

International Banking Seminar for Commercial Bankers in Ghana, Part I

Presented by:



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Participant's Manual
Foreign Exchange

**FOREIGN EXCHANGE AND
INTERNATIONAL FINANCIAL MARKETS**

PARTICIPANT'S MANUAL

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MODULE 1

HISTORY AND EVOLUTION OF FOREIGN EXCHANGE

MODULE OBJECTIVES

- ◆ IDENTIFY MARKET STRUCTURE AND PARTICIPANTS
- ◆ UNDERSTAND THE HISTORY AND EVOLUTION OF FOREIGN EXCHANGE MARKETS
- ◆ ANTICIPATE CHANGES IN THE FUTURE WITH THE ADVENT OF THE EMU

◆ MARKET STRUCTURE AND PARTICIPANTS

The foreign exchange “market” is a collection of participants, connected through telecommunications, whose sole purpose is to buy and sell one foreign currency for another. There are more than 180 different currencies traded in more than 250 sovereign nations throughout the world. If all nations used the same currency there would be no need for foreign exchange. but in reality, individuals wishing to purchase foreign goods and services must exchange home currency into foreign currency units. Market participants can include individuals, corporations, central banks, currency brokers, but are primarily commercial banks. Most large commercial banks provide a foreign exchange service to their corporate clients. They assist their clients with hedging products and act as an information source. They also perform in the role as market maker to other banks in this decentralized market system. For many banks, foreign exchange trading is a significant revenue producer for the institution.

“Interbank dealing” is the term given to the event where one bank contacts a second bank for the purpose of buying or selling one currency for another. This contact can be made through a simple telephone call, across a specialized computer link (Reuter’s Dealing System), or through a third party (foreign exchange brokers, which may be human or electronic matching systems). The bank making the price is a “market maker” and the bank dealing on the given price is a “market taker”. The prices or markets that are quoted reflect the interest of the bank in buying or selling a particular currency relative to current market knowledge.

The foreign exchange market is the largest financial market in the world with estimated daily turnover of more than one trillion dollars a day! It is unique in that there is no central physical location like most other financial markets such as the New York Stock Exchange. Because of immediate electronic disbursement of market information and prices for most currencies it is also the most efficient market in the world. Up-to-date information is essential for any bank dealing in foreign exchange. To assist the dealer and his/her clients, banks subscribe to various news services such as Reuter’s , Dow Jones Telerate, or Knight- Ridder to provide immediate information. This information is a snapshot in time and reflects the most current indication rates for that given moment. To enter into a trade, there must be contact with another trading party.

Foreign exchange brokers or electronic broking systems such as EBS provide actual markets that can be dealt on in marketable amounts.

Foreign currency contracts are also traded on a variety of futures markets such as the International Monetary Market (IMM) in Chicago, Illinois or the London International Financial Futures Exchange in London, England. The futures market will be covered in Module 6.

Although there is no central physical location, most trading is clustered in various world financial centers. London, England and New York City are the two major centers for inter-bank dealing. Secondary centers are Tokyo, Japan; Amsterdam, Netherlands; Paris, France; Zurich, Switzerland, Frankfurt, Germany; and Singapore. Trading centers of a smaller size exist in many other cities such as Toronto, Canada ; Mexico City, Mexico; Melbourne, Australia to mention a few. Foreign exchange markets do not have a set opening and closing time unlike other specific markets. Trading “follows the sun” starting on Monday morning in Australia, moving into the far east then Europe. North America provides the transition back to the Australian market throughout the week, ending with trading on the West coast of the United States on Friday afternoon.

◆ HISTORY OF FOREIGN EXCHANGE MARKETS

In this section we will look briefly at the history of government attempts through their central banks and structured policies to stabilize foreign exchange rates in recent history.

◇ The Gold Standard

Early monetary systems used both gold and silver as references, but by 1880 the Gold Standard, using gold alone, was established. This was a system by which fixed exchange rates were established whose parities were set in relation to gold. Gold then became the recognized means of international payments and as the one accepted domestic medium of exchange. Liquidity was determined by gold production and the use of gold for industrial uses. Gold acted as a reserve asset and paper money could be exchanged for gold at the bank of issue.

The operation of the Gold Standard had direct impact on international payments. Countries with a balance of payments deficit had to surrender gold, causing deflation, to countries with a surplus. This caused inflation in those countries. This caused subsequent raising and lowering of interest rates to bring the payments into balance. After the First World War, differing inflation rates made it impossible to adhere to the exchange rate parities and a series of devaluations spelled the demise of the system.

◇ **The Bretton Woods System**

In 1944, a conference was held in Bretton Woods to establish a new monetary system based on the Gold Exchange Standard and the International Monetary Fund. The purpose was to establish stable exchange rates, eliminate exchange controls and achieve convertibility for all currencies. Each member of the IMF set a parity for its currency relative to gold or the USD. They agreed to central bank intervention to limit fluctuations to within 1% of parity. Changes to parity had to be approved by the IMF. The USD was fixed to gold at the rate of \$35 per ounce and was confirmed as the major reserve currency. The USD also became the parity reference which other central banks bought or sold against their own currencies to keep them within the prescribed limits.

This system was effective for about 25 years. During the 1960's, however again differences in growth rates and balances of payments caused stress on the system. Revaluations of Deutschmarks and Dutch Guilders and devaluations of British Pounds and French Francs were in excess of 10%. This was coupled with a loss of confidence in the U.S. Dollar. Large Balance of payments deficits led to a shortage of gold reserves. Lower interest rates set off massive capital outflows, and the Dollar crisis was in full swing. European banks intervened, but were unable to stem the flow. In August of 1971 the United States was forced to abandon the gold standard and most other currencies were left to float.

