regimes
- Costs and benefits of different exchange rate regimes

The Mundell-Fleming Model:

- Like $IS - LM$, but for a small, open economy
- Small $\Rightarrow r = r^*$
- Instead of relating r and Y (as in $IS - LM$), MF relates e and Y (recall, e is the nominal exchange rate)
- The model:
 - DRAW MF model - vertical LM^* and downward sloping IS^* . Vertical axis is e , horizontal is Y
 - Note: “*” because of r^*
 - $IS^* : Y = C(Y - T) + I(r^*) + G + NX(e)$
 - $LM^* : \frac{M}{P} = L(r^*, Y)$
 - * \Rightarrow no dependence on e
- Exogenous variables: G, T, M, P, r^*
- Endogenous variables: e, Y
- Eq'm: Values of e and Y such that money market and goods market both clear (i.e., supply=demand in both markets)

Why does IS^* slope downward?:

- $e = \#$ foreign currency per unit of domestic currency (e.g. $\frac{\# \text{€}}{\$}$)
- Since we are in the short run, P and P^* are fixed
- Thus, $e = \epsilon \frac{P^*}{P}$ means that the real and nominal exchange rates move in the same direction and by the same percentage since prices are fixed. (recall that ϵ was used to denote the real exchange rate)
- So we can write demand for net exports as a function of e : $NX(e)$ (recall we wrote NX as a function of the real exchange rate previously)
- $\uparrow e$ means that domestic goods become more expensive
 - $\Rightarrow NX$ falls (foreigners buy less and domestics import more)

- \Rightarrow Planned expenditures fall (recall agg expend model: $Y = C + I + G + NX$)
- \Rightarrow income falls (Keynesian cross)

- Graphically:

- DRAW $NX(e)$ function. Show how move up along curve as e increases. This means less NX .
- DRAW agg expend model. Show how drop in NX is a shift down in the E curve. Show how new eq'm have less income.
- DRAW IS^* below the agg expend model and on same level as NX function. Show how IS^* curve is traced out by the different combinations of e and Y

Why is the LM curve vertical?:

- The exchange rate has no effect on money demand or supply
- To see this, look at graphs:
 - DRAW LM function. It is an upward sloping function of r . but horizontal line at r^* since interest rate exogenous for small open economy. So just one value of Y
 - DRAW LM^* below the LM model. Show how LM^* curve is same for all e .
 - \Rightarrow level of income determined by money market eq'm given by M , P , and r^*

All together:

- DRAW MF model - show Y^* at intersection of IS^* and LM^*

Exchange rate systems: 1. Floating exchange rates:

- Currency regime where e allowed to fluctuate
- This is the case for the US and most other countries
 - Exceptions are mostly in Latin America, Eastern Europe, and Africa
- e moves to achieve simultaneous equilibria in the goods market and the money market

2. Fixed exchange rates:

- Currency regime where e is kept at a predetermined level
- Central bank controls e
- e.g., Denmark, several Central American and African economies now, Argentina in the 1990s, US and others when on gold standard
- To keep e at a certain level, the central bank must have enough currency reserves to affect the market price for these currencies
 - Let \bar{e} be the peg rate, the fixed rate that the central bank wants to maintain
 - e.g., if China wants to keep $\bar{e} = \frac{0.125 \text{ dollars}}{\text{yuan}}$, then if $e = \frac{0.5 \text{ dollars}}{\text{yuan}}$, the People's Bank of China must lower e

