31 OPEN-ECONOMY MACROECONOMICS: BASIC CONCEPTS

WHAT'S NEW IN THE SIXTH EDITION:

There are no major changes in this chapter.

LEARNING OBJECTIVES:

By the end of this chapter, students should understand:

- how net exports measure the international flow of goods and services.
- how net capital outflow measures the international flow of capital.
- why net exports must always equal net foreign investment.
- how saving, domestic investment, and net capital outflow are related.
- the meaning of the nominal exchange rate and the real exchange rate.
- purchasing-power parity as a theory of how exchange rates are determined.

CONTEXT AND PURPOSE:

Chapter 18 is the first chapter in a two-chapter sequence dealing with open-economy macroeconomics. Chapter 18 develops the basic concepts and vocabulary associated with macroeconomics in an international setting: net exports, net capital outflow, real and nominal exchange rates, and purchasing-power parity. The next chapter, Chapter 19, builds an open-economy macroeconomic model that shows how these variables are determined simultaneously.

The purpose of Chapter 18 is to develop the basic concepts macroeconomists use to study open economies. It addresses why a nation's net exports must equal its net capital outflow. It also addresses the concepts of the real and nominal exchange rate and develops a theory of exchange rate determination known as purchasing-power parity.

KEY POINTS:

- Net exports are the value of domestic goods and services sold abroad (exports) minus the value of foreign goods and services sold domestically (imports). Net capital outflow is the acquisition of foreign assets by domestic residents (capital outflow) minus the acquisition of domestic assets by foreigners (capital inflow). Because every international transaction involves an exchange of an asset for a good or service, an economy's net capital outflow always equals its net exports.

- An economy's saving can be used to finance investment at home or buy assets abroad. Thus, national saving equals domestic investment plus net capital outflow.

- The nominal exchange rate is the relative price of the currency of two countries, and the real exchange rate is the relative price of the goods and services of two countries. When the nominal exchange rate changes so that each dollar buys more foreign currency, the dollar is said to *appreciate* or *strengthen*. When the nominal exchange rate changes so that each dollar buys less foreign currency, the dollar is said to *depreciate* or *weaken*.

- According to the theory of purchasing-power parity, a dollar (or a unit of any other currency) should be able to buy the same quantity of goods in all countries. This theory implies that the nominal exchange rate between the currencies of two countries should reflect the price levels in those two countries. As a result, countries with relatively high inflation should have depreciating currencies, and countries with relatively low inflation should have appreciating currencies.

CHAPTER OUTLINE:

I. We will no longer be assuming that the economy is a closed economy.

   A. Definition of **closed economy: an economy that does not interact with other economies in the world**.

   B. Definition of **open economy: an economy that interacts freely with other economies around the world**.

II. The International Flows of Goods and Capital

   A. The Flow of Goods: Exports, Imports, and Net Exports

      1. Definition of **exports: goods and services that are produced domestically and sold abroad**.

      2. Definition of **imports: goods and services that are produced abroad and sold domestically**.

Point out foreign products that students are likely to buy.

      3. Definition of **net exports: the value of a nation's exports minus the value of its imports, also called the trade balance**.

NX = Exports – Imports

4. Definition of **trade balance: the value of a nation's exports minus the value of its imports, also called net exports**.

5. Definition of **trade surplus: an excess of exports over imports**.

6. Definition of **trade deficit: an excess of imports over exports**.

7. Definition of **balanced trade: a situation in which exports equal imports**.

Point out to students that a trade surplus implies a positive level of net exports, a trade deficit means that net exports are negative, and balanced trade occurs when net exports are equal to zero. While this will likely be obvious to most students, some will benefit if you review this.

8. There are several factors that influence a country's exports, imports, and net exports:

   a. The tastes of consumers for domestic and foreign goods.

   b. The prices of goods at home and abroad.

   c. The exchange rates at which people can use domestic currency to buy foreign currencies.

   d. The incomes of consumers at home and abroad.

   e. The cost of transporting goods from country to country.

   f. Government policies toward international trade.

9. *Case Study: The Increasing Openness of the U.S. Economy*

Figure 1

   a. Figure 1 shows the total value of exports and imports (expressed as a percentage of GDP) for the United States since 1950.

   b. Advances in transportation, telecommunications, and technological progress are some of the reasons why international trade has increased over time.

   c. Policymakers around the world have also become more accepting of free trade over time.

