Chapter 15: Monetary and Fiscal Policy in the Open Economy

1. The Mundell-Fleming Model

- An open economy version of the IS-LM model
- Remember:
  - \( LM: L(Y, r) \rightarrow \bar{r}_{LM} = \frac{c_0 - M^S}{c_2} + \frac{c_1}{c_2} Y \)
  - \( IS: S(Y) + T = I(r) + G \rightarrow r_{IS} = \frac{a - b_T + I + G}{d} - \frac{1 - b}{d} Y \)
- The \( LM \) function remains the same, the external sector is added to the \( IS \) schedule
  - \( C + S + T \equiv Y = C + I + G + X - Z \)
  - \( S + T = I + G + X - Z \)
  - Imports \( (Z) \) depend on income and the exchange rate
    - \( Z = Z(Y, e), \frac{\partial Z}{\partial Y} > 0, \frac{\partial Z}{\partial e} < 0 \), where \( e \) is USD per EUR
  - Exports \( (X) \) depend on foreign income and the exchange rate
    - \( X = X(Y^f, e), \frac{\partial X}{\partial Y^f} > 0, \frac{\partial X}{\partial e} > 0 \)
- In addition to the \( IS \) and \( LM \) schedules, the model contains a \( BP \) (balance of payments) schedule (Figure 15-1)
  - \( BP \) schedule: All interest rate-income combinations that result in a balance of payment equilibrium
  - Equilibrium means: The ORT account is zero (which means that \( CA + FA = 0 \))
  - \( BP: X(Y^f, e) - Z(Y, e) + F(r - r^f) = 0 \)
    - \( X \) and \( M \) represent the trade balance (net exports) (CA)
    - \( F \) represents capital flows (FA), which depends on the difference between domestic and foreign interest rates
      - If \( (r - r^f) \) increases, then there are net capital inflows
      - If \( (r - r^f) \) decreases, then there are net capital outflows
  - \( BP \) is upward sloping
    - If income increase, then \( Z \) increases but \( X \) remains the same
    - Then \( CA \) decreases and \( FA \) needs to rise to keep \( CA + FA = 0 \)
    - For \( FA \) to increase, \( r \) needs to increase to attract capital flows
    - Important: \( BP \) is upward sloping with imperfect capital mobility (domestic and foreign assets are substitutes, but not perfect)
Shifts of $BP$
- **USD depreciates**
  - $BP$ shifts (parallel) to the right. For a given $r$, a higher income is needed for $Z$ to rise and the $BP$ to be in equilibrium
- **USD appreciates**
  - $BP$ shifts (parallel) to the left. For a given $r$, a lower income is needed for $Z$ to fall and the $BP$ to be in equilibrium
- A (relative) fall in $r^f$
  - $BP$ shifts (parallel) to the right. Capital inflows decrease and more imports are needed for $BP$ to be in equilibrium
- A (relative) rise in $r^f$
  - $BP$ shifts (parallel) to the left. Capital inflows increase and less imports are needed for $BP$ to be in equilibrium
- Deficit in $BP$: Points below the $BP$ schedule
- Surplus in $BP$: Points above the $BP$ schedule

**FIGURE 15-1** Open Economy IS–LM Model

The $LM$ schedule shows combinations of $r$ and $Y$ that are points of equilibrium for the money market, and the $IS$ schedule shows combinations of $r$ and $Y$ that clear the goods market. The $BP$ schedule shows the combinations of $r$ and $Y$ that will equate supply and demand in the foreign exchange market at a given exchange rate.
2. Imperfect Capital Mobility