- It does this by promising to exchange \$1 for 8 yuan
- Given this, if $e = \frac{0.5 \text{ dollars}}{\text{yuan}}$, people can make money by exchanging 2 yuan for \$1 in the open market and then trading the \$1 to the PBC for 8 yuan - then trade 8 yuan for \$4 and go back to the PBC and get 16 yuan... arbitrage opportunity...
- This currency trade affects the market for dollars and yuan
- DRAW Market for USD. Vertical axis is #yuan/dollar, horizontal is Q. Show shift out in demand shifting price up from 2/1 to 8/1.
- When people trade yuan for dollars, this increases the demand for dollars
- DRAW Market for Yuan. Vertical axis is #dollar/yuan, horizontal is Q. Show shift out in supply shifting price down from 1/2 to 1/8.
- When PBC gives out yuan in exchange for \$, this increases the supply of yuan on the open market
- The effect in both markets is to push e to the rate the bank set: $\bar{e} = \frac{0.125 \text{ dollars}}{\text{yuan}}$
- One BIG risk here → currency crises
 - e.g., Argentina in the 1990's (Also Mexico, England, Thailand in the 90's)
 - Can just print more domestic money, but need to make sure have enough reserves of foreign currency (because the central bank can't create more of these)
 - If people don't think you have enough, this can cause a panic
 - To see this:
 - * DRAW market for Argentine pesos. Vertical axis is #dollars/peso, horizontal is Q. Show fixed exchange rate \bar{e} that is above the free market eq'm. Show D shifting out, but not enough to hit \bar{e}
 - * If e too low, Argentina's central bank must use \$s to buy up pesos, increasing demand for pesos
 - * But if people think the central bank will run out of \$s - so that they can't push demand for pesos up high enough to hit \bar{e} - then people will want to get those \$s now, while they last
 - * This means that they get rid of pesos even more quickly and the supply of pesos shifts out
 - * DRAW market for Argentine pesos. Vertical axis is #dollars/peso, horizontal is Q. Show fixed exchange rate \bar{e} that is above the free market eq'm. Show S shifting out, pushing e down further away from \bar{e}
 - * This makes it even more difficult for the bank to hit its target!
 - This is a currency crisis
 - * Much like a bank run
 - * Depends upon confidence
 - Solution: a currency devaluation (a lowering of \bar{e}) - or abandonment of fixed exchange rate regime
 - Hedge funds have had speculative attacks on fixed exchange rate regimes - e.g. George Soros (and others) against Thailand in the late 1990s. If they have enough capital, then can precipitate a crisis by moving prices enough themselves

Now we'll consider economic policies under different exchange rate regimes in small open economies:

- Fiscal
- Monetary
- Trade

Economic policy in floating exchange rate regimes:

- Fiscal policy:

- $\uparrow G$
- DRAW IS*-LM* model. Show the shift out in the IS* curve. Note shifts IS* curve out by $\frac{\Delta G}{(1-MPC)}$. Note no increase in Y . Note increase in e
- $\Rightarrow e \uparrow$, no change in Y
- Why no change in Y ?
 - * Key is what happens with interest rates and exchange rates
 - * $\uparrow G \Rightarrow \uparrow Y$ (Agg Exp Model)
 - * $\uparrow Y \Rightarrow \uparrow L(r, Y)$ (Liquidity Theory of Money)
 - * \rightarrow since the supply of money is fixed, $r \uparrow$ to balance supply and demand (Market for Real Money Balances)
 - * \rightarrow but $r = r^*$ (because it is a small, open economy)
 - * $\rightarrow \rightarrow$ as $r \uparrow$ foreigners buy domestic assets
 - * $\rightarrow \rightarrow$ DRAW asset market. vertical axis is P , horiz is Q . Show shift out in demand, increasing prices.
 - * $\rightarrow \rightarrow$ Note that $r = \frac{\text{payoff} - P}{P}$ (this is the rate of return on assets)
 - * $\rightarrow \rightarrow$ So as demand for assets increases, $P \uparrow$ (and payoff the same) - so $r \downarrow$
 - * $\rightarrow \rightarrow$ This happens until $r = r^*$
 - * $\rightarrow \rightarrow$ This is standard arbitrage argument
 - * \rightarrow Capital purchases noted above require domestic currency. Thus demand for this increases
 - * $\rightarrow \rightarrow$ DRAW market for \$. vertical axis is $e = \text{Eur}/\text{\$}$, horiz is Q . Show shift out in demand and increase in e that results
 - * $\rightarrow \rightarrow$ Value of currency increases - i.e., $e \uparrow$
 - * $\rightarrow e \uparrow \Rightarrow NX(e) \downarrow$ (Demand Curve for NX)
 - * $\rightarrow NX(e) \downarrow = Y \downarrow$ (Agg Exp Model)
 - * $\rightarrow \rightarrow$ The fall in $NX(e)$ exactly offsets the fiscal stimulus
 - * $\rightarrow \rightarrow$ This is the move back along the IS^* curve