10. *In the News: Breaking Up the Chain of Production*

   a. Some goods have parts that are manufactured in many countries.

   b. This is an article from *The New York Times* describing the origin of the 451 parts that make up the Apple iPod.

B. The Flow of Financial Resources: Net Capital Outflow

1. Definition of **net capital outflow (NCO): the purchase of foreign assets by domestic residents minus the purchase of domestic assets by foreigners**.

NCO = purchases of foreign assets by domestic residents − purchases of domestic assets by foreigners

You will likely have to write this equation several times on the board for students when discussing this chapter and the next. Students can grasp the concept of net exports more easily than they can grasp the concept of net capital outflow.

2. The flow of capital abroad takes two forms.

   a. Foreign direct investment occurs when a capital investment is owned and operated by a foreign entity.

   b. Foreign portfolio investment involves an investment that is financed with foreign money but operated by domestic residents.

3. Net capital outflow can be positive or negative.

   a. When net capital outflow is positive, domestic residents are buying more foreign assets than foreigners are buying domestic assets. Capital is flowing out of the country.

   b. When net capital outflow is negative, domestic residents are buying fewer foreign assets than foreigners are buying domestic assets. The country is experiencing a capital inflow.

4. There are several factors that influence a country's net capital outflow:

   a. The real interest rates being paid on foreign assets.

   b. The real interest rates being paid on domestic assets.

   c. The perceived economic and political risks of holding assets abroad.

   d. The government policies that affect foreign ownership of domestic assets.

C. The Equality of Net Exports and Net Capital Outflow

1. Net exports and net capital outflow each measure a type of imbalance in a world market.

   a. Net exports measure the imbalance between a country's exports and imports in world markets for goods and services.

   b. Net capital outflow measures the imbalance between the amount of foreign assets bought by domestic residents and the amount of domestic assets bought by foreigners in world financial markets.

2. For an economy, net exports must be equal to net capital outflow.

3. Example: You are a computer programmer who sells some software to a Japanese consumer for 10,000 yen.

a. The sale is an export for the United States so net exports increases.

b. There are several things you could do with the 10,000 yen

c. You could hold the yen (which is a Japanese asset) or use it to purchase another Japanese asset. Either way, net capital outflow rises.

d. Alternatively, you could use the yen to purchase a Japanese good. Thus, imports will rise so the net effect on net exports will be zero.

e. One final possibility is that you could exchange the yen for dollars at a bank. This does not change the situation though, because the bank then must use the yen for something.

ALTERNATIVE CLASSROOM EXAMPLE:
Assume that U.S. residents do not want to buy any foreign assets, but foreign residents want to purchase some stock in a U.S. firm (such as Microsoft).

How are the foreigners going to get the dollars to purchase the stock?

They would do it the same way U.S. residents would purchase the stock—they would have to earn more than they spend. In other words, foreigners must sell the United States more goods and services than they purchase from the United States.

This leads to negative net exports for the United States. The extra dollars spent by U.S. residents on foreign-produced goods and services would be used to purchase the stock in Microsoft.

4. This example can be generalized to the economy as a whole.

   a. When a nation is running a trade surplus (NX > 0), it must be using the foreign currency to purchase foreign assets. Thus, capital is flowing out of the country (NCO > 0).

   b. When a nation is running a trade deficit (NX < 0), it must be financing the net purchase of these goods by selling assets abroad. Thus, capital is flowing into the country (NCO < 0).

5. Every international transaction involves exchange. When a seller country transfers a good or service to a buyer country, the buyer country gives up some asset to pay for the good or service.

6. Thus, the net value of the goods and services sold by a country (net exports) must equal the net value of the assets acquired (net capital outflow).

D. Saving, Investment, and Their Relationship to the International Flows

1. Recall that GDP (Y) is the sum of four components: consumption (C), investment (I), government purchases (G) and net exports (NX).

$$Y = C + I + G + NX$$

2. Recall that national saving is equal to the income of the nation after paying for current consumption and government purchases.

$$S = Y - C - G$$

3. We can rearrange the equation for GDP to get:

$$Y - C - G = I + NX$$

Substituting for the left-hand side, we get:

$$S = I + NX$$

4. Because net exports and net capital outflow are equal, we can rewrite this as:

$$S = I + NCO$$

5. This implies that saving is equal to the sum of domestic investment (I) and net capital outflow (*NCO*).

6. When an American citizen saves $1 of his income, that dollar can be used to finance accumulation of domestic capital or it can be used to finance the purchase of capital abroad.

