Exchange Rates, Business Cycles, and Macroeconomic Policy in the Open Economy, Part 2

Agenda

• How Exchange Rates are Determined (again)
• The IS-LM Model for an Open Economy
• Macroeconomic Policy in an Open Economy with Flexible Exchange Rates

How exchange rates are determined

• In a flexible exchange-rate system, exchange rates are determined in the foreign exchange market where the demand for the currency equals the supply of the currency.

The supply of and demand for the dollar

\[ P_s \text{ or } e_{wex} \]

\[ Q_s \]
How exchange rates are determined

• The supply of dollars come from domestic residents who want to buy:
  ➢ Foreign made goods and services (imports), and/or
  ➢ Foreign real and financial assets.

• The demand for dollars comes from foreign residents who want to buy:
  ➢ Domestic made goods and services (exports), and/or
  ➢ Domestic real and financial assets.

How exchange rates are determined

• Factors that increase the supply of the currency:
  ➢ An increase in domestic output, Y.
  ➢ A decrease in the domestic real interest rate, r.
  ➢ An increase in the foreign real interest rate, r_{FOR}.
  ➢ A shift in world demand away from domestic goods, services, or assets.

• The exchange rate will change whenever there is a change in the supply of, or demand for, the currency.
  ➢ The supply of the currency will increase if domestic residents want to buy more foreign goods, services, or assets.
  ➢ The demand for the currency will increase if foreign residents want to buy more domestic goods, services, or assets.

How exchange rates are determined

• Factors that increase the demand for the currency:
  ➢ An increase in foreign output, Y_{FOR}.
  ➢ A decrease in the foreign real interest rate, r_{FOR}.
  ➢ An increase in the domestic real interest rate, r.
  ➢ A shift in world demand towards domestic goods, services, or assets.
An increase in the domestic real interest rate

- An increase in the foreign real interest rate

The IS-LM Model for an Open Economy

- Only the IS curve is affected by having an open economy instead of a closed economy; the LM curve and FE line are the same.
  - The IS curve is affected because net exports are part of the demand for goods.
  - The IS curve remains downward sloping.

The IS-LM Model for an Open Economy

- Only the IS curve is affected by having an open economy instead of a closed economy; the LM curve and FE line are the same.
  - The AD-AS and DAD-SRAS models are not used because the focus is on what happens to the real interest rate, which has an important impact on the exchange rate.
The IS-LM Model for an Open Economy

- The goods-market equilibrium condition in an open economy is:
  \[ S^d - I^d = NX \]
  - Desired foreign lending MUST equal foreign borrowing.

Goods market equilibrium, open economy

- Goods market equilibrium, open economy:
  - The \( S^d - I^d \) curve slopes upward because a rise in the real interest rate increases desired national saving and reduces desired investment.
  - The \( NX \) curve slopes downward because a rise in the real interest rate increases the real exchange rate and thus reduces net exports.
  - Net exports can be positive or negative.
The IS-LM Model for an Open Economy

- Goods market equilibrium, open economy:
  - Goods market equilibrium in an open economy occurs where the $S_d - I_d$ and $NX$ curves intersect.

- To derive an open-economy IS curve, analyze what happens to goods market equilibrium when domestic output changes.

Derivation of the IS curve, open economy

- The open-economy IS curve:
  - Because higher output increases saving, the $S_d - I_d$ curve shifts to the right.
  - Because higher output reduces net exports, the $NX$ curve shifts to the left.
  - A new equilibrium occurs at a lower real interest rate and the IS curve is downward sloping.
    - The open-economy IS curve is flatter than the closed-economy IS curve.

- The factors that shift the open-economy IS curve:
  - Any factor that shifts the closed-economy IS curve also shifts the open-economy IS curve and in the same direction.
  - Any factor that changes net exports (for a given domestic output and the domestic real interest rate) also shifts the open-economy IS curve and in the same direction.
The IS-LM Model for an Open Economy

• Factors that shift the open-economy IS curve:
  ➢ The open-economy IS curve shifts to the right because of:
    • an increase in expected future output,
    • an increase in wealth,
    • an increase in government purchases,

• Factors that shift the open-economy IS curve:
  ➢ The open-economy IS curve also shifts to the right because of:
    • An increase in net exports that is \textbf{NOT} caused by a change in domestic output or the domestic real interest rate.

An increase in government purchases

The IS-LM Model for an Open Economy

• Factors that shift the open-economy IS curve:
  ➢ The open-economy IS curve shifts to the right because of:
    • a decline in taxes,
      – if Ricardian equivalence doesn’t hold,
    • an increase in the expected future marginal product of capital, and/or
    • a decrease in the effective tax rate on capital.

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The IS-LM Model for an Open Economy

- Factors that shift the open-economy IS curve:
  - **Three things** could increase net exports for a given level of domestic output and the domestic real interest rate.
    - **First**, an increase in foreign output, \( Y_{For} \).
      - This increases foreigners’ demand for domestic exports.
      - Also causes the currency to appreciate, “crowding out” some net exports although, on balance, net exports increase.
    - **Second**, an increase in the foreign real interest rate, \( r_{For} \).
      - This makes domestic residents want to buy foreign assets.
      - Also causes the currency to depreciate and net exports to rise.
    - **Third**, a shift in worldwide demand toward the domestic country’s goods.
      - This increases the foreign demand for domestic exports.
      - Also causes the currency to appreciate, “crowding out” some net exports although, on balance, net exports increase.

