

Chapter 17 International Investment Decisions

Chapter Overview

What is the financial impact that firms experience when they create products and services in one country and sell in another? The *What Companies Do* opening feature discusses the change in the policies surrounding the trading of the Chinese yuan. This would allow more movement in the yuan than ever before. During the year following the relaxing of the trade conditions, the yuan rose more than 2.5%. During this time, McDonald's become the first non-financial intermediary to issue bonds denominated in yuan. Is the rising yuan good for business? This chapter discusses the financial issues facing international firms.

What Companies Do Discussion Questions:

1. Who is helped and hurt by a falling domestic currency rate? Think of the position of manufacturers who sell their goods abroad. What about domestic manufacturers who import materials needed for production from abroad? What about consumers at home and abroad? What about tourists at home and abroad?
2. How could McDonald's reduce its currency risk?

This chapter looks at:

- 17-1. Exchange Rate Fundamentals
- 17-2. Long-term Investment Decisions

Technology

1. **Smart Video.** Ike Mathur of the University of Southern Illinois at Carbondale, looks at international capital budgeting projects and the advantages of being a first mover.
2. **Smart Video.** Beth Acton, vice president and treasurer of Ford Motor Co., looks at hedging Ford's currency risk. The firm is not in the business of speculating on currency fluctuations but instead wishes to reduce its risk.
3. **Smart Solutions** provides a step-by-step solution to Problem 17-7, illustrating arbitrage profits because of differences in exchange rate.

After studying this chapter you should be able to:

- describe the difference between fixed and floating exchange rates, and interpret exchange rate quotes taken from the Web or financial newspapers
- revise the NPV decision rule for capital budgeting analysis to incorporate the added complexity that arises when an investment is undertaken in a foreign currency.

Lecture Guide

This chapter is important in corporate finance because just about every company has some international dealings. A company may obtain some of its revenues abroad, or it may have production facilities abroad. Even a company that has all of its production and sales in Australia may be impacted by exchange rate changes. For example, if the dollar strengthens, then foreign purchases become more attractive, potentially making domestic purchases less attractive to consumers.

Forwards and futures have been used for a long time. Forwards were used by Flemish traders in the 12th century, while futures and options date back to the Amsterdam stock exchange in the 17th century.

Futures were also used in the Osaka rice market in the late 17th century. Organised commodity exchanges were set up in Chicago and New York in the middle of the 19th century.

Figure 17.1 Average Monthly Yuan Exchange Rates Against the US Dollar and Australian Dollar (June 2010 to December 2010)

17-1 Exchange Rate Fundamentals

17-1a Fixed versus Floating Exchange Rates

Most countries have floating foreign exchange rates, in which the domestic currency value moves up (appreciates) or moves down (depreciates) relative to other countries' currencies. Some countries peg their currencies to the US dollar, with their local currencies appreciating when the US dollar appreciates and vice versa.

There have been a number of innovations in this area in the past few decades. In the early 1970s, for example, the abandonment of the gold standard and the move to floating rather than fixed exchange rates led to wide fluctuations in exchange rates – and a much greater need for foreign exchange futures.

Table 17.1 Global Foreign Exchange Market Share by Currency

17-1b Exchange Rate Quotes

This section illustrates exchange rate quote terminology. Currencies can be quoted as units of foreign currency per dollar or dollars per unit of foreign currency.

Table 17.2 Australian Dollar Exchange Rates: Reserve Bank Snapshot for Thursday, 11 October 2012

Table 17-3 Exchange Rates: New York Closing Snapshot for Thursday

Currencies trade at discounts or premiums, relative to another currency. This reflects whether currencies are expected to depreciate or appreciate in the future.

If markets were perfectly efficient, there would be no arbitrage opportunities – no opportunities for traders to make profits exchanging one currency for another. If markets are not perfect and information is not fully incorporated into exchange rates, then there is the potential for arbitrage profits.

Figure 17.2 Triangular Arbitrage

17-1c The Foreign Exchange Market

The foreign exchange market is not a physical presence market but a global telecommunications market. With a total volume of more than \$4 trillion a day, and locations all over the world, this market is a continuously changing. This section discusses the major players in the forex market: (1) exporters and importers, (2) investors, (3) hedgers, (4) speculators, (5) dealers, and at times, (6) governments.

Figure 17.3 Global Foreign Exchange Turnover by Counterparty

17-d Natural Exchange Rate Risk Hedges

This section explains how businesses can use their choice of assets and liabilities, or match revenues and expenses, to form natural hedges to currency exposure.