- Policy under fixed exchange rates
  - Monetary policy (Figure 15-2)
    - Assume an increase in the money supply from \( M_0 \) to \( M_1 \)
    - \( Y \) increases -> Imports increase
    - \( BP \) moves towards a deficit
    - \( r \) falls -> Net capital flows decrease
    - \( BP \) moves towards a deficit
    - To move to a new equilibrium, fiscal policy needs to accommodate
  - Fiscal policy (Figures 15-3 and 15-4)
    - Assume an increase in government spending from \( G_0 \) to \( G_1 \)
    - \( Y \) increases -> Imports increase
    - \( BP \) moves towards a deficit
    - \( r \) rises -> Net capital flows increase
    - \( BP \) moves towards a surplus
    - Is the net effect on \( BP \) surplus or deficit?
      - slope \( BP < \) slope \( LM \) -> expansionary fiscal policy produces a surplus in the \( BP 
      - slope \( BP > \) slope \( LM \) -> expansionary fiscal policy produces a deficit in the \( BP 
      - The less responsive the FA account is to changes in interest rates the more steep \( BP \) is
      - The larger the marginal propensity to import, the steeper \( BP \) is
      - To move to a new equilibrium, monetary policy needs to accommodate
An increase in the quantity of money shifts the $LM$ schedule from $LM(M_0)$ to $LM(M_1)$. The equilibrium point shifts from $E_0$ to $E_1$. The rate of interest falls, and the level of income rises. The new equilibrium point is below the $BP$ schedule, indicating a deficit in the balance of payments.

An increase in government spending shifts the $IS$ schedule from $IS(G_0)$ to $IS(G_1)$. The equilibrium point shifts from $E_0$ to $E_1$. Income and the interest rate rise. The new equilibrium point is above the $BP$ schedule, indicating that, with a fixed exchange rate for the case in which the $BP$ schedule is flatter than the $LM$ schedule, the expansionary fiscal policy results in a surplus in the balance of payments.
As in Figure 15-3, an increase in government spending shifts the $IS$ schedule to the right, increasing both income and the rate of interest. In this case, where the $BP$ schedule is steeper than the $LM$ schedule, the new equilibrium point ($E_1$) is below the $BP$ schedule. The expansionary fiscal policy results in a balance of payments deficit.
• Policy under flexible exchange rates
  
  o Monetary policy (Figure 15-5)
    ▪ Assume an increase in the money supply from $M_0$ to $M_1$
    ▪ $Y$ increases -> Imports increase
    ▪ $BP$ moves towards a deficit
    ▪ $r$ falls -> Net capital flows decrease
    ▪ $BP$ moves towards a deficit
    ▪ The USD depreciates
    ▪ The $BP$ shifts to the right
    ▪ Exports increase and imports fall, therefore $IS$ also shifts to the right
  
  o Fiscal policy (Figure 15-6)
    ▪ Assume an increase in government spending from $G_0$ to $G_1$ and that slope $BP$ < slope $IS$
    ▪ $Y$ increases -> Imports increase
    ▪ $BP$ moves towards a deficit
    ▪ $r$ rises -> Net capital flows increase
    ▪ $BP$ moves towards a surplus
    ▪ Net effect is $BP$ in surplus
    ▪ The USD appreciates
    ▪ The $BP$ shifts to the left
    ▪ Imports increase and exports decrease, therefore $IS$ also shifts to the left
An increase in the money supply shifts the $LM$ schedule to the right, moving the equilibrium point from $E_0$ to $E_1$. The point $E_1$ is below the $BP$ schedule, where there is an incipient balance of payments deficit. In the flexible exchange rate case, the exchange rate rises, causing the $BP$ schedule to shift to the right from $BP(\pi_0)$ to $BP(\pi_1)$ and the $IS$ schedule to shift to the right from $IS(\pi_0)$ to $IS(\pi_1)$. The final equilibrium point is at $E_2$ with an income level $Y_2$, above $Y_1$, the new equilibrium for a fixed exchange rate.
FIGURE 15-6  Fiscal Policy with a Flexible Exchange Rate

An increase in government spending shifts the IS schedule to the right from $IS(G_0, \pi_0)$ to $IS(G_1, \pi_1)$, moving the equilibrium point from $E_0$ to $E_1$. With the BP schedule flatter than the LM schedule, $E_1$ is above the initial BP schedule, $BP(\pi_0)$. There is an incipient balance of payments surplus, and the exchange rate will fall, shifting the BP schedule to the left to $BP(\pi_1)$ and shifting the IS schedule to the left from $IS(G_1, \pi_0)$ to $IS(G_1, \pi_1)$. The final equilibrium is at $E_2$ with income level $Y_2$, below $Y_1$, the new equilibrium for a fixed exchange rate.
3. Perfect Capital Mobility