- Monetary policy:

- $\uparrow M$
- DRAW IS*-LM* models. Show the shift to the right in the LM* curve that results from increase in M . Note increase in Y and fall in e .
- How does the ΔM affect Y ?
 - * Keys are the effects on the interest rate and the exchange rate
 - * $\uparrow M \Rightarrow \downarrow r$ (Money Market Eq'm)
 - * $\downarrow r \Rightarrow$ capital flows out until $r = r^*$ (Asset Market Eq'm)
 - * Capital outflow $\Rightarrow \downarrow e$ (b/c increase # dollars traded for foreign currency - demand for dollars falls) (Foreign Exchange Market Eq'm)
 - * $\downarrow e = NX(e) \uparrow$ (Demand for NX)
 - * $NX(e) \uparrow \Rightarrow Y \uparrow$ (Agg Exp Model)

- Trade Policy:

- Tariff or quota - either will shift $NX(e)$ out (b/c now less imports and any given e)
- DRAW $NX(e)$ function shifting out
- \Rightarrow Shift IS^* curve out (higher $NX \Rightarrow$ higher Y for each e)
- DRAW MF model. Show IS^* curve shifting out

- Note: $e \uparrow$, no effect on Y
- Why no effect on Y ?
 - * Shift $NX(e) \Rightarrow \uparrow Y$
 - * $\uparrow Y \Rightarrow \uparrow L(r, Y)$
 - * $\uparrow L(r, Y) \Rightarrow \uparrow r$
 - * $\uparrow r \Rightarrow$ capital flows in until $r = r^*$
 - * Capital inflow $\Rightarrow e \uparrow$ (b/c demand for local currency increases)
 - * $e \uparrow \Rightarrow Y \downarrow$, perfectly offsetting the trade policy
- Another way to see this:
 - * Rearrange national accts identity: $NX(e) = Y - C(Y - T) - I(r) - G$
 - * Note that the trade barrier doesn't affect the RHS above
 - * So it can't affect the LHS either (because the RHS is the same for all trade policies)
 - * Imports fall, but so do exports

Economic policy in fixed exchange rate regimes:

- Fiscal policy:
 - $\uparrow G \Rightarrow$ Shift IS^* to the right
 - DRAW MF model with IS^* shifting out note that e fixed at \bar{e} , so need to shift LM^* and so Y increases
 - Need to shift LM^* or else exchange rate will increase
 - Keep e at \bar{e} by buying foreign currency with domestic currency
 - * $\uparrow M \Rightarrow$ shift LM^* to the right
 - * The increase in M offsets the increase in demand for domestic currency to buy domestic assets by increasing the supply of domestic currency. The net effect in the market for domestic currency is that there is not change in e .
 - Result: $\Delta e = 0, \uparrow Y$
 - * Now fiscal policy has an effect b/c monetary policy (i.e. maintaining the fixed exchange rate) keeps e from offsetting the effects of fiscal policy
 - * Fiscal policy matters when a country has a fixed exchange rate ($\uparrow G \Rightarrow \uparrow Y, \downarrow T \Rightarrow \uparrow Y$)
- Monetary policy:
 - $\uparrow M \Rightarrow$ shift LM^* to the right and then shift back
 - DRAW MF model with LM shifting to the right
 - This drives e down
 - Respond to lower e by selling domestic currency to the central bank for foreign currency
 - * $\Rightarrow M \downarrow$
 - * $M \downarrow$ just enough to offset the original increase (and keep e at \bar{e})
 - No change in e or Y
 - No effect of monetary policy w/ fixed e
 - Monetary policy can't do anything but maintain \bar{e}
- Trade policy:
 - Trade barrier (tariff or quota)