Figure 17.4 Bonds Issues by Australian Companies (US \$ million Outstanding by Quarter)

Table 17.4 Keybridge Capital Ltd's Currency Exposures as at 31 December 2011

17-2 Long-Term Investment Decisions

17-2a Capital Budgeting

While an international company evaluates capital budgeting projects as usual – by developing a set of relevant cash flows and discounting those cash flows at an appropriate required rate of return – international projects present additional difficulties for the firm's analysis. Note that a company needs to be consistent – it should evaluate foreign cash flows with a foreign discount rate or translate the foreign cash flows to the domestic currency and then discount the flows with a domestic cost of capital. The following shows several methods for calculating cash flows in international terms:

- Compute NPV in foreign currency:
 - This is a numerical illustration of computing the value of a capital budgeting project by computing the value in the foreign currency, using a foreign discount rate and then converting the foreign currency to dollars.
- Compute NPV in forward contracts:
 - Here, each cash flow is converted into dollars and then NPV is found using a US discount rate. Each approach provides the same answer to the capital budgeting problem.

17-2b Cost of Capital

It is appropriate to take international considerations into account when computing discount rates. Note that the foreign market is probably not perfectly positively correlated with the domestic market. This means there may be advantages to diversifying with international investments.

International Investment Decisions summary

Truly everyone needs to be concerned with international financial management. It is difficult to make daily purchases that don't involve multinational corporations, foreign corporations, or domestic corporations with foreign customers or suppliers.

Chapter 17 Resource Articles

'Europe's Tender Equity Culture,' *Wall Street Journal*, 18 September 2002. This article notes that as stock prices decline, Europe is retreating from a market-focused model. Privatisation projects are on hold, and efficiency-driven consolidation has faltered.

'A Capital Idea,' *Wall Street Journal*, 14 October 2002. The European Union hopes to make its financial markets more efficient. This looks at recent rules passed to help European markets become better able to challenge US markets.

'European Debt Woes, Fed's Dour Outlook A Toxic Brew for the Market,' *Forbes*, 22 September 2011. This article discusses the global ramifications of the debt problems in Europe and how it is affecting investing in the US and other countries.

Answers to Concept Review Questions

1. A rise in the euro makes French wine more expensive to Australian consumers, but it would make Australian gold imports cheaper for the German firm.
2. An increase in real UK interest rates should attract investors to the UK and push up the value of the pound.
3. If someone says, 'The exchange rate between dollars and pounds increased today,' you cannot determine which currency appreciated and which depreciated unless you know how the currency was quoted (e.g., dollars per pound or pounds per dollar).

4. The spot rate is the exchange rate for an immediate trade, and the forward rate is the exchange rate that applies to a trade that will occur later. A trader expecting to transact in one month might prefer to enter a forward contract to lock in a known exchange rate rather than taking the risk that the exchange rate might move in an adverse way.
5. Discounting the cash flows of a foreign investment using the foreign cost of capital, then converting that to the home currency at the spot rate, yields the same *NPV* as converting the project's cash flows to domestic currency at the forward rate and then discounting them at the domestic cost of capital. These two methods essentially yield the same result because interest rate parity holds. Recall that IRP says that the interest rate, expressed in a common currency, is the same on similar investments in different countries. In this context, we are talking about one investment project with one particular risk profile, and whether we express that investment's cash flows in dollars and discount using a dollar interest rate, or whether we express cash flows in foreign currency and discount at a foreign interest rate doesn't matter.
6. It is not surprising to find that the risk premium on the world market portfolio is lower than the domestic risk premium, because the world market portfolio is a broader portfolio than the domestic market portfolio. This means that it is more diversified and has less systematic risk, so its risk premium should be lower.

Solutions to Self-Test Problems

ST17-1. Use Table 17.3 to determine whether the British pound trades at a forward discount or a forward premium relative to the Japanese yen. Use the 6-month forward rate in your calculations.

A: To calculate the spot and forward exchange rates between pounds and yen, we must take the ratio of the exchange rate of each currency relative to the dollar.

$$\text{Spot rate} = \frac{\text{US\$1.6092} / \text{£}}{\text{US\$0.012007} / \text{¥}} = \text{¥134.0218} / \text{£}$$

$$\text{Fwd rate} = \frac{\text{US\$1.6053} / \text{£}}{\text{US\$0.01203} / \text{¥}} = \text{¥133.4414} / \text{£}$$

This calculation shows that one pound buys fewer yen on the forward market than on the spot market, so the pound trades at a forward discount and the yen trades at a forward premium.

ST17-2. Suppose the spot exchange rate equals ¥100/\$ and the six-month forward rate equals ¥101/\$. An investor can purchase a Treasury bill that matures in six months and earns an annual rate of return of 3%. What would be the annual return on a similar Japanese investment?