7. Note that, in a closed economy such as the one we assumed earlier, net capital outflow would equal zero and saving would simply be equal to domestic investment.

E. Summing Up

1. Table 1 describes three possible outcomes for an open economy: a country with a trade deficit, a country with balanced trade, or a country with a trade surplus.

Table 1

2. *Case Study: Is the U.S. Trade Deficit a National Problem?*

Figure 2

a. Panel (a) of Figure 2 shows national saving and domestic investment for the United States as a percentage of GDP since 1960.

b. Panel (b) of Figure 2 shows net capital outflow for the United States as a percentage of GDP for the same time period.

c. Before 1980, domestic investment and national saving were very close, meaning that net capital outflow was small.

d. National saving fell after 1980 (in part due to large government budget deficits) but domestic investment did not change by as much. This led to a dramatic increase in the size of net capital outflow (in absolute value because it was negative).

e. From 1991 to 2000, the capital flow into the United States also increased as investment went from 13.4% to 17.7% of GDP.

f. From 2000 to 2006, the capital flow into the United States increased further, reaching a record 5.7% of GDP.

g. Since 2006, this trend has reversed with a dramatic drop in investment during the economic downturn.

h. When national saving falls, either investment will have to fall or net capital outflow will have to fall.

i. On the other hand, a trade deficit led by an increase in investment will not pose a large problem for the United States if the increased investment leads to a higher production of goods and services.

III. The Prices for International Transactions: Real and Nominal Exchange Rates

Students are curious about the currencies of other countries. Bring in a current list of nominal exchange rates between several currencies and the U.S. dollar. Quiz the students to see if they can match up the currencies with the countries where they are used. Encourage students to bring in foreign currencies if they have them.

A. Nominal Exchange Rates

1. Definition of **nominal exchange rate: the rate at which a person can trade the currency of one country for the currency of another**.

2. An exchange rate can be expressed in two ways.

   a. Example: 80 yen per dollar.

   b. This can also be written as 1/80 dollar (or 0.0125 dollar) per yen.

ALTERNATIVE CLASSROOM EXAMPLE:

$1 = 10 pesos

1 peso = $0.10

3. Definition of **appreciation: an increase in the value of a currency as measured by the amount of foreign currency it can buy**.

4. Definition of **depreciation: a decrease in the value of a currency as measured by the amount of foreign currency it can buy**.

5. When a currency appreciates, it is said to *strengthen;* when a currency depreciates, it is said to *weaken*.

6. When economists study nominal exchange rates, they often use an exchange rate index, which converts the many nominal exchange rates into a single measure.

7. *FYI: The Euro*

a. During the 1990s, many European nations decided to give up their national currencies and use a new common currency called the *euro*.

b. The euro started circulating on January 1, 2002.

c. Monetary policy is now set by the European Central Bank (ECB), which controls the supply of euros in the economy.

d. Benefits of a common currency include easier trading ability and increased unity.

e. However, because there is only one currency, there can be only one monetary policy.

f. In 2010, worries about having a common currency came to the forefront when Greece faced a possible default of its government debt.

Make sure that you emphasize that when the dollar appreciates against a particular currency that currency must depreciate against the dollar. Use an example to illustrate this point.

***Seinfeld, "The Checks."* (Season 8, 11:44-12:33).** Kramer ends up hosting a group of Japanese tourists, saying, "Manhattan can be quite pricey, even with 50,000 yen." To which Elaine says, "50,000 yen—isn't that only a few hundred dollars?" "Evidently," Kramer replies. This illustrates the nominal exchange rate (50,000 yen for a few hundred dollars) and points to the idea of the real exchange rate (in terms of purchasing power, 50,000 yen doesn't purchase many visiting days in Manhattan).

B. Real Exchange Rates

1. Definition of **real exchange rate: the rate at which a person can trade the goods and services of one country for the goods and services of another**.

2. Example: A bushel of American rice sells for $100 and a bushel of Japanese rice sells for 16,000 yen. The nominal exchange rate is 80 yen per dollar.

