Monetary Macroeconomics

Lecture 5

Aggregate demand: external trade

Mark Hayes
Exogenous: $M, G, T, i^*, \pi^e$

Goods market
KX and IS
$(Y, C, I)$

Money market (LM)
$(i, Y)$

Labour market
$(P, Y)$
AS

IS-LM
$(i, Y, C, I)$
AD

Phillips Curve
$(\pi, u)$

AD-AS
$(P, i, Y, C, I)$

AD*-AS
$(P, e, Y, C, NX)$

Foreign exchange market
$(NX, e)$

IS*-LM*
$(e, Y, C, NX)$
AD*

$M, G, T, i^*, \pi^e$
\[ E = C + I + G + (X - Z) \]

\[ = \left( c_1 (1 - t) - z_1 \right) Y + A \]
Summary of policy effects in the Mundell-Fleming model

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Legend: ↑ : Increase; ↓ : Decrease
Chart 2.13  UK current account

(a) Includes compensation of employees.
Chart 1.5  Sterling exchange rates
Real and nominal exchange rates

- In Mankiw, nominal exchange rate is relative price of *domestic* currency (‘indirect’ measure)

\[ e = \frac{m_f}{m_d} \]

- real exchange rate is relative price of domestic goods (terms of trade)

\[ \varepsilon = e \times \frac{P_d}{P_f} = \frac{m_f}{m_d \times m_d} \times \frac{q_d \times q_f}{q_f} = \frac{m_f}{q_f} \times \frac{q_f}{q_d} \]
The net exports function

- The net exports function represents an inverse relationship between $NX$ and $\varepsilon$:

$$NX = NX(\varepsilon)$$
The $NX$ curve

When $\varepsilon$ is relatively low, domestic goods are relatively inexpensive, so net exports will be high.
The $\text{NX}$ curve

At high enough values of $\varepsilon$, domestic goods become so expensive that we export less than we import.

At $\varepsilon_2$, we have $\text{NX}(\varepsilon_2) = 0$.
The Mundell-Fleming model

- IS*-LM* - a simplified version of Robert Mundell and Marcus Fleming (1962)
- ABSOLUTELY KEY ASSUMPTION: Small open economy with perfect capital mobility.
  \[ i = i^* \]
- Goods market equilibrium – the IS* curve:
  ( )

NB: $NX(e)$ not $NX(\varepsilon)$
The *IS* curve: Goods market eq’m

The *IS* curve is drawn for a given value of *i*.

Intuition for the slope:

\[ \downarrow e \implies \uparrow NX \implies \uparrow Y \]
The $LM^*$ curve: Money market eq’m

The $LM^*$ curve:
- is drawn for a given value of $i^*$.
- is vertical because: given $i^*$, there is only one value of $Y$ that equates money demand with supply, regardless of $e$. 
Equilibrium in the Mundell-Fleming model

( )

- **equilibrium exchange rate**
- **equilibrium level of income**

[Diagram showing the IS* and LM* curves intersecting to determine equilibrium income (Y) and exchange rate (e)]
Floating & fixed exchange rates

- In a system of **floating exchange rates**, e is allowed to fluctuate in order to clear the foreign exchange market.

- In contrast, under **fixed exchange rates**, the central bank trades its domestic for foreign currency to “peg” the exchange rate and “makes the market”.

Next, policy analysis –
- first, in a floating exchange rate system
- then, in a fixed exchange rate system
Fiscal policy under floating exchange rates

At any given value of $e$, a fiscal expansion increases $Y$, shifting $IS^*$ to the right.

Results:

$\Delta e > 0, \ \Delta Y = 0$
Lessons about fiscal policy

- In a small open economy with perfect capital mobility, fiscal policy cannot affect real GDP.

- “Crowding out”
  - closed economy: Fiscal policy crowds out investment by causing the interest rate to rise.
  - small open economy: Fiscal policy crowds out net exports by causing the exchange rate to appreciate. 100%! 
Monetary policy under floating exchange rates

An increase in $M$ shifts $LM^*$ right because $Y$ must rise to restore eq’m in the money market.

Results:

$\Delta e < 0, \Delta Y > 0$
Lessons about monetary policy

- Monetary policy affects output by affecting the components of aggregate demand:
  
  **closed economy:** \( \uparrow M \Rightarrow \downarrow i \Rightarrow \uparrow I \Rightarrow \uparrow Y \)
  
  **small open economy:** \( \uparrow M \Rightarrow \downarrow e \Rightarrow \uparrow NX \Rightarrow \uparrow Y \)
Trade policy under floating exchange rates

At any given value of $e$, a tariff or quota reduces imports, increases $NX$, and shifts $IS^*$ to the right.

Results:

$\Delta e > 0$, $\Delta Y = 0$
Lessons about trade policy

- Import restrictions under floating rates cannot reduce a trade deficit.
- Even though $NX$ is unchanged, there is less trade:
  - the trade restriction reduces imports.
  - the exchange rate appreciation reduces exports.
- Less trade means fewer “gains from trade”
- No increase in income or total employment.
Fixed exchange rates

- Under fixed exchange rates, the central bank stands ready to buy or sell the domestic currency for foreign currency at a predetermined rate.

- In the Mundell-Fleming model, the central bank shifts the $LM^*$ curve as required to keep $e$ at its preannounced rate.

- This system fixes the nominal exchange rate. When prices are flexible, the real exchange rate can move even if the nominal rate is fixed.
Fiscal policy under fixed exchange rates

Under floating rates, fiscal policy is ineffective at changing output.

Under fixed rates, fiscal policy is very effective at changing output.

Results:

\[ \Delta e = 0, \quad \Delta Y > 0 \]
Monetary policy under fixed exchange rates

Under floating rates, monetary policy is very effective at changing output.

Under fixed rates, monetary policy cannot be used to affect output.

Results:

\[ \Delta e = 0, \quad \Delta Y = 0 \]
Trade policy under fixed exchange rates

Under floating rates, import restrictions do not affect \( Y \) or \( NX \).

Under fixed rates, import restrictions increase \( Y \) and \( NX \).
Summary of policy effects in the Mundell-Fleming model

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The Policy Trilemma

A nation cannot have free capital flows, independent monetary policy, and a fixed exchange rate simultaneously.

A nation must choose one side of this triangle and give up the opposite corner.

Option 1 (U.K.)

Option 3 (China)

Option 2 (Hong Kong, Eurozone member)
Next time

- Tie up IS*-LM* with AD curve
- Consider aggregate supply (AS)
- Tie AD and AS together to complete the model