Chapter 17: Macroeconomics in an Open Economy

Yulei Luo

SEF of HKU

April 16, 2012
Learning Objectives

1. Explain how the balance of payments is calculated.
2. Explain how exchange rates are determined and how changes in exchange rates affect the prices of imports and exports.
3. Explain the saving and investment equation in an open economy.
4. Explain the effect of a government budget deficit on investment in an open economy.
5. Discuss the difference between the effectiveness of monetary and fiscal policy in an open economy and in a closed economy.
The Balance of Payments

- **Closed economy**: An economy that has no interactions in trade or finance with other economies.

- **Open economy**: An economy that has interactions in trade or finance with other economies. Consumers, firms, and investors routinely interact with consumers, firms, and investors in other economies.

- **Balance of payments (BOP)**: The record of a country’s trade with other countries in G&S and assets. It is the best way to understand the interactions between two countries.

- BOPs include: *Current account, financial account, and capital account.*
The Current Account

- *Current account (CA)*: The part of the BOPs that records a country’s net exports, net investment income, and net transfers.

- CA records current, or short-term flows of funds into and out of a country.

- The CA for the U.S. includes:
  1. imports and exports of G&S (net exports)
  2. income received by U.S. residents from investment in other countries and income paid on investment in the U.S. owned by other countries (net investment income)
  3. the difference bw transfers made to other countries and transfers received by U.S. residents (net transfers).
Balance of Trade

- BOT is the largest part of the CA and is the difference between the value of the goods a country exports and the value of the goods a country imports.
- If a country exports more than (less than) its imports, it has a trade surplus (trade deficit).
- Net Exports equals the sum of the balance of trade and the balance of services.
- In 2008, the U.S. had a TD of about $700.
The Financial Account

- **Financial account (FA):** The part of the balance of payments that records purchases of assets a country has made abroad and foreign purchases of assets in the country.
- The FA records long-term flows of funds into and out of a country.
- **Capital outflow:** A home country investor buys a bond issued by a foreign company or gov. (foreign portfolio investment) or when a firm builds a factory in a foreign country (foreign direct investment).
- **Capital inflow:** A foreign investor buys a bond issued by a home company or gov. or when a foreign firm builds a factory in a home country.
- **Net foreign investment:** The difference between capital outflows from a country and capital inflows, also equal to net foreign direct investment plus net foreign portfolio investment.
(Cont.) *Net capital flows:* Another way of thinking of the balance of the FA. The difference between capital inflows and capital outflows.

*Net foreign investment:* The difference between capital outflows (An investor buys a bond issued by a foreign company or government, or when a firm builds a factory in a foreign country) from a country and capital inflows, also equal to net foreign direct investment plus net foreign portfolio investment.

*Net capital flows and net foreign investment* are always equal but have opposite signs.
The Capital Account

- **Capital Account**: The part of the BOPs that records relatively minor transactions, such as migrants’ transfers, and sales and purchases of nonproduced, nonfinancial assets.
- A nonproduced, nonfinancial asset is a copyright, patent, trademark, or right to natural resources.
- Note that the capital account prior to 1999 recorded all the transactions included now in both the FA and the capital account.
- Today the capital account is so small, so for simplicity we will ignore it in our discussion.
### The Balance of Payments: Linking the United States to the International Economy

#### The Current Account

<table>
<thead>
<tr>
<th>CURRENT ACCOUNT</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exports of goods</td>
<td>$1,277</td>
</tr>
<tr>
<td>Imports of goods</td>
<td>- 2,117</td>
</tr>
<tr>
<td>Balance of trade</td>
<td>- 840</td>
</tr>
<tr>
<td>Exports of services</td>
<td>549</td>
</tr>
<tr>
<td>Imports of services</td>
<td>- 405</td>
</tr>
<tr>
<td>Balance of services</td>
<td>144</td>
</tr>
<tr>
<td>Income received on investments</td>
<td>764</td>
</tr>
<tr>
<td>Income payments on investments</td>
<td>- 646</td>
</tr>
<tr>
<td>Net income on investments</td>
<td>118</td>
</tr>
<tr>
<td>Net transfers</td>
<td>- 128</td>
</tr>
<tr>
<td>Balance on current account</td>
<td>- 706</td>
</tr>
</tbody>
</table>