3. The real exchange rate depends on the nominal exchange rate and on the prices of goods in the two countries measured in the local currencies.

$$\text{real exchange rate} = \frac{\text{Nominal exchange rate} \times \text{Domestic price}}{\text{Foreign price}}$$

4. In our example:

$$\text{real exchange rate} = \frac{(80 \text{ yen per dollar})(\$100 \text{ per bushel of American rice})}{16{,}000 \text{ yen per bushel of Japanese rice}}$$

$$\text{real exchange rate} = \frac{8{,}000 \text{ yen per bushel of American rice}}{16{,}000 \text{ yen per bushel of Japanese rice}}$$

real exchange rate = 1/2 bushel of Japanese rice per bushel of American rice

ALTERNATIVE CLASSROOM EXAMPLE:
Price of Mexican corn = 50 pesos/bushel
Price of American corn = $10/bushel
Nominal exchange rate: $1 = 12 pesos

$$\text{real exchange rate} = \frac{(12 \text{ pesos per dollar})(\$10 \text{ per bushel of American corn})}{50 \text{ pesos per bushel of Mexican corn}}$$

$$\text{real exchange rate} = \frac{120 \text{ pesos per bushel of American corn}}{50 \text{ pesos per bushel of Mexican corn}}$$

real exchange rate = 2.4 bushels of Mexican corn per bushel of American corn

5. The real exchange rate is a key determinant of how much a country exports and imports.

6. When studying an economy as a whole, macroeconomists focus on overall prices instead of the prices of individual goods and services.

   a. Price indexes are used to measure the level of overall prices.

   b. Assume that *P* is the price index for the United States, *P** is a price index for prices abroad, and *e* is the nominal exchange rate between the U.S. dollar and foreign currencies.

$$\text{real exchange rate} = \frac{e \times P}{P^*}$$

7. The real exchange rate measures the price of a basket of goods and services available domestically relative to the price of a basket of goods and services available abroad.

8. A depreciation in the U.S. real exchange rate means that U.S. goods have become cheaper relative to foreign goods. U.S. exports will rise, imports will fall, and net exports will increase.

9. Likewise, an appreciation in the U.S. real exchange rate means that U.S. goods have become more expensive relative to foreign goods. U.S. exports will fall, imports will rise, and net exports will decline.

IV. A First Theory of Exchange-Rate Determination: Purchasing-Power Parity

A. Definition of **purchasing-power parity: a theory of exchange rates whereby a unit of any given currency should be able to buy the same quantity of goods in all countries**.

B. The Basic Logic of Purchasing-Power Parity

1. The law of one price suggests that a good must sell for the same price in all locations.

   a. If a good sold for less in one location than another, a person could make a profit by buying the good in the location where it is cheaper and selling it in the location where it is more expensive.

b. The process of taking advantage of differences in prices for the same item in different markets is called *arbitrage*.

c. Note what will happen as people take advantage of the differences in prices. The price in the location where the good is cheaper will rise (because the demand is now higher) and the price in the location where the good was more expensive will fall (because the supply is greater). This will continue until the two prices are equal.

2. The same logic should apply to currency.

a. A U.S. dollar should buy the same quantity of goods and services in the United States and Japan; a Japanese yen should buy the same quantity of goods and services in the United States and Japan.

b. Purchasing-power parity suggests that a unit of all currencies must have the same real value in every country.

c. If this was not the case, people would take advantage of the profit-making opportunity and this arbitrage would then push the real values of the currencies to equality.

Activity 1—A Profitable Opportunity

Type: In-class assignment
Topics: Exchange rates, arbitrage
Materials needed: None
Time: 20 minutes
Class limitations: Works in any size class

Purpose
This assignment lets the students practice calculating prices with exchange rates and looking for profit opportunities.

Instructions
Explain the following: Molson's Beer is produced in Canada and sold in many countries. In the province of Ontario, a six-pack of Molson's beer sells for $12.95 Canadian. Across the border in Michigan, a six pack of the same beer sells for $6.99 U.S. Suppose that the exchange rate is $0.90 U.S. = $1.00 Canadian.

Ask the class to make the following calculations:
1. How much would it cost in U.S. currency to buy the beer in Ontario?
2. How much would it cost in Canadian currency to buy the beer in Michigan?
3. Is there an arbitrage opportunity?
4. If there is an arbitrage opportunity, where would you buy and where would you sell? How much profit could you expect on a six-pack?