- \Rightarrow shift $NX(e)$ to the right
- \Rightarrow shift IS^* to the right
- Effects are just like for fiscal policy:
- DRAW MF model. Show IS^* shift out. Show LM^* shift out to maintain \bar{e}
- Monetary policy needed to keep e at \bar{e}
- \Rightarrow shift out LM^*
 - * $\Rightarrow \uparrow Y$
 - * $\Rightarrow \uparrow S$
 - * $\Rightarrow \uparrow NX = S - I$
- Result: $\Delta e = 0, Y \uparrow$
- Monetary policy keeps e constant and thus avoids offsetting effects of a change in the exchange rate.

What type of exchange rate regime is best?:

- Floating:
 - Pro
 - * Free to conduct monetary policy to stabilize economy
 - Con
 - * Volatile exchange rate may discourage trade, capital flows
- Fixed:
 - Pro
 - * Trade is easier
 - * Commitment device for monetary policy makers
 - Con
 - * Not free to conduct monetary policy
 - * Risk a currency crisis
- You can't have it all
 - The Impossible Trinity
 - DRAW triangle with Free Capital Flows, Fixed Exchange Rate, Independent Monetary Policy at points. Between Free capital flows and indep monetary policy is the US. Between Free capital and fixed exchange rate is Hong Kong. Between Fixed exchange rate and indep monetary policy is China.
 - * Note for China - citizens limited on their holdings of foreign assets $\Rightarrow r \neq r^*$
 - Can only be along one side of this triangle \implies can only have 2 of 3 points as policies

Tracing out aggregate demand: Changing P :

- As with $IS - LM$, ΔP is a shift in LM^*
- When consider LR , use ϵ , not e
 - We used e before b/c $\epsilon = e \frac{P}{P^*}$

- since P not change, we could use e instead since in the case of a fixed P , both e and ϵ move the same
- DRAW MF model with ϵ on vertical axis. Show shift out in LM^* for fall from P_1 to P_2 . Note fall in ϵ
- What does this mean for AD ?
 - Since a fall in P results in an \uparrow in Y , we can see that the AD curve is downward sloping
 - DRAW AD drive. Noting that you move down and along curve as P falls from P_1 to P_2 .
 - As $P \downarrow, \epsilon \downarrow \Rightarrow NX(\epsilon) \uparrow \Rightarrow Y \uparrow$

Summary of why AD slopes down: (covered in Chapters 11, 12, and 13)

1. Pigou Wealth Effect

- Real wealth falls as prices increase, pushing consumption down
- $\uparrow P \Rightarrow \downarrow C \Rightarrow \downarrow Y$

2. Keynes Interest Rate Effect

- Interest rates rise as prices increase due to changing equilibrium in the Market for Real Money Balances, pushing investment down
 - $\uparrow r$ because $\frac{M}{P} \downarrow$ as $P \uparrow$
- $\uparrow P \Rightarrow \uparrow r \Rightarrow \downarrow I \Rightarrow \downarrow Y$

3. Mundell-Fleming Exchange Rate Effect

- As prices increase, the real exchange rate rises, pushing net exports down (exports fall, imports rise)
 - The real exchange rate is given by $\epsilon = e \frac{P}{P^*}$ and so it increases as P increases
- $\uparrow P \Rightarrow \uparrow \epsilon \Rightarrow \downarrow NX \Rightarrow \downarrow Y$