◇ **The Smithsonian Agreement**

In December of 1971, one more attempt was made to establish the precepts of the Bretton Woods Agreement. The official price for gold was raised to \$38 per ounce. European and Japanese currencies were revalued by 7.66% and the intervention bands were widened to 2.25% either side of the fixings. By 1973 the USD was forced to devalue again and raised the gold price to \$42.22. Japan and Europe would no longer intervene in the market, so the plan was unraveled again.

◇ **The European Monetary System**

Europe still felt that exchange rate stability was still desirable among the EEC currencies. The EMS was established, pooling reserves and setting an Exchange Rate Mechanism. In, 1979, the European Currency Unit was established as a weighted basket of currencies from which individual parities could be established. The 2.25% bands were established for most currencies with 6% bands set for those requiring greater movement. Currencies such as GBP have entered and exited the ERM over time. It is still firmly established and is the basis for the EMU (Economic and Monetary Union).

◆ **THE ADVENT OF THE EMU**

The Treaty on Economic Union, which was signed in Maastricht in February 1992, laid the ground work for the EMU to be implemented in three phases. Phase A includes the decision to join and laid out the economic criteria for admittance.

◇ **LONG-TERM INTEREST RATES** Average long term interest rates over 1997 must be within 2% of the three best performing countries.

◇ **CURRENCY STABILITY** No devaluations for two years prior to start of EMU

◇ **DEFICIT RATIO** Budget deficits for 1997 can not exceed 3% of GDP.

- ◇ **DEBT RATIO** Total debt cannot exceed 60% of GDP.

- ◇ **INFLATION** Average inflation over 1997 should be within 1.5% of the three best performing countries.

Phase B is intended to begin on Jan. 1, 1999. This will include the fixing of exchange rates of the participating countries and the commencement of activities by the European Central Bank. Phase C will begin in the year 2002 with the conversion of national currencies into the single currency.

Much progress has been made recently towards EMU. Over the weekend of 1-3 May 1998, European Union leaders met in Brussels and endorsed an eleven member launch of EMU. The eleven nations to participate include Austria, Belgium, Finland, Germany, Italy, France, Ireland, Luxembourg, Netherlands, Portugal and Spain. These countries monetary policies will be managed by the European Central Bank (ECB), which will be established on June 1 1998, and will be using the new single currency - the euro- for cashless transactions when EMU is launched on January 1, 1999. A compromise was reached in Brussels over who should be president of the first ECB. Wim Duisenberg of the Netherlands is likely to step down halfway through his eight year term to hand over to Frenchman Jean-Claude Trichet.

Euro notes and coins will not be introduced until January 1, 2002 so the national currencies of the eleven countries will remain in existence as legal tender for a three year transition period, January 1 1999-December 31 2001. Bilateral exchange rates of the member countries were announced at the EU summit and were in line with existing European Rate mechanism (ERM) central rates. These rates will be locked as of January 1st 1999 and cross trading between these currencies will cease.

The conversion rate from the euro to each of the participating national currencies will be officially determined by the last value of the European Currency Unit (ECU)- a basket of currencies- on December 31, 1999. The ECU will be exchanged with the Euro at a rate of 1 to 1 on January 1, 1999. Since the ECU includes currencies which will not participate in the euro, it

will not be possible to set the conversion rates from the euro to EMU participating countries currencies before the final exchange rate of the ECU to all its baskets currencies is known.

During the transition period, January 1 1999- December 31 2001, the use of the euro will be governed by the “no compulsion, no prohibition” principle. Parties are in principle free to use the euro unit if they choose, but cannot be obliged to do so. In the transition period, a company will be able to insist on paying or being paid in a national currency, but most are expected to adopt the euro on an expanding basis. How fast companies will adopt the euro as a transaction currency is hard to predict. The “no compulsion, no prohibition” principle benefits small companies and businesses, because it allows them to select what for them is the optimum time to make the transition to the euro.

Large corporations within Europe will be key drivers to an early switch to euro payments, spurred by prospective gains in efficiency. Though the “no compulsion, no prohibition” principle is in place, the more aggressive approach of many large European corporations suggest a bias toward compulsion: switch to euro accounting or cease to be a supplier.

Perhaps the euro’s most visible impact will be in exposing difference in pricing of pan-European products, what economists call transparency. EMU will create a grand, domestic market with significantly increased competition and price transparency. Presently the cost of a 1.5 liter bottle of cola may vary up to 50% within the European Union. Under the euro such disparities will become strikingly obvious. Not only will companies have to re-price their products in euros , they will have to fix it at a price at which people want to buy. They might have to consider repackaging or reformulating the product to bring it to another price. Price transparency will affect brand positioning.

The technological aspects of EMU are large and costly for both banks and corporations. EMU will affect information technology systems that govern accounting, sales, purchase order processing, inventory control, pricing and payroll processing. For some companies the cost to prepare for the euro will exceed the cost of the year 2000 project.

American business people can not afford to not be knowledgeable about EMU. Trade with Western Europe represents 20 percent of U.S. imports and 22 percent of its exports, more than the U.S. trade with Canada. Early preparation for the euro promises future gains. Those that start early will be more likely to seize the commercial opportunities presented to the changeover to the single currency.

MODULE 2 FOREIGN EXCHANGE

MARKET MECHANICS AND CONVENTIONS

MODULE OBJECTIVES

- ◆ UNDERSTAND FOREIGN EXCHANGE RATE QUOTATIONS
- ◆ KNOW VALUE DATE CONVENTIONS
- ◆ USE DISCOUNTS AND PREMIUMS
- ◆ PRICE OUTRIGHT FORWARD TRANSACTIONS
- ◆ KNOW THE ELEMENTS AND SETTLEMENT PROCEDURES FOR A FOREIGN EXCHANGE CONTRACT

Most foreign exchange trading is done through commercial bank dealing rooms where trading functions are highly specialized and idiosyncratic. Likewise, foreign exchange dealers have developed their own terminology and conventions for executing market transactions. The aim of this module is to provide a "plain English" explanation of foreign exchange jargon and to present a concise analysis of the common conventions and mathematics of foreign exchange.