#### FINANCIAL ACCOUNT

<table>
<thead>
<tr>
<th>FINANCIAL ACCOUNT</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in foreign holdings of assets in the United States</td>
<td>534</td>
</tr>
<tr>
<td>Increase in U.S. holdings of assets in foreign countries</td>
<td>- 0</td>
</tr>
<tr>
<td>Balance on financial account</td>
<td>534</td>
</tr>
</tbody>
</table>

#### BALANCE ON CAPITAL ACCOUNT

<table>
<thead>
<tr>
<th>BALANCE ON CAPITAL ACCOUNT</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistical discrepancy</td>
<td>200</td>
</tr>
<tr>
<td>Balance of payments</td>
<td>0</td>
</tr>
</tbody>
</table>

The Balance of Payments: Linking the United States to the International Economy

The Current Account

Net Exports Equals the Sum of the Balance of Trade and the Balance of Services

The balance of services is the difference between the value of the services a country exports and the value of the services a country imports. Notice that, technically, net exports is not equal to the current account balance because the current account balance also includes net income on investments and net transfers. But these other two items are relatively small.
The Balance of Payments: Linking the United States to the International Economy

The Current Account

Figure 17-1

Trade Flows for the United States and Japan, 2008

Panel (a) shows that in 2008, the United States ran a trade deficit with all its major trading partners and with every region of the world. Panel (b) shows that Japan ran trade deficits with China, the Middle East, and Africa, and it ran trade surpluses with other regions. In each panel, the green arrows represent exports from the United States or Japan, and the red arrows represent imports.
Why Is the Balance of Payments Always Zero?

- BOP is always 0 because the sum of the CA balance and the financial account balance must equal zero.
  - Consider the following case, in 2008, the U.S. had a CA deficit of $706 billion. What happened to that $706 billion? Every dollar of $706 billion must be either added to foreign holdings of dollars or used by foreign agents to invest in the U.S.
  - Note that there is nowhere else for the dollars to go: Since they weren’t spent on U.S. G&S (otherwise, they would have shown up in the CA), they must have been spent on investment in the U.S. or not spent at all.

- Foreign investment and foreign holdings of dollars both increase the U.S. FA balance. Therefore, a CA deficit must be exactly offset by a FA surplus, leaving the BOP equal to zero.
- If they cannot be offset, there must have some measurement errors because some transactions must not have been accounted for. Need the statistical discrepancy be included in the BOP.
Solved Problem 17-1
Understanding the Arithmetic of Open Economies

Test your understanding of the relationship between the current account and the financial account by evaluating the following assertion by a political commentator:

“The industrial countries are committing economic suicide. Every year, they invest more and more in developing countries. Every year, more U.S., Japanese, and European manufacturing firms move their factories to developing countries. With extensive new factories and low wages, developing countries now export far more to the industrial countries than they import.”

YOUR TURN: For more practice, do related problems 1.7, 1.8 and 1.9 at the end of this chapter.
A multinational corporation may sell its product in many different countries and receive payment in many different currencies. The question is how to compare different currencies.

Nominal exchange rate (NER): The value of one country’s currency in terms of another country’s currency.

NER can determine how many units of a foreign currency you can buy with one dollar.

E.g., the NER bw the U.S. dollar and HKD can be expressed as HKD 7.6=USD 1.0.
### Exchange Rates Listings

#### 17.2 Learning Objective

Explain how exchange rates are determined and how changes in exchange rates affect the prices of imports and exports.