A: In order for the Interest Rate Parity to hold, we get:

$$\begin{aligned} 101/100 &= (1+x)/1.015 \\ x &= 0.0252 \end{aligned}$$

Therefore, the annualised return on Japanese investment will be $2 \times 0.0252 = 5.03\%$

Answers to End-of-Chapter Questions

- Q17-1.** Define a multinational corporation (MNC). What additional factors must be considered by the manager of an MNC that a manager of a purely domestic firm is not forced to face?
- A17-1.** An MNC is a large corporation that does business in many different countries. Managers of MNCs have to worry about many factors, including the risks associated with foreign exchange movements.
- Q17-2.** Who are the major players in foreign currency markets, and what are their motivations for trading?
- A17-2.** Exporters and importers enter the FX markets to execute transactions that arise from ordinary operations. Investors enter the markets to buy and sell foreign assets. Hedgers enter the markets to eliminate or reduce their exposure to FX movements. Speculators enter the markets to make a profit on currency swings. Governments enter the market to stabilise their currencies. Dealers facilitate the trading of other parties.
- Q17-3.** Suppose that an exchange rate is quoted in terms of euros per pound. In what direction would this rate move if the euro appreciated against the pound?
- A17-3.** It would get smaller.
- Q17-4.** Explain how triangular arbitrage ensures that currency values are essentially the same in different markets around the world at any given moment.
- A17-4.** If exchange rate quotes in different markets are not consistent with each other, the traders can buy a currency in the market where its price is low and sell it in the market where the price is high, making a profit and helping the market move back toward equilibrium.
- Q17-5.** In what sense is it a misnomer to refer to a currency as weak or strong? Who benefits and who loses if the yen appreciates against the pound?
- A17-5.** Currency movements benefit some and harm others. If the yen appreciates against the pound, Japanese businesses and consumers who import from the UK benefit, but exporters from Japan are harmed.
- Q17-6.** What does a spot exchange rate have in common with a forward rate, and how are they different?
- A17-6.** Both are simply prices of one currency in terms of another, but the spot rate applies to immediate transactions whereas the forward rate applies to transactions that will take place in the future.
- Q17-7.** What does it mean to say that a currency trades at a forward premium?
- A17-7.** A forward premium means the currency buys more of another currency on the forward market than it does on the spot market.
- Q17-8.** In terms of risk, is an Australian investor indifferent about whether to buy an Australian government bond or a British government bond? Why or why not?

- A17-8.** The British bond is riskier for the Australian investor due to currency risk. However, if the British trader can cover the FX exposure with a forward contract, then the instruments are equivalent in terms of risk.
- Q17-9.** If the euro trades at a forward premium against the yen, explain why interest rates in Japan would have to be higher than they are in Europe.
- A17-9.** If the euro trades at a forward premium, then a European investor who sends money to Japan to invest will experience a currency loss when they convert their money back into euros at the forward rate. To compensate for this loss, interest rates in Japan have to be higher.
- Q17-10.** Interest rates on risk-free bonds in the United States are about 2%, whereas interest rates on Swiss government bonds are 6%. Can we conclude that investors around the world will flock to buy Swiss bonds? Why or why not?
- A17-10.** The Swiss rate is not necessarily a better deal. You have to look at the forward discount/premium between the dollar and the Swiss franc to decide which one is the better investment.
- Q17-11.** A Japanese investor decides to purchase shares in a company that trades on the London Stock Exchange. The investor's plan is to hold these shares for one year, selling them and converting the proceeds to yen at year's end. During the year, the pound appreciates against the yen. Does this enhance or diminish the investor's return on the shares?
- A17-11.** It enhances the Japanese investor's return.

Solutions to End-of-Chapter Problems

Exchange Rate Fundamentals

- P17-1.** One month ago, the Mexican peso (Ps)–US dollar exchange rate was Ps9.0395/\$ (\$0.1106/Ps). This month, the exchange rate is Ps9.4805/\$ (\$0.1055/Ps). State which currency appreciated and which depreciated over the last month, and then calculate both the percentage appreciation of the currency that rose in value and the percentage depreciation of the currency that declined in value.
- A17-1.** The dollar appreciates because it buys more pesos today than it did a month ago. The percentage increase in the value of one dollar is $(9.4805 - 9.0395)/9.0395 = 4.88\%$ in one month. The percentage decrease in the value of one peso is $(0.1055 - 0.1106)/0.1106 = -4.6\%$ for one month.
- P17-2.** Using the data presented in Table 17.3, calculate the spot exchange rate on Wednesday between Canadian dollars and British pounds (in pounds per Canadian dollar).
- A17-2.** If we divide \$1.0062/C\$ by \$1.6104/£, we obtain £0.6248/C\$.
- P17-3.** On Thursday the exchange rate between the Canadian dollar and Japanese yen was C\$0.0098/¥, and on Friday the exchange rate was C\$0.0099/¥. Which currency appreciated and which currency depreciated?
- A17-3.** The yen appreciated while the Canadian dollar depreciated.