◆ CURRENCY CODES

ISO codes (International Organization for Standardization) are used to represent currencies. The first two letters represent the name of the country and the last letter denotes the currency. The GB in GBP designates Great Britain as the country and P stands for Pound. Several ISO codes frequently used in this handbook are:

<u>Country</u>	<u>Codes</u>	<u>Currency</u>
Canada	CAD	- Canadian Dollar
Switzerland	CHF	- Swiss Franc
Germany	DEM	- German Deutschemark
France	FRF	- French Franc
Great Britain	GBP	- English Pound
Japan	JPY	- Japanese Yen
United States	USD	- United States Dollar

See the Exhibits for a more complete listing of ISO codes, currencies and countries.

◆ ELEMENTS OF A CONTRACT

A foreign exchange contract is an obligation between two parties to exchange two different currencies at a prearranged exchange rate on a specified future date. By convention, foreign currencies are generally purchased and sold initially through a binding verbal agreement. That agreement is subsequently confirmed by a written contract.

At a minimum, a foreign exchange contract includes:

- ◇ The names and addresses of the two parties entering into the foreign exchange contract.
- ◇ The date the contract was arranged.
- ◇ The value date--that is, the date of contract settlement or date the currencies are to be delivered.
- ◇ The first currency (usually foreign).
- ◇ The first currency amount.
- ◇ The exchange rate.
- ◇ The second currency (usually U.S. dollars).
- ◇ The second currency amount.

Detailed payment instructions can be included in the contract or arranged just prior to maturity of the contract.

◆ **CONTRACT SETTLEMENT PROCEDURES**

Drafts, bank notes, or mail transfers are generally not acceptable forms of contract settlement, unless special arrangements are made when the contract is originated.

Delivery of currencies made under a foreign exchange contract must be made on value date, in immediately available funds, to accounts in the respective countries represented in the contract.

Commercial banks that deal in foreign exchange maintain foreign currency accounts with their branches or foreign correspondent banks that can be used for the receipt or payment of currencies due under foreign exchange contracts. The customer and/or bank normally wire payment instructions at least one day in advance of settlement, allowing the foreign bank to debit or credit the account on the appropriate date.

◆ UNDERSTANDING FOREIGN EXCHANGE RATE QUOTATIONS

Foreign exchange quotations can be presented in different formats and described in a variety of terms. This section will define and explain the most commonly used formats and terms.

◇ Quotations in "Direct" or "Indirect" Terms

Direct terms: This is a foreign exchange quote based on the number of units of your local currency needed in exchange for one unit of a foreign currency.

Indirect terms: This is a foreign exchange quote based on the number of units of a foreign currency needed in exchange for one unit of your local currency.

You can see, however, the terms "direct" and "indirect" depend upon point of reference. For example, a quote of 1.8325 Deutschemarks to one U.S. dollar would be called a "direct quote" by a German corporation and an "indirect quote" by a U.S. corporation.

To avoid this confusion, this handbook will use two, more commonly used terms that do not require a point of reference for understanding, "American terms" and "European terms."

◇ Quotations in American or European Terms

American and European terms describe the two primary methods of quoting foreign exchange rates.

American terms: This is a foreign exchange quote based on the number of units of U.S. dollars required in exchange for one unit of a foreign currency.

European terms: A foreign exchange quote based on the number of units of a foreign currency required in exchange for one U.S. dollar.

To further explain these two quotations, study a clipping chosen from The Wall Street Journal (in the Exhibits), a daily published source of spot and forward foreign exchange rates.

◇ The column labeled "U.S. \$ equiv." is expressed in American terms and shows how many units of one U.S. dollar are equivalent to one unit of a foreign currency. For example, .5552 units of one U.S. dollar equals one Deutschemark.

◇ The column labeled "Currency per U.S. \$" is expressed in European terms and shows how many units of a foreign currency are equal to one U.S. dollar. For example, 1.8010 units of one Deutschemark equals one U.S. dollar.

In this handbook, we will use these exchange rates as unit ratios. American terms will be called USD/DEM (U.S. dollars per Deutschemark) and European terms will be called DEM/USD (Deutschemarks per U.S. dollar). Many publications may also express European terms as USD/DEM and American terms as DEM/USD. This format expresses a value relationship, not a unit relationship, as addressed in this handbook.

It is conventional for banks to quote most major currencies in European terms. Primary exceptions are the British pound, Australian dollar, Irish punt, New Zealand dollar and the South African rand--these currencies are quoted in American terms.

To derive a rate in European terms when the rate is known in American terms (or vice versa), merely divide the number "one" by the known rate. The rates are reciprocal. (See The Wall Street Journal in the Exhibits.)

$$\frac{1}{\text{European}} = \text{American} \qquad \frac{1}{\text{American}} = \text{European}$$

$$\frac{1}{\text{DEM 1.8010}} = \text{USD } .5552 \qquad \frac{1}{\text{USD } .5552} = \text{DEM 1.8010}$$

*The .00015 difference from The Wall Street Journal rate, results from The Wall Street Journal's rounding.

◇ **Cross Rates**

American terms and European terms describe exchange rates that involve the U.S. dollar. A "cross rate" is an exchange rate between two currencies other than the U.S. dollar. Because exchange rates quoted in terms of the U.S. dollar are available for all currencies, determining cross rates is simply a mathematical process. The following are guidelines for determining cross rates:

◇ **If two currencies are quoted in European terms--**

Divide one exchange rate by the other. Generally, the larger number is divided by the smaller number.