#### Exchange Rate Between the Dollar and the Indicated Currency

<table>
<thead>
<tr>
<th>Currency</th>
<th>Units of Foreign Currency per U.S. Dollar</th>
<th>U.S. Dollar per Unit of Foreign Currency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canadian dollar</td>
<td>1.116</td>
<td>0.896</td>
</tr>
<tr>
<td>Japanese yen</td>
<td>94.360</td>
<td>0.011</td>
</tr>
<tr>
<td>Mexican peso</td>
<td>13.358</td>
<td>0.075</td>
</tr>
<tr>
<td>British pound</td>
<td>0.612</td>
<td>1.634</td>
</tr>
<tr>
<td>Euro</td>
<td>0.709</td>
<td>1.410</td>
</tr>
</tbody>
</table>

Many online sites that report economic news and the financial pages of most newspapers provide information on exchange rates.

**YOUR TURN:** Test your understanding by doing related problem 2.5 at the end of this chapter.
Equilibrium in the Market for Foreign Exchange

- Banks are the most active participants in the FEX market. Businesses and individuals usually obtain foreign currency from banks in their own countries.

- The market Foreign ER is determined by the interaction of demand and supply. There are three sources of foreign currency demand for the U.S. dollar:

  1. Foreign firms and households who want to buy goods and services produced in the U.S.

  2. Foreign firms and households who want to invest in the U.S. either through foreign direct investment—buying or building factories or other facilities in the U.S.—or through foreign portfolio investment—buying stocks and bonds issued in the United States.

  3. Currency traders who believe that the value of the dollar in the future will be greater than its value today.
The Foreign Exchange Market and Exchange Rates

Equilibrium in the Market for Foreign Exchange

Figure 17-2

Equilibrium in the Foreign Exchange Market

When the exchange rate is ¥150 to the dollar, it is above its equilibrium level, and there will be a surplus of dollars.

When the exchange rate is ¥100 to the dollar, it is below its equilibrium level, and there will be a shortage of dollars.

At an exchange rate of ¥120 to the dollar, the foreign exchange market is in equilibrium.

17.2 LEARNING OBJECTIVE

Explain how exchange rates are determined and how changes in exchange rates affect the prices of imports and exports.
(Cont.) *Currency appreciation* An increase in the market value of one currency relative to another currency.

*Currency depreciation* A decrease in the market value of one currency relative to another currency.
How Do Shifts in Demand and Supply Affect the Exchange Rate?

Three main factors cause the demand and supply curves in the FEX market to shift:

1. Changes in the demand for U.S.-produced goods and services and changes in the demand for foreign-produced goods and services
2. Changes in the desire to invest in the United States and changes in the desire to invest in foreign countries
3. Changes in the *expectations* of currency traders about the likely future value of the dollar and the likely future value of foreign currencies
(Cont.) Shifts in the Demand for Foreign Exchanges

- During an economic expansion in Japan, the incomes of Jap. HHs increase and then the demand for the U.S. G&S will increase. At any given EXR, the demand for the U.S. dollar will increase and the demand curve will shift to the right.
- If IRs in the U.S. rise, the U.S. securities will become more desirable, and the DC for dollars will also shift to the right.
- If speculators become convinced that the value of the dollar is going to rise relative to the value of yen, the DC will shift to the right.

- Speculators: Currency traders who buy and sell foreign exchange in an attempt to profit by changes in exchange rates.
(Cont.) Shifts in the *Supply* for Foreign Exchanges

- An expansion in the U.S. increases the incomes of U.S. HHs and increases their demand for G&S, including G&S made in Japan. Consequently, U.S. agents must supply dollars i.e.f. yen, which causes the supply curve for dollars to shift to the right.
- An increase in IR in Japan will make financial investments in Japan more attractive, which also shift the SD to the right because more yen need more yen.
- Finally, if speculators believe that the value of the yen will be higher relative to the dollar in the future, the SD will also shift to the right.

Adjustment to a New Equilibrium: The factors that affect the demand and supply for currencies are constantly changing. Whether the EXR increases or decreases depends on the direction and size of the shifts in the demand curve and supply curve.
The Foreign Exchange Market and Exchange Rates

How Do Shifts in Demand and Supply Affect the Exchange Rate?