Common Answers and Points for Discussion
1. How much would it cost in U.S. currency to buy the beer in Ontario?
   $12.95 × 0.90 = $11.66 U.S.
2. How much would it cost in Canadian currency to buy the beer in Michigan?
   $6.99/0.90 = $7.77 Canadian

3. Is there an arbitrage opportunity?
   Yes. A price differential exists. The beer is more expensive in Canada, cheaper in the United States.
4. If there is an arbitrage opportunity, where would you buy and where would you sell? How much profit could you expect on a six-pack?
   Buy in Michigan, sell in Ontario. The profit per six-pack would be the difference between the price in Ontario, $11.66, and the price in Michigan, $6.99, which equals $4.67 U.S. (Or, measured in Canadian currency, a profit of $5.19 Canadian.)

C. Implications of Purchasing-Power Parity

1. Purchasing-power parity means that the nominal exchange rate between the currencies of two countries will depend on the price levels in those countries.

2. If a dollar buys the same amount of goods and services in the United States (where prices are measured in dollars) as it does in Japan (where prices are measured in yen), then the nominal exchange rate (the number of yen per dollar) must reflect the prices of goods and services in the two countries.

3. Suppose that P is the price of a basket of goods in the United States (measured in dollars), P^* is the price of a basket of goods in Japan (measured in yen), and e is the nominal exchange rate (the number of yen each dollar can buy).

   a. In the United States, the purchasing power of $1 is $1/P$.

   b. In Japan, $1 can be exchanged for e units of yen, which in turn have the purchasing power of e/P^*.

   c. Purchasing-power parity implies that the two must be equal:

   $$1/P = e/P^*$$

   d. Rearranging, we get:

   $$1 = (eP)/P^*$$

   Note that the left-hand side is a constant and the right-hand side is the real exchange rate. This implies that if the purchasing power of a dollar is always the same at home and abroad, then the real exchange rate cannot change.

   e. We can rearrange again to see that:

   $$e = P/P^*$$

   This implies that the nominal exchange rate is determined by the ratio of the foreign price level to the domestic price level. Nominal exchange rates will change when price levels change.

4. Because the nominal exchange rate depends on the price levels, it must also depend on the money supply and money demand in each country.

a. If the central bank increases the supply of money in a country and raises the price level, it also causes the country's currency to depreciate relative to other currencies in the world.

b. When a central bank prints large quantities of money, that money loses value both in terms of the goods and services it can buy and in terms of the amount of other currencies it can buy.

5. *Case Study: The Nominal Exchange Rate during a Hyperinflation*

Figure 3

a. Figure 3 shows the German money supply, the German price level, and the nominal exchange rate (measured as U.S. cents per German mark) during Germany's hyperinflation in the early 1920s.

b. When the supply of money begins growing, the price level also increases and the German mark depreciates.

D. Limitations of Purchasing-Power Parity

1. Exchange rates do not always move to ensure that a dollar has the same real value in all countries all of the time.

2. There are two reasons why the theory of purchasing-power parity does not always hold in practice.

a. Many goods are not easily traded (haircuts in Paris versus haircuts in New York). Thus, arbitrage would be too limited to eliminate the difference in prices between the locations.

b. Tradable goods are not always perfect substitutes when they are produced in different countries (American cars versus German cars). There is no opportunity for arbitrage here, because the price difference reflects the different values the consumer places on the two products.

3. *Case Study: The Hamburger Standard*

a. *The Economist*, an international news magazine, occasionally compares the cost of a Big Mac in various countries all around the world.

b. Once we have the prices of Big Macs in two countries, we can compute the nominal exchange rate predicted by the theory of purchasing-power parity and compare it with the actual exchange rate.

c. In an article from July 2009, it was shown that the exchange rates predicted by the theory were not exactly equal to the actual rates. However, the predicted rates were fairly close to the actual rates.

Students who have lived or traveled overseas will often point out that many American products (such as blue jeans) are much more expensive overseas than they are in the United States. Point out to students that this could be the result of trade restrictions or price discrimination. Examine the implications of each.

Point out to students that, even with its flaws, purchasing-power parity does tell us about exchange rates. Large and persistent movements in nominal exchange rates typically reflect changes in price level at home and abroad.

SOLUTIONS TO TEXT PROBLEMS:

Quick Quizzes

1. Net exports are the value of a nation's exports minus the value of its imports, also called the trade balance. Net capital outflow is the purchase of foreign assets by domestic residents minus the purchase of domestic assets by foreigners. Net exports equal net capital outflow.