Example for European Terms

$$\text{DEM/USD} = 1.8010$$

$$\text{FRF/USD} = 6.0370$$

To determine the FRF/DEM cross rate:

$$\underline{6.0370}$$

$$1.8010 = 3.3520 \text{ French francs per Deutschemark.}$$

◇ **If two currencies are quoted in American terms--**

◇ Use same procedure as above.

◇ **If one currency is quoted in European terms, and one is quoted in American terms--**

Multiply the two rates together. The rate derived will reflect the units of the lower value currency per one unit of the higher value currency.

Example for European and American Terms

$$\text{DEM/USD} = 1.8010 \quad \text{USD/GBP} = 1.6759$$

To determine the DEM/GBP cross rate:

$$1.8010 \times 1.6759 = 3.0183 \text{ Deutschemarks per pound}$$

◆ **BIDS AND OFFERS**

Foreign exchange quotations, like over-the-counter stock market quotations, are expressed in two ways--a "bid" and an "offer." The bid price is always shown on the left side of the quotation and the offer price is always on the right.

Commercial banks buy currency from corporations at the bid price and sell currency to corporations at the offer price. This two-way price--bid and offer--creates a market in which the market-maker always wants to "buy low and sell high." When dealing with a bank, it is helpful to remember that you sell at the bank's bid price and buy at the bank's offer price. When dealing in foreign exchange, it is important to determine whether the bid and offer is being quoted in American or European terms. In American terms, the bank's

bid and offer is for the foreign currency; in European terms, the bank's bid and offer is for United States dollars.

The Wall Street Journal (see Exhibits) rates reflect offer quotations for foreign currencies. Using the Deutschemark and U.S. dollar, the example below includes a "bid" and "offer" quotation for both sides of the market. The difference between the buying and selling price is known as the "spread."

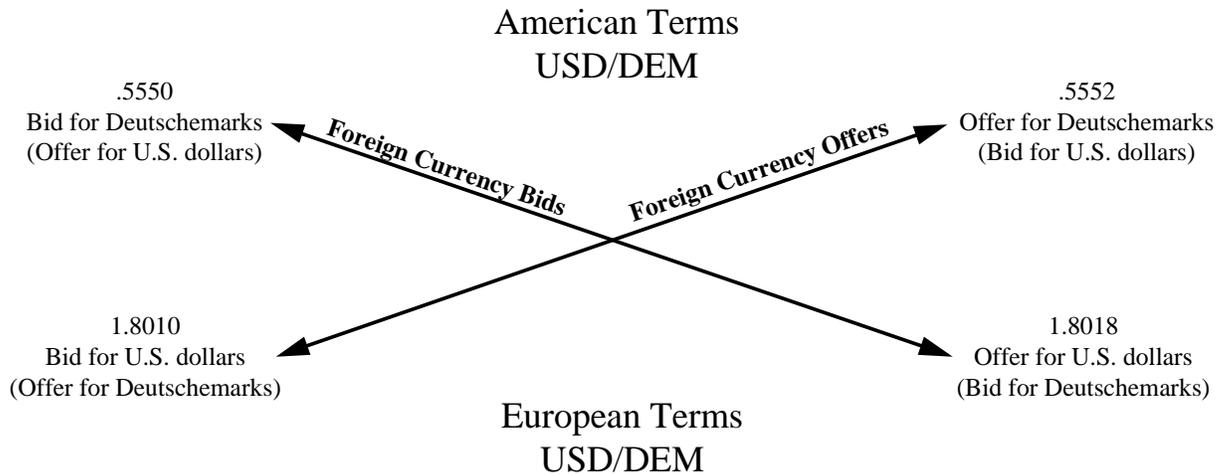
AMERICAN		EUROPEAN	
BID	OFFER	BID	OFFER
<u>.5550</u>	<u>.5552</u>	<u>1.8010</u>	<u>1.8018</u>

In this example, .5552 is the offer in American terms for Deutschemarks and 1.8010 (the .00015 difference from The Wall Street Journal rate of 1.8010 results from The Wall Street Journal's rounding) is the bid in European terms for dollars. Therefore, The Wall Street Journal rate of .5552 indicates that a bank would sell Deutschemarks in exchange for U.S. Dollars at the ratio of .5552 U.S. Dollars for each Deutschemark. The 1.8010 rate means a bank would purchase U.S. dollars in exchange for Deutschemarks at the ratio of 1.8010 Deutschemarks for each U.S. dollar. As this example has illustrated, an "exchange rate" is a ratio stating the number of units of one currency required to purchase or sell one unit of a second currency. The quote in "American terms" is a bid and offer for Deutschemarks in relation to the U.S. dollar. The quote in "European" terms is a bid and an offer for U.S. dollars in relation to the Deutschemark. Therefore, in an exchange of currencies, an offer of one currency is simultaneously a bid for the second currency.

If you have Deutschemarks to sell, and you contact a bank for a quotation, the bank would quote you .5550 in American terms or 1.8018 in European terms. Conversely, if you wish to purchase Deutschemarks, the bank would sell them to you at .5552 in American terms or 1.8010 in European terms.

To recap:

Bids/Offers



◆ VALUE DATES

Foreign exchange dealers use the term "value date" when defining contract settlement dates for foreign exchange. The most common value date designations are known as "spot" and "forward." First we will examine how spot and forward rates are defined. Next, we will address cash transactions, and finally how value dates are determined.

Value Dates			
Today	One Business Day	Two Business Days	Three Business Days and Beyond
"CASH" for all currencies.	"SPOT" for the Canadian dollar.	"FORWARD" for the Canadian dollar. "SPOT" for most other currencies	"FORWARD" for all currencies.