Adjustment to a New Equilibrium

Figure 17-3

Shifts in the Demand and Supply Curve Resulting in a Higher Exchange Rate

Holding other factors constant, an increase in the supply of dollars will decrease the equilibrium exchange rate. An increase in the demand for dollars will increase the equilibrium exchange rate.

In the case shown in this figure, the demand curve and the supply curve have both shifted to the right.

Because the demand curve has shifted to the right by more than the supply curve, the equilibrium exchange rate has increased from ¥120 to $1 at point A to ¥130 to $1 at point B.

17.2 LEARNING OBJECTIVE

Explain how exchange rates are determined and how changes in exchange rates affect the prices of imports and exports.
Low U.S. interest rates have played a role in the declining value of the dollar. Second, many investors and some central banks became convinced that the value of the dollar was too high in 2002 and that it was likely to decline in the future.

YOUR TURN: Test your understanding by doing related problems 2.12 and 2.13 at the end of this chapter.
Some ERs Are Not Determined by the Market

- Some currencies have fixed ERs that don’t change over long periods. E.g., China fixed the EXR to 8.28 yuan per dollar for more than 10 years; Argentina fixed the EXR before the bank panic.

How Movements in the ER Affect Exports and Imports

- If the economy is currently below potential GDP, then, holding all other factors constant, a depreciation in the domestic currency should increase net exports, AD, and real GDP.
- An appreciation in the domestic currency should have the opposite effect: Exports should fall, and imports should rise, which will reduce net exports, AD, and real GDP.
Solved Problem 17-2
Using Exchange Rates

Calculate the price of the bottle of California wine in the euro area, using the current exchange rate.

Price in the euro area = Exchange rate (€/$) × Price in the United States
Price in the euro area = €0.83/$1 × Price in the United States
Price in the euro area = $20.00 × €0.83 = €16.6

Calculate the price of the bottle of French wine in the United States using the current exchange rate.

Price in the euro area = Exchange rate (€/$) × Price in the United States
€30 = €0.83/$1 × Price in the United States
Price in the United States = €30/€0.83/$1 = $36.15

YOUR TURN: For more practice, do related problem 2.9 at the end of this chapter.
The Real Exchange Rate

- The relative prices of each country’s goods determines the level of a country’s exports to and imports from another countries.
- The relative prices are determined by two factors that can be combined to determine the real EXR:
  1. The relative price levels in two countries.
  2. The nominal EXR

- *Real exchange rate* The price of domestic goods in terms of foreign goods. They are reported as index numbers with one year chosen as the base year.

\[
RER = NER \times \frac{\text{domestic price level}}{\text{foreign price level}}. \tag{1}
\]
The International Sector and National Saving and Investment

Figure 17-4


Imports and exports are much larger fractions of GDP today than they were before 1970. Imports have increased faster than exports, which has made net exports negative every year since 1975.
Domestic Saving, DI, and Net FI

- In the U.S., net FI is negative nearly every year, DI (I) must be greater than national saving (S).
- In China and Japan, saving has been well above domestic investment, which means that it runs high levels of Net FI.
The International Sector and National Saving and Investment

Net Exports Equal Net Foreign Investment

Current account balance + Financial account balance = 0

or:

Current account balance = -Financial account balance

or:

Net exports = Net foreign investment
The International Sector and National Saving and Investment

Domestic Saving, Domestic Investment, and Net Foreign Investment

National saving = Private saving + Public saving

\[ S = S_{\text{private}} + S_{\text{public}} \]

Private saving = National income – Consumption - Taxes

\[ S_{\text{private}} = Y - C - T \]

Government saving = Taxes – Government spending

\[ S_{\text{public}} = T - G \]
The International Sector and National Saving and Investment

Domestic Saving, Domestic Investment, and Net Foreign Investment

Remember the basic macroeconomic equation for GDP or national income:

\[ Y = C + I + G + NX \]

**Saving and investment equation**  An equation that shows that national saving is equal to domestic investment plus net foreign investment.