P17-4. Recently a financial newspaper reported the following spot and forward rates for the Japanese yen (¥)

Spot:	\$0.007556/¥ (¥132.34/\$)
1-month:	\$0.007568/¥ (¥132.14/\$)
3-month:	\$0.007593/¥ (¥131.71/\$)

Supply the forward yen premium or discount (specify which it is) for both the one- and three-month quotes as an annual percentage rate.

A17-4. The dollar trades at a discount and the yen trades at a premium. The annualised premium on the yen given the one-month forward contract is $(0.007568 - 0.007556)/0.007556 \times 12 = 1.91\%$. The annualised premium given the three-month forward rate is $(0.007593 - 0.007556)/0.007556 \times 4 = 1.96\%$.

P17-5. Using the data presented in Table 17.3, specify whether the US dollar trades at a forward premium or discount relative to the Canadian dollar, the Japanese yen, and the Swiss franc. Use the three-month forward rates to determine the answer.

A17-5. The dollar buys fewer units of Japanese yen and the Swiss franc on the three-month forward market than it does on the spot market, so it trades at a forward discount relative to the Japanese yen and the Swiss franc. The dollar buys more units of the Canadian dollar on the three-month forward market than it does on the spot market, so it trades at a forward premium relative to the Canadian dollar.

P17-6. Using the data presented in Table 17.3, determine the forward premium or discount on the Canadian dollar relative to the British pound, the Japanese yen, and the Swiss franc. Use the six-month forward rates to determine the answer, and express your answer as an annual rate.

A17-6. First we need spot and forward exchange rates between these currencies. We will quote exchange rates in terms of foreign currency per Canadian dollar. We can calculate spot rates as follows:

$$\begin{aligned} (£0.6214/\$) / (\text{C}\$0.9958/\$) &= £0.6240/\text{C}\$ \\ (\text{SFr}0.9697/\$) / (\text{C}\$0.9958/\$) &= \text{SFr}0.9738/\text{C}\$ \\ (¥83.28/\$) / (\text{C}\$0.9958/\$) &= ¥83.63/\text{C}\$ \end{aligned}$$

Similarly, we can get six-month forward rates like this:

$$\begin{aligned} (£0.6229/\$) / (\text{C}\$1.0002) &= £0.6228/\text{C}\$ \\ (\text{SFr}0.9681/\$) / (\text{C}\$1.0002) &= \text{SFr}0.9679/\text{C}\$ \\ (¥83.13/\$) / (\text{C}\$1.0002) &= ¥83.11/\text{C}\$ \end{aligned}$$

Next, we calculate the percentage difference between spot rates and forward rates and multiply by 2 to get the annual forward discount or premium.

$$\begin{aligned} [£0.6228/\text{C}\$ - £0.6240/\text{C}\$] / (£0.6240/\text{C}\$) &= -0.0019 \text{ or } -0.19\% \text{ or } -0.38\% \text{ per year} \\ [\text{SFr}0.9679/\text{C}\$ - \text{SFr}0.9738/\text{C}\$] / (\text{SFr}0.9738/\text{C}\$) &= -0.0061 \text{ or } -0.61\% \text{ or } -1.22\% \text{ per year} \\ [¥83.11/\text{C}\$ - ¥83.63/\text{C}\$] / (¥83.63/\text{C}\$) &= -0.0062 = -0.62\% \text{ or } -1.24\% \text{ per year} \end{aligned}$$

P17-7. You are quoted the following series of exchange rates for the US dollar (\$), the Canadian dollar (C\$), and the British pound (£):

\$0.6000/C\$	C\$1.6667/\$
\$1.2500/£	£0.8000/\$
C\$2.5000/£	£0.4000/C\$

Assuming that you have \$1 million in cash, how can you take advantage of this series of exchange rates? Show the series of trades that would yield an arbitrage profit, and calculate how much profit you would make.