◆ Spot Rates

"Spot" means the basic value date or settlement date for a foreign exchange transaction. The spot quotation is used by the news media to describe current price levels in the foreign exchange market. (See The Wall Street Journal in the Exhibits.) The settlement date for a spot transaction is generally one or two business days after the date a foreign exchange contract is consummated. This one to two-day delay allows parties to the contract enough time to arrange for delivery of the two currencies.

Foreign exchange rates for settlement on all other value dates are derived from adjustments to the spot rate. If you request a foreign exchange rate from a foreign exchange dealer without specifying a value date, you will normally receive a spot quotation.

The following are two examples of spot transactions:

◇ Example 1:

(See The Wall Street Journal in the Exhibits.) Find the Canadian dollar spot rate of 1.4276 to be used in this example. Assume you called U.S. Bank to purchase Canadian dollars 1,000,000 on Monday, April 20, 1998. The contract date would be April 20 and the spot date (or value date) would be Tuesday April 21. Therefore, on April 21, you would receive Canadian dollars 1,000,000 and pay U.S. Bank United States dollars 700,476.32 (CAD 1,000,000 ÷ 1.4276 = USD 700,476.32).

◇ Example 2:

(See The Wall Street Journal in the Exhibits.) Find the Deutschmark spot rate 1.8010 to be used in this example. Assume you called U.S. Bank to purchase Deutschmarks 1,000,000 on Monday, April 20, 1998. The contract date would be April 20, and the spot

date (or value date) would be Wednesday, April 22. Therefore, on April 22, you would receive Deutschemarks 1,000,000 and pay U.S. Bank United States dollars 555,247.08 (DEM 1,000,000 ÷ 1.8010 = USD 555,247.08).

◆ **Forward Rates**

"Forward" is a term generally used to describe a value date or settlement date that occurs three or more business days after a foreign exchange transaction is consummated. (Canada offers an exception, however. Forward dates for Canadian dollar transactions are two business days and beyond.) Forward rates are available for many, if not most, freely convertible currencies of the world. Where forward markets exist, a transaction can generally be concluded for a term of up to six months.

Transactions in major Western European and Far Eastern currencies can generally be arranged up to one year forward. Most banks require special internal approvals to transact foreign exchange beyond one year forward; however, the Deutschemark, Swiss franc, English pound, Canadian dollar, Japanese yen and other major currencies have traded several years forward. The availability of forward prices in any currency is always subject to changing regulations, market conditions and other variables.

◇ **Example 1:**

(See The Wall Street Journal in the Exhibits, for the six-month forward rate for Japanese yen--128.72 to be used in this example.) Assume you called U.S. Bank on April 20, 1998, to purchase yen 250,000,000 for delivery six months forward, October 22. (As you recall, spot is two business days from contract date. Therefore, to determine the forward date, first determine the spot date, then determine six months from that point.) On October 22, you would receive Japanese yen 250,000,000 and pay U.S. Bank United States dollars 1,942,200.10 (JPY 250,000,000 ÷ 128.72 = USD 1,942,200.10).

◇ **Cash**

In the United States, same day or cash transactions can generally be arranged for the Canadian dollar until about 10 a.m., Eastern Standard Time. Because of time zone differences, cash transactions cannot be arranged for Far Eastern currencies and are extremely difficult to arrange for European currencies.

◇ **One Business Day**

In the United States transactions can usually be arranged for Far Eastern and European currencies for settlement the next business day. However, supply and demand, market conditions, special national regulations and other factors can impede the next business day transaction.

◇ **How Value Dates Are Determined in the Market**

Every foreign exchange transaction involves the delivery of two different currencies, so a contract value date must be a business day in both countries involved. When a potential value date falls on a holiday, the value date is advanced to the next business day (with one exception noted later). Holidays that occur in one, but not both, of the countries involved can produce aberrations to the two business days equals spot - three business days equals forward rule of thumb.

Consequently, any foreign exchange transactions calling for deliveries during the year-end holiday season require special care. If you have any doubts about the correct value date in a holiday situation, it is best to ask a foreign exchange dealer to verify the date.

Forward value dates are determined by a number of special rules. In all cases, you must first determine the spot date.

- ◇ Value dates occurring in monthly increments from the spot date are called "straight" dates, and are routinely quoted in the business press (see The Wall Street Journal in the Exhibits).
- ◇ All other forward dates are called "odd" dates. Exchange rates for forward transactions settling on odd dates require individual calculations.
- ◇ When a spot date is the last business day of a month, "straight" forward dates fall on the last business day of each subsequent month.
- ◇ Other rules regarding month end (or near month end) settlement of forward transactions may actually require that a potential value date occurring on a holiday or a weekend be moved to the next previous business day.

Once again, specific questions regarding value date determinations should be referred to a foreign exchange dealer.

Use the Calendar Below to Solve the Examples on the Following Pages.

Value Date Examples

January

SUN	MON	TUE	WED	THU	FRI	SAT
					U	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24/ 31	25	26	27	28	29	30

February

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	U	16	17	18	19	20
21	22	23	24	25	26	27
28						

March

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6

April

SUN	MON	TUE	WED	THU	FRI	SAT
				1	2	3

7	8	9	10	11	12	13
14	15	16	17	18	G	20
21	22	23	24	25	26	27
28	29	30	J			

4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

Code:

Hypothetical holidays:

U--United States

G--Germany

J--Japan

◆ **Spot Date Examples**

◇ **Example 1**

Transaction: Deutschemarks - spot

Transaction date: March 17

Value date: March 22

The value date is determined by adding two business days to the transaction date. Because the 19th is a holiday in Germany, the value date must be moved to the next business day, March 22.

◇ **Example 2**

Transaction: Canadian dollars - spot

Transaction date: February 11

Value date: February 12

The Canadian dollar is traded for spot settlement one business day from the transaction date. The value date is February 12 because it is a business day in both Canada and the United States.