2. The nominal exchange rate is the rate at which a person can trade the currency of one country for the currency of another. The real exchange rate is the rate at which a person can trade the goods and services of one country for the goods and services of another. They are related through the expression: real exchange rate equals nominal exchange rate times domestic price divided by foreign price.

   If the nominal exchange rate goes from 100 to 120 yen per dollar, the dollar has appreciated because a dollar now buys more yen.

3. Because Mexico has had high inflation and Japan has had low inflation, the number of Mexican pesos a person can buy with Japanese yen has increased.

Questions for Review

1. The net exports of a country are the value of its exports minus the value of its imports. Net capital outflow refers to the purchase of foreign assets by domestic residents minus the purchase of domestic assets by foreigners. Net exports are equal to net capital outflow by an accounting identity, because exports from one country to another are matched by payments of some asset from the second country to the first.

2. Saving equals domestic investment plus net capital outflow, because any dollar saved can be used to finance accumulation of domestic capital or it can be used to finance the purchase of capital abroad.

3. If a dollar can buy 100 yen, the nominal exchange rate is 100 yen per dollar. The real exchange rate equals the nominal exchange rate times the domestic price divided by the foreign price, which equals 100 yen per dollar times $10,000 per American car divided by 500,000 yen per Japanese car, which equals two Japanese cars per American car.

4. The economic logic behind the theory of purchasing-power parity is that a good must sell for the same price in all locations. Otherwise, people would profit by engaging in arbitrage.

5. If the Fed started printing large quantities of U.S. dollars, the U.S. price level would increase, and a dollar would buy fewer Japanese yen.

Problems and Applications

1. a. When an American art professor spends the summer touring museums in Europe, he spends money buying foreign goods and services, so U.S. exports are unchanged, imports increase, and net exports decrease.

   b. When students in Paris flock to see the latest movie from Hollywood, foreigners are buying a U.S. good, so U.S. exports rise, imports are unchanged, and net exports increase.

   c. When your uncle buys a new Volvo, an American is buying a foreign good, so U.S. exports are unchanged, imports rise, and net exports decline.

   d. When the student bookstore at Oxford University sells a pair of Levi's 501 jeans, foreigners are buying U.S. goods, so U.S. exports increase, imports are unchanged, and net exports increase.

   e. When a Canadian citizen shops in northern Vermont to avoid Canadian sales taxes, a foreigner is buying U.S. goods, so U.S. exports increase, imports are unchanged, and net exports increase.

2. a. When an American buys a Sony TV, there is a decrease in net exports.

   b. When an American buys a share of Sony stock, there is an increase in net capital outflow.

   c. When the Sony pension fund buys a U.S. Treasury bond, there is a decrease in net capital outflow.

   d. When a worker at Sony buys some Georgia peaches from an American farmer, there is an increase in net exports.

3. Foreign direct investment requires actively managing an investment, for example, by opening a retail store in a foreign country. Foreign portfolio investment is passive, for example, buying corporate stock in a retail chain in a foreign country. As a result, a corporation is more likely to engage in foreign direct investment, while an individual investor is more likely to engage in foreign portfolio investment.

4. a. When an American cellular phone company establishes an office in the Czech Republic, U.S. net capital outflow increases, because the U.S. company makes a direct investment in capital in the foreign country.

   b. When Harrod's of London sells stock to the General Electric pension fund, U.S. net capital outflow increases, because the U.S. company makes a portfolio investment in the foreign country.

   c. When Honda expands its factory in Marysville, Ohio, U.S. net capital outflow declines, because the foreign company makes a direct investment in capital in the United States.

   d. When a Fidelity mutual fund sells its Volkswagen stock to a French investor, U.S. net capital outflow declines (if the French investor pays in U.S. dollars), because the U.S. company is reducing its portfolio investment in a foreign country.

5. a. The newspaper shows nominal exchange rates, because it shows the number of units of one currency that can be exchanged for another currency.

   b. Many answers are possible. In October 2010, the nominal exchange rate between the U.S. dollar and the Canadian dollar was 1 U.S. dollar = 1.0133 Canadian dollars. The nominal exchange rate between the U.S. dollar and the Japanese yen was 1 U.S. dollar = 82 yen. Therefore, the exchange rate between the Canadian dollar and the Japanese yen should be 1.0133 Canadian dollars = 82 yen. This implies that 1 Canadian dollar = 82/1.10133 yen = 80.92 yen.

   c. If U.S. inflation exceeds Japanese inflation over the next year, you would expect the dollar to depreciate relative to the Japanese yen because a dollar would decline in value (in terms of the goods and services it can buy) more than the yen would.