- A17-7.** Taking the ratio of the first two exchange rates we have $(\$0.6000/\text{C\$}) / (\$1.2500/\text{£}) = \text{£}0.4800/\text{C\$}$. This is what the spot rate should be in terms of pounds per Canadian dollars, which translates into $\text{C\$}2.0833/\text{£}$. Clearly the third row does not match these numbers. The actual exchange rate in terms of Canadian dollars per pound is \$2.5. This is 'too high' which means that one pounds buys 'too many' Canadian dollars. The pound is overvalued and the Canadian dollar is undervalued. Therefore, take the following actions: Sell \$1 million in exchange for £800,000 ($\$1 \text{ million} \times 0.8000$). Next, sell these pounds in exchange for C\$2 million ($\text{£}800,000 \times 2.5000$). Finally, convert the Canadian currency back into \$1.2 million ($\text{C\$}2 \text{ million} \times 0.6000$). You make a profit of \$200,000.

Long-Term Investment Decisions

- P17-8.** A German company manufactures a specialised piece of manufacturing equipment and leases it to a UK enterprise. The lease calls for five end-of-year payments of £1 million. The German company spent €3.5 million to produce the equipment, which is expected to have no salvage value after five years. The current spot rate is €1.5/£. The risk-free interest rate in Germany is 3 per cent, and in the United Kingdom it is 5 per cent. The German company reasons that the appropriate (German) discount rate for this investment is 7 per cent. Calculate the NPV of this investment in two ways.
- First, convert all cash flows to pounds, and discount at an appropriate (UK) cost of capital. Convert the resulting NPV to euros at the spot rate.
 - Second, calculate forward rates for each year, convert the pound-denominated cash flows into euros using those rates, and discount at the German cost of capital. Verify that the NPV obtained from this approach matches (except perhaps for small rounding errors) that obtained in part (a).

- A17-8.** a. Project cash flows:

Year	0	1	2	3	4	5
	€3.5	£1	£1	£1	£1	£1

The euro to pound spot rate can be converted to a pound to euro rate of 0.6667 pounds per euro. Converting to pounds, 3.5 million euros is worth £2,333,333. The pound cash flows are

Year	0	1	2	3	4	5
	-2.33	1	1	1	1	1

The appropriate discount rate in pounds is $(1.05/1.03)(1.07) - 1 = 9.08\%$.

The project's discounted value is £1.55 million. Multiplying this time the spot rate yields the euro NPV of €2.33 million.

- b. The forward rate (in euros per pound) in year 't' is given by the following formula:

$$\frac{F}{1.5} = \left(\frac{1.03}{1.05} \right)^t$$

This implies that forward rates over the next five years are:

$F_1 = 1.4714$

$F_2 = 1.4434$

$F_3 = 1.4159$

$F_4 = 1.3889$

$F_5 = 1.3625$

Multiplying these forward rates times the 1 million pound cash flow in each of the next five years results in a series of euro denominated cash flows, which we can discount at the euro interest rate of 7%. The resulting NPV is 2.32 million euros.

Answer to MiniCase

International Financial Management

Five years after completing your college degree you accept an exciting new job with the multinational firm Rangsit Trading Incorporated. This new position will involve a great deal of travel, along with some other challenging responsibilities. Part of your job function is to set company policy to manage exchange rate risk. As such, you decide that you need to become fluent in the following topics.

Assignment

1. First, you decide to review basic exchange rate terminology.
 - a. Describe fixed and floating exchange rate systems. What are some problems with these systems?
 - b. Describe a managed floating rate system.
 - c. Describe a currency board arrangement system.
2. Next, you review the following parity relationships.
 - a. Describe forward-spot parity.

Answers

1. a. In a fixed-rate system, governments fix (or peg) their currency's value, usually in terms of another currency such as the US dollar. Once a government pegs the currency at a particular value, it must stand ready to pursue economic and financial policies necessary to maintain that value. In many countries with fixed exchange rates, governments impose restrictions on the free flow of currencies into and out of the country. Even so, maintaining a currency peg can be quite difficult. A floating exchange rate means that forces of supply and demand continuously move currency values up and down. A floating exchange rate system creates some planning difficulties for companies and individuals.
- b. A managed floating rate system is a hybrid in which a nation's government loosely 'fixes' the value of the national currency in relation to that of another currency, but does not expend the effort and resources that would be required to maintain a completely fixed exchange rate regime.
- c. A currency board arrangement simply calls for a nation to use another nation's currency as their own. In such an arrangement, the national currency continues to circulate, but every unit of the currency is fully backed by government holdings of another currency, usually the US dollar.
2. a. If the spot rate governs foreign exchange transactions in the present and the forward rate equals the price of trading currencies at some point in the future, intuition suggests that the forward rate might be useful in predicting how the spot rate will change over time. Therefore, forward-spot parity exists if firms from different countries are indifferent to whether they transact in the spot or the forward market. If forward-spot parity holds, the forward rate is an unbiased predictor of where the spot rate is headed.