◆ Forward Date Examples

◇ Example 1:

Transaction: Deutschemarks - one month forward

Transaction date: January 11

Value date: February 16

The spot date for Deutschemarks is determined to be January 13. One month forward would be February 13. Because this is a Saturday and Monday, February 15 is a holiday in the United States, the value date becomes February 16.

◇ Example 2:

Transaction: Japanese yen - one, two, and three months forward

Transaction date: January 27

Value dates: February 26 for one month

March 30 for two months

April 30 for three months

The spot date for Japanese yen is determined to be January 29. When the spot date is the last business day of a month, you transact for the last business day of each subsequent month. Therefore, a one-month transaction settles on Friday, February 26. A two-month transaction settles on Tuesday, March 30, because March 31 is a holiday in Japan. A three-month transaction settles on April 30, the last business day of the month.

◆ FORWARD PREMIUMS AND DISCOUNTS

The price of currency for a "forward" value date may be higher or lower than the price of the same currency for a "spot" value date. When those conditions occur, these foreign exchange terms come into play:

- ◇ If the forward price is greater than the spot price, a currency is said to trade at a FORWARD PREMIUM.
- ◇ If the forward price is less than the spot price, a currency is said to trade at a FORWARD DISCOUNT.

The difference between the forward price and the spot price is called the premium or the discount. This difference is stated in "points" that are added to, or subtracted from, the spot rate to determine the forward rate. A "point" is defined as the last decimal place to which a price is normally quoted for a given currency.

(The premium or discount relationship between two currencies is determined by the interest rate differential between the respective Eurocurrencies, as explained in Module 4.)

◆ American Terms

Let's look at an example from The Wall Street Journal in the Exhibits. The offered rates for British pounds quoted in American terms are:

Spot USD/GBP:	\$ 1.6759
30-Day Forward (one month):	\$ 1.6735
90-Day Forward (three months):	\$ 1.6686
180-Day Forward (six months):	\$ 1.6617

The price for the British pound is lower for each of the forward delivery dates than for the spot date; therefore, the British pound is said to trade at a forward discount against the U.S. dollar. To calculate the amount of the discount for one month delivery, subtract the spot rate from the one month rate ($1.6735 - 1.6759 = .0024$). Because the British pound is normally quoted to four decimal places, a point in that currency equals .0001. Therefore, the one-month British pound discount is expressed as 24 points.

◆ European Terms

A different orientation is required for currencies quoted in European terms (remember that is a price for U.S. dollars as expressed in number of foreign currency units). Again referring to The Wall Street Journal, in the Exhibits, French francs are shown as follows:

Spot FRF/USD:	FRF 6.0370
30-Day Forward (one month):	FRF 6.0265
90-Day Forward (three months):	FRF 6.0063
180-Day Forward (six months):	FRF 5.9788

The price for the U.S. dollar (in terms of the French franc) is lower for each of the forward delivery dates than for the spot date; therefore, the U.S. dollar is said to trade at a forward discount against French francs. Conversely, the French franc trades at a forward premium against the U.S. dollar. The premium is easily seen, because it takes less French francs to equal one U.S. dollar for forward value dates than for the spot value date.

That French francs trade at a premium to the U.S. dollar can also be verified by looking at the French franc rates under the "U.S. \$ equiv." column in The Wall Street Journal. Use the following table for reference and review of the principles just discussed.

Foreign Exchange Rates		
	Forward - Spot = positive	Forward - Spot = negative
American Terms	Foreign Currency Premium	Foreign Currency Discount
European Terms	Foreign Currency Discount	Foreign Currency Premium

◆ Two Sided Markets and Premiums/Discounts

The examples given above are simplified in two respects:

- (1) Forward prices, like spot prices, have two sides--bid and offer.
- (2) Forward quotes normally provide only the premiums or discounts. Those, in turn, must be combined with spot rates to determine complete forward prices.

The Sample Interbank Rate Screen in the Exhibits offers an example of how spot and forward rates are typically quoted in the market. Let's examine the Australian Dollar (AUD) rates on that page for spot and one-month rates.

	<u>Bid</u>	<u>Offer</u>
Spot AUD	.6460	.6464
1 Month	1+	4+

First, determine if the one month points are premiums or discounts. Two simple rules apply to this calculation:

- ◇ IF THE OFFERED SIDE OF THE FORWARD POINTS QUOTE IS GREATER THAN THE BID SIDE (and both bid and offer are positive numbers), THE FORWARD BID AND OFFER ARE PREMIUMS AND SHOULD BE ADDED TO THE SPOT BID AND OFFER.
- ◇ IF THE OFFERED SIDE OF THE FORWARD POINTS QUOTE IS SMALLER THAN THE BID SIDE (and both bid and offer are positive numbers), THE FORWARD BID AND OFFER ARE DISCOUNTS AND SHOULD BE SUBTRACTED FROM THE SPOT BID AND OFFER.

By the above rules, the one-month Australian Dollar bid and offer of 1+ to 4+ are considered premiums and should be added to the spot rate. We determined earlier that a

point in Australian Dollars is quoted in the fourth decimal place, so the outright bid and offer for one-month Australian Dollar becomes:

	<u>Bid</u>	<u>Offer</u>
Outright 1 Month AUD	.6461	.6468

Through this calculation, we have determined two things:

- ◇ First, that a forward bid and offer of 1+ to 4+ determines that the points are "premiums" and should be added to the spot bid and offer.
- ◇ Second, because the one-month outright prices for Australian Dollars are greater than the spot prices, the Australian Dollar trades at a forward premium against the U.S. dollar in the one-month period.

Remember, the Australian Dollar is quoted in American terms. Let's now look at an example of a currency quoted in European terms. (Refer again to the Sample Interbank Rate Screen in the Exhibits.)