6. a. Dutch pension funds holding U.S. government bonds would be happy if the U.S. dollar appreciated. They would then get more Dutch guilders for each dollar they earned on their U.S. investment. In general, if you have an investment in a foreign country, you are better off if that country's currency appreciates.

   b. U.S. manufacturing industries would be unhappy if the U.S. dollar appreciated because their prices would be higher in terms of foreign currencies, which will reduce their sales.

   c. Australian tourists planning a trip to the United States would be unhappy if the U.S. dollar appreciated because they would get fewer U.S. dollars for each Australian dollar, so their vacation will be more expensive.

   d. An American firm trying to purchase property overseas would be happy if the U.S. dollar appreciated because it would get more units of the foreign currency and could thus buy more property.

7. All the parts of this question can be answered by keeping in mind the definition of the real exchange rate. The real exchange rate equals the nominal exchange rate times the domestic price level divided by the foreign price level.

   a. If the U.S. nominal exchange rate is unchanged, but prices rise faster in the United States than abroad, the real exchange rate rises.

   b. If the U.S. nominal exchange rate is unchanged, but prices rise faster abroad than in the United States, the real exchange rate declines.

   c. If the U.S. nominal exchange rate declines and prices are unchanged in the United States and abroad, the real exchange rate declines.

   d. If the U.S. nominal exchange rate declines and prices rise faster abroad than in the United States, the real exchange rate declines.

8. If purchasing-power parity holds, then 12 pesos per soda divided by $0.75 per soda equals the exchange rate of 16 pesos per dollar. If prices in Mexico doubled, the exchange rate will double to 32 pesos per dollar.

9. a. To make a profit, you would want to buy rice where it is cheap and sell it where it is expensive. Because American rice costs 100 dollars per bushel, and the exchange rate is 80 yen per dollar, American rice costs 100 × 80 equals 8,000 yen per bushel. So

American rice at 8,000 yen per bushel is cheaper than Japanese rice at 16,000 yen per bushel. So you could take 8,000 yen, exchange them for 100 dollars, buy a bushel of American rice, then sell it in Japan for 16,000 yen, making a profit of 8,000 yen. As people did this, the demand for American rice would rise, increasing the price in America, and the supply of Japanese rice would rise, reducing the price in Japan. The process would continue until the prices in the two countries were the same.

b. If rice were the only commodity in the world, the real exchange rate between the United States and Japan would start out too low, then rise as people bought rice in America and sold it in Japan, until the real exchange became one in long-run equilibrium.

10. If you take *X* units of foreign currency per Big Mac divided by 3.57 dollars per Big Mac, you get *X*/3.57 units of the foreign currency per dollar; that is the predicted exchange rate.

    a. Chile: 1,750 pesos/3.57 = 490 pesos/$
    Hungary: 720 forints/3.57 = 202 forints/$
    Czech Republic: 67.9 korunas/3.57 = 19 korunas/$
    Brazil: 8.03 reales/3.57 = 2.25 reales/$
    Canada: 3.89C$/3.57 = 1.09C$/$

    b. Under purchasing-power parity, the exchange rate of the Hungarian forint to the Canadian dollar is 720 forints per Big Mac divided by 3.89 Canadian dollars per Big Mac equals 185 forints per Canadian dollar. The actual exchange rate is 199 forints per dollar divided by 1.16 Canadian dollars per dollar equals 172 forints per Canadian dollar.

    c. The exchange rate predicted by the Big Mac index (185 forints per Canadian dollar) is somewhat close to the actual exchange rate of 172 forints per Canadian dollar.

11. a. The exchange rate is 1 Ecterian dollar is equal to 3 Wiknamian pesos.

    b. In Ecteria, the price of Spam would double. The price level will quadruple in Wiknam. The exchange rate between the two countries' currencies would double because of the differences in inflation rates.

    c. Wiknam will have a higher nominal interest rate because of the Fisher effect.

    d. The get-rich scheme would only work if there were a difference in real interest rates, not nominal interest rates. The nominal exchange rate between the two countries will adjust for the effects of inflation.