- Domestic and international assets are perfect substitutes
  - Assume no different in risk and negligible transaction costs
- Then: \( r = r^f \)
- Any difference between \( r \) and \( r^f \) produces massive flows of capital. Therefore \( BP \) is horizontal
- With imperfect capital mobility domestic interest rates can deviate from international interest rates
  - The country is so small that has no effect on international credit markets
  - The country is big and domestic policy affects international markets but we assume this “second” effect away for simplicity
- Policy under fixed exchange rate
  - Monetary policy (Figure 15-7)
    - Assume an increase in the money supply from \( M_0 \) to \( M_1 \)
    - \( r \) falls \( \rightarrow \) Net capital flows decrease
    - Demand for foreign exchange increases
    - The domestic central bank supplies the foreign exchange
    - Because of this, (domestic) money supply falls from \( M_1 \) to \( M_0 \)
    - Monetary policy is ineffective
  - Fiscal policy (Figure 15-8)
    - Assume an increase in government spending from \( G_0 \) to \( G_1 \) and that slope \( BP < \) slope \( IS \)
    - \( r \) rises \( \rightarrow \) Net capital flows increase
    - The central bank buys the inflow of capital at the fixed exchange rate
    - Money supply increases and \( r \) falls
    - Fiscal policy is effective
An increase in the money supply shifts the $LM$ schedule from $LM(M_0)$ to $LM(M_1)$. The domestic interest rate falls below the foreign interest rate, triggering a massive capital outflow. Central bank intervention to maintain the fixed exchange rate causes the money supply to fall back to the initial level, $M_0$. The domestic interest rate is restored to equality with the foreign interest rate, and income is back at its initial level.
An increase in government spending shifts the IS schedule from $IS(G_0)$ to $IS(G_1)$. The domestic interest rate is pushed above the foreign interest rate, resulting in a massive capital inflow. Central bank intervention to maintain the fixed exchange rate causes the money supply to rise. The $LM$ schedule shifts from $LM(M_0)$ to $LM(M_1)$. The domestic interest rate is brought back into equality with the foreign rate, and the increase in the money supply reinforces the expansionary effect of the increase in government spending.
Policy under flexible exchange rate

- Monetary policy (Figure 15-9)
  - Assume an increase in the money supply from $M_0$ to $M_1$
  - $r$ falls -> Net capital flows decrease
  - Demand for foreign exchange increases
  - USD depreciates
  - Imports decrease, exports increase and therefore the IS also shifts to the right
  - Monetary policy is effective

- Fiscal policy (Figure 15-10)
  - Assume an increase in government spending from $G_0$ to $G_1$ and that slope $BP < $ slope $IS$
  - $r$ rises -> Net capital flows increase
  - USD appreciates
  - Imports increase, exports decrease and therefore the IS shifts to the left
  - Fiscal policy is ineffective
An increase in the money supply causes the \( LM \) schedule to shift from \( LM(M_0) \) to \( LM(M_1) \). The domestic interest rate falls below the foreign interest rate, triggering a massive outflow of capital. The capital outflow causes the exchange rate to rise, shifting the \( IS \) schedule from \( IS(\pi_0) \) to \( IS(\pi_1) \). The domestic interest rate is brought back into equality with the foreign interest rate, and income rises to \( Y_1 \).
FIGURE 15-10 Fiscal Policy with a Flexible Exchange Rate

An increase in government spending causes the IS schedule to shift from \( IS(G_0, \pi_0) \) to \( IS(G_1, \pi_0) \). The domestic interest rate rises above the foreign interest rate, with a resulting massive inflow of capital. The capital inflow causes the exchange rate to fall. The fall in the exchange rate shifts the IS schedule back to \( IS(G_0, \pi_0) = IS(G_1, \pi_1) \). The domestic interest rate is reequilibrated with the foreign interest rate, and income returns to its initial level.