	<u>Bid</u>	<u>Offer</u>
Spot CAD	1.4276	1.4279
3 Months	<u>26-</u>	<u>23-</u>
Outright 3 Month CAD	1.4250	1.4256

We know from the previously stated rule that a forward bid and offer of 26- to 23- are discounts and should be subtracted from the spot bid and offer. HOWEVER, we know from previous examples that the above quotes are for U.S. dollars in terms of the Canadian dollar. THEREFORE, the U.S. dollar is at a discount to the Canadian dollar in this three-month quote. Conversely, the Canadian dollar is at a premium to the U.S. dollar.

◆ Other Considerations

In some cases, a forward bid may be a discount while the offer is a premium. Returning to the Australian dollar example, let's assume that the one-month quote was 2- to 4+. We would then subtract the 2 point discount from the spot bid, and add the 4 point premium to the spot offer as follows:

Spot AUD	.6460	.6464
1 Month	<u> 2-</u>	<u> 4+</u>
Outright 1 Month AUD	.6458	.6468

The positive and negative signs used above simply denote discount or premium; therefore, do not apply the mathematical rule for subtracting negative numbers. Notice that the one-month outright price for British pounds is at a discount to spot on the bid side and at a premium to spot on the offer side. The term "around" is used to describe situations where forward points are a discount on the bid side and a premium on the offer side. For example, a quote of "3-to-3 around" means that the bid is 3 points discount and the offer is 3 points premium.

A final point: A currency need not consistently be at a premium or discount in all forward periods. A foreign currency may be quoted, for example, at a premium to the U.S. dollar in the one through three-month periods and at a discount in the six-month period. This variance depends on the relationship between the yield curves of the respective Eurocurrencies.

◆ SWAPS

A swap is the simultaneous purchase and sale (or sale and purchase) of one currency against another for two different value dates (e.g., a sale of AUD 1,000,000 against U.S.

dollars for value July 15 with a simultaneous purchase of AUD 1,000,000 against U.S. dollars for value August 15).

The two related contracts in a swap differ from two similar unrelated contracts in that a swap generally eliminates the "spread" cost of the spot market. In other words, with a swap, the same spot price is used as a basis for both the spot and forward contracts even though one is a purchase and the other a sale.

On the Sample Interbank Rate Screen in the Exhibits, the AUD in the spot market is .6460 - .6464, and the one-month forward quote is 1 - 4. In a swap, the side of the forward-points market upon which you deal is determined by the far date transaction. If you were to sell spot AUD and purchase one-month forward AUD, the prices would be .6460 and .6464, respectively. The premium of four points is added to the spot price because the far date transaction is a purchase, and therefore, is based on the "offered side" of the forward market. An unrelated spot sale and forward purchase would have been based on a .6460(bid) and .6468 (offer plus forward adjustment), for an additional four points cost. Swaps involving two forward delivery dates are called "forward - forward", and may be priced differently from ordinary swaps, as explained in Module 3.

Swaps are used:

- ◇ to provide the spot exchange and forward hedge for foreign currency borrowings or investments;
- ◇ to gain the use of needed foreign currency balances without incurring an outright position in that currency;
- ◇ to maintain a position in a currency, while gaining the use of a second currency during a period when balances in the primary currency are not needed;
- ◇ in conjunction with previously negotiated forward contracts, to alter a delivery date.

Rollover, tom-next, weekend, borrow balances, lend balances, are commonly associated with swap transactions. Examples of how swaps are used and priced are in Module 3.

Sample Wall Street Journal Exchange Rates

Monday, April 20, 1998

The New York foreign exchange selling rates below apply to trading among banks in amounts of \$1 million and more, as quoted at 4 p.m. Eastern time by Wall Street Journal and other sources. Retail transactions provide fewer units of foreign currency per dollar.

	<u>U.S. \$ Equivalent</u>		<u>Currency per U.S. \$</u>	
	Mon	Fri	Mon	Fri
Australia (Dollar)	.6464	.6505	1.5470	1.5373
Belgium (Franc)	.02693	.02679	37.135	37.332
Britain (Pound)	1.6759	1.6845	.5967	.5936
1-month forward	1.6735	1.6820	.5976	.5945
3-months forward	1.6686	1.6771	.5993	.5963
6-months forward	1.6617	1.6701	.6018	.5988
Canada (Dollar)	.7005	.6997	1.4276	1.4291
1-month forward	.7009	.7002	1.4267	1.4282
3-months forward	.7018	.7010	1.4250	1.4265
6-months forward	.7030	.7022	1.4225	1.4241
France (Franc)	.1656	.1650	6.0370	6.0610
1-month forward	.1659	.1653	6.0265	6.0502
3-months forward	.1665	.1658	6.0063	6.0304
6-months forward	.1673	.1666	5.9788	6.0028
Germany (Mark)	.5552	.5528	1.8010	1.8090
1-month forward	.5562	.5537	1.7980	1.8059
3-months forward	.5580	.5556	1.7920	1.8000
6-months forward	.5606	.5581	1.7837	1.7917
Italy (Lira)	.0005615	.0005598	1781.00	1786.50
Japan (Yen)	.007570	.007590	132.10	131.75
1-month forward	.007602	.007622	131.55	131.20
3-months forward	.007668	.007688	130.41	130.07
6-months forward	.007769	.007789	128.72	128.39
Switzerland	.6677	.6671	1.4977	1.4990
1-month forward	.6701	.6696	1.4924	1.4935
3-months forward	.6747	.6742	1.4821	1.4833
6-months forward	.6816	.6810	1.4672	1.4684

WORKSHEET 1

BIDS, OFFERS, CROSS RATES

1. The current rate for spot DEM/USD is 1.8010/20. You have a DEM 500,000 receivable that you want to sell. What rate will the bank quote you? _____