National saving = Domestic investment + Net foreign investment

\[ S = I + NFI \]
The Effect of a Government Budget Deficit on Investment

- When the gov runs a budget deficit, national saving will decline (unless private saving increases the same amount), thereby reducing either DI or net FI. The mechanism is as follow:

  1. The U.S. treasury must raise an amount of deficit by selling bonds. To attract investors, they must have to increase the IRs on their bonds. As a result, other IRs will also increase.
  2. Higher IRs will reduce DI and attract foreign investors to invest more in U.S. assets. This greater demand for dollars will increase its value and then reduce net exports as well as net FI.

- When a gov BD leads to a decline in net exports, the result is referred to as the twin deficits (BD and CA deficit).
Many economists believe that the CA deficits of 1980s were closely related to the federal BDs.

As the BD narrowed in the mid-1990s and disappeared in the late 1990s, the large CA deficits continued because foreign investors continued in investing in the U.S. despite low IRs. The reasons are:

1. Some countries suffered severe economic problems (South Korea, Russia, etc.), many investors sold their investments there and bought investments in the U.S.
2. The strong performance of the U.S. stock market also attracted many investors.
3. The sharp decline in private saving in U.S. during the late 1990s also contributed to the large CA deficit.

This can be seen as a vote of confidence in the strength of the U.S. economy. The large negative net FI help U.S. maintain the high levels of DI required for EG.
The Effect of a Government Budget Deficit on Investment

Explain the effect of a government budget deficit on investment in an open economy.

**Figure 17-5**

The Twin Deficits, 1978–2008

During the early 1980s, large federal budget deficits occurred at the same time as large current account deficits, but twin deficits did not occur in the 1990s.
Why Is the United States Called the “World’s Largest Debtor”?  

Large current account deficits have resulted in foreign investors purchasing large amounts of U.S. assets.

**17.4 LEARNING OBJECTIVE**

Explain the effect of a government budget deficit on investment in an open economy.

**YOUR TURN:** Test your understanding by doing related problem 4.6 at the end of this chapter.
Monetary Policy in an Open Economy

- When the Fed uses the expansionary MP to stimulate the open economy (lower the IR and increase AD), lower IRs will also affect the ER bw the dollar and other currencies:
  - Lower IRs will make investors switch from investing in U.S. assets to investing in foreign assets, thereby reducing the demand for the dollar, the value of it, and then increase the net exports. Hence, the MP can increase AD by increasing net exports.

- Similarly, contractionary MP can reduce AD by reducing net exports.

- MP has a *larger* impact on AD in an open economy than in a closed economy.
Solved Problem 17-5
Monetary and Fiscal Policy in a Recession

To answer the question, think about:

Explaining if the United States had a closed economy, the Federal Reserve would have to lower the federal funds rate by more or less than 50 basis points in order to have the same impact on aggregate demand as in an open economy.

Explaining which value of the MPI an income tax cut would have the greater impact on aggregate demand.

YOUR TURN: For more practice, do related problem 5.7 at the end of this chapter.
An expansionary FP (increase GP or cut taxes) may result in higher IRs. In an open economy, increasing IRs will also increase the value of the dollar and then reduce net exports, thereby reducing AD. In open economies, expansionary FP is less effective because the crowding out effect may be larger.

Similarly, a contractionary FP reduces the BD (or increases BS), which may reduce the IRs. Consequently, in open economies, reductions in the IRs increase net exports and then increase AD, which offsets the effects of the contractionary FP.

FP has a smaller effect on AD in an open economy than in a closed economy.
Key Terms

- Balance of payments; Balance of trade
- Current account; Capital account; Financial account
- Closed economy; Open economy
- Currency appreciation; Currency depreciation
- Net foreign investment
- Nominal exchange rate; Real exchange rate
- Saving and investment equation
- Speculators