An increase in net exports
The IS-LM Model for an Open Economy

- International transmission of business cycles:
  - The impact of foreign economic conditions on the real exchange rate and net exports is one of the principal ways by which cycles are transmitted internationally.

What would be the effect on Japan of a recession in the United States?
- A similar effect could occur because of a shift in preferences (or trade restrictions) for Japanese goods.

A recession in the U.S.

Macro policy in an open economy

- Two key questions:
  - How do fiscal and monetary policy affect a country’s real exchange rate and net exports?
  - How do the macroeconomic policies of one country affect the economies of other countries?
Macro policy in an open economy

• To analyze these questions:
  ➢ Use an IS-LM diagram to determine the effects on domestic output and the real interest rate.
  ➢ Determine how these changes affect the exchange rate and net exports.
  ➢ Use an IS-LM diagram to determine the effects on foreign output and the real interest rate.

Macro policy in an open economy

• The effects of a fiscal expansion:
  ➢ An increase in domestic government purchases and/or a decrease in taxes.
    • With no Ricardian equivalence.
  ➢ A fiscal expansion shifts the IS curve to the right.

An increase in domestic government purchases

- Domestic output increases.
- Domestic real interest rates increase.

Macro policy in an open economy

• The effects of a fiscal expansion:
  ➢ On domestic output and the real interest rate:
    • Domestic output increases.
    • Domestic real interest rates increase.
Macro policy in an open economy

• The effects of a fiscal expansion:

➢ On the exchange rate:

  • Higher domestic output increases the supply of the currency, causing the currency to **depreciate**.
  
  • Higher real interest rates increase the demand for the currency, causing the currency to **appreciate**.
  
  • The net effect on the exchange rate is ambiguous.
    – Typically the interest rate effect is larger.

Macro policy in an open economy

• The effects of a fiscal expansion:

➢ On net exports:

  • Higher output causes net exports to **decrease**.
  
  • Higher domestic real interest rates increase the demand for the currency, causing the currency to appreciate, which in turn causes net exports to **decrease**.
  
  • The net effect is that net exports **decrease**.

Macro policy in an open economy

• The effects of a fiscal expansion:

➢ On a foreign economy:

  • Domestic net exports decrease, implying foreign net exports **increase**.
  
  • The foreign country’s IS curve shifts to the right.
    – Foreign output **increases**.
    – Foreign real interest rates **increase**.

Macro policy in an open economy

• The effects of a fiscal expansion:

➢ In the long-run:

  • The **domestic economy’s LM curve shifts to the left as the price level rises to restore equilibrium**.
    – Domestic real interest rates are higher.
      » Fiscal expansion “crowds out” both investment and net exports.
    – Domestic output is unchanged.
    – Domestic price level is higher.
Macro policy in an open economy

- The effects of a fiscal expansion:
  - In the long-run:
    - The foreign economy’s LM curve shifts to the left as the price level rises to restore equilibrium.
      - Foreign real interest rates are higher.
      - Foreign output is unchanged.
      - Foreign price level is higher.

Macro policy in an open economy

- The effects of a fiscal expansion:
  - In the long-run:
    - The real exchange rate appreciates.
    - The nominal exchange rate is ambiguous.
      - The nominal exchange rate is given by: \( e_{\text{nom}} = eP_1 / P \)
      - It is ambiguous because although the real exchange rate appreciates, the domestic price level rises (by more than the foreign price level).

Macro policy in an open economy

- The effects of a monetary contraction:
  - A decrease in the money supply.
  - A monetary contraction shifts the LM curve to the left.
Macro policy in an open economy

• The effects of a monetary contraction:
  ➢ On domestic output and the real interest rate:
    • Domestic output decreases.
    • Domestic real interest rates increase.

Macro policy in an open economy

• The effects of a monetary contraction:
  ➢ On the exchange rate:
    • Lower domestic output decreases the supply of the currency, causing the currency to appreciate.
    • Higher domestic real interest rates increases the demand for the currency, causing the currency to appreciate.
    • The net effect on the exchange rate is an appreciation.

Macro policy in an open economy

• The effects of a monetary contraction:
  ➢ On net exports:
    • Lower domestic output causes net exports to increase.
    • Higher domestic real interest rate increase the demand for the currency, causing the currency to appreciate, which in turn causes net exports to decrease.
    • Following the J curve analysis, assume the latter effect is weak in the short run, so that net exports increase.

Macro policy in an open economy

• The effects of a monetary contraction:
  ➢ On a foreign economy:
    • Domestic net exports increase, implying foreign net exports decrease.
    • The foreign country’s IS curve to the left.
      – Foreign output decrease
      – Foreign real interest rates decrease.
Macro policy in an open economy

• The effects of a monetary contraction:

  ➢ In the long-run:

    • The domestic economy’s LM curve shifts to the right as the price level falls to restore long-run equilibrium.
      – The LM curve returns to its original position.

    • All real variables return to their original levels.
      – Including net exports and the real exchange rate.

Macroscope

• In the short-run:

  ➢ Monetary policy has a larger effect on the domestic output than does fiscal policy.

    • A monetary expansion causes the currency to depreciate.
      – This causes a further increase in net exports and economic output.

    • A fiscal expansion has an ambiguous effect on the currency.
      – This reduces any increase in net exports (relative to a monetary expansion) so net exports and economic output do not rise as much.