What is the USD value based on that rate? _____

2. The spot rate for DEM/USD has now moved to 1.7940/50. You want to sell your DEM at the new rate. What rate will the bank quote you now? _____

Has the DEM gained or lost strength against the USD compared to question 1? _____

What is the dollar value of your receivable now? _____

3. Spot CAD/ USD is quoted 1.4310/15. You have a CAD 1,000,000 payable. What rate will the bank quote you? _____

What is the USD value of the payable? _____

4. The market has now changed to 1.4350/55. You want to buy your CAD now at the new rate. What is the value of your payable now? _____

Has the CAD gained or lost strength against the USD? _____

5. What is the DEM/CAD cross rate based on DEM/USD 1.8010 and CAD/USD 1.4350? _____

WORKSHEET 2

VALUE DATES

Value Date Examples

January

SUN	MON	TUE	WED	THU	FRI	SAT
					U	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24 _{/31}	25	26	27	28	29	30

February

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	U	16	17	18	19	20
21	22	23	24	25	26	27
28						

March

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	G	20
21	22	23	24	25	26	27
28	29	30	J			

April

SUN	MON	TUE	WED	THU	FRI	SAT
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

Code:

Hypothetical holidays: U--United States G--Germany J--Japan

ASSUME TODAY IS JANUARY 13.

CURRENCY QUOTE

SPOT DEM

ONE MONTH GBP

TWO MONTH JPY

VALUE DATE

THREE MONTH DEM

ASSUME TODAY IS JANUARY 27.

CURRENCY QUOTE

VALUE DATE

SPOT DEM

ONE MONTH DEM

TWO MONTH JPY

THREE MONTH GBP

SAMPLE INTERBANK RATE SCREEN

	SPOT	1 MONTH	2 MONTH	3 MONTH	6 MONTH	12 MONTH
USD/GBP	1.6754/59	26/24	51/48	77/73	150/142	300/290
CAD/USD	1.4276/79	9/8	17/15	26/23	51/46	102/94
USD/AUD	.6460/64	1/4	2/6	4/8	10/15	30/40
DEM/USD	1.8010/18	30/28	60/56	90/85	173/165	340/330
JPY/USD	132.10/15	55/52	110/104	169/165	338/330	680/670
ITL/USD	1781.00/ 1781.50	150/300	-150/+200	300/0	650/250	1200/700

WORKSHEET 3

FORWARD POINTS

LOOK AT YOUR SAMPLE INTERBANK RATE SHEET. (EXHIBITS)
DETERMINE THE FOLLOWING FORWARD PRICES.

<u>CURRENCY</u>	<u>DATE</u>	<u>BID</u>	<u>OFFER</u>
DEM/USD	3 MONTH	_____	_____
USD/GBP	2 MONTH	_____	_____
USD/AUD	6 MONTH	_____	_____
JPY/USD	1 MONTH	_____	_____
ITL/USD	12 MONTH	_____	_____

ROLE PLAYS

1. EXPORTER CONTRACTING WITH A BANK

EXPORT USA has recently sold an order of widgets to a customer in France. They are expecting payment in FRF in 90 days. Contact BEST BANK to arrange a forward contract to hedge this exposure. Include all components and settlement details for your contract.

2. IMPORTER CONTRACTING WITH A BANK

IMPORT USA has agreed to purchase a new printing press from Great Britain which will be delivered in 90 days. After delivery, they have an additional 30 days to make the payment in GBP. Contact BEST BANK to arrange the appropriate forward contract.

3. BANK CONTRACTING WITH ANOTHER BANK

BEST BANK must now contact BETTER BANK to unwind the positions they acquired from IMPORT USA and EXPORT USA. Determine if the bank made or lost money on the trades.

MODULE 3

FOREIGN EXCHANGE IN PRACTICE

MODULE OBJECTIVES

- ◆ DEVELOP AND UTILIZE A DECISION TREE FOR EXPORTERS AND IMPORTERS
- ◆ UNDERSTAND THE USE AND CHARACTERISTICS OF COMPENSATING CONTRACTS
- ◆ UNDERSTAND THE USES AND PRICING OF SWAP TRANSACTIONS
- ◆ CALCULATE PER ANNUM HEDGING COSTS/BENEFITS

Assume you know your company has a foreign exchange exposure. Now you are considering covering your exposure through your commercial bank. What follows are some initial questions to answer before taking that next step:

- ◇ Do you intend to buy or sell foreign currency?
- ◇ Will you use American or European terms? (Remember that most U.S. commercial banks quote currencies in European terms.)
- ◇ Will your company buy or sell in the spot market?
- ◇ Will your company buy or sell in the forward market?
- ◇ If you buy or sell in the forward market, will it cost your company more or less than the spot market? Is the foreign currency involved available at a premium or a discount to the U.S. dollar? Will your company earn or lose points on the forward purchase or sale?
- ◇ Should you hedge? Have you compared the cost/benefit of the forward contract to other available hedging alternatives (borrowing/investing in foreign currency or option contracts, for example)?
- ◇ Have you compared the outright forward price to hedge your exposure with the probable range for a spot price on the same future date? If so, have you conducted a risk/reward analysis to determine if hedging is, in fact, the preferred strategy?
- ◇ In general, is your foreign exposure a risk or an opportunity?

Apply these questions to the following import and export trade examples.

◆ FOREIGN EXCHANGE FOR THE IMPORTER

If you are an importer and your supplier has quoted you a selling price in a foreign currency, acquiring those goods will lead to a foreign exchange exposure for your company. What can you--the importer--do about this exposure? Let us explore some options to be discussed with examples in this section.

◆ Example 1: Spot Contract

IMPORT USA Corporation has agreed to purchase merchandise from Canada for Canadian \$500,000, and the supplier will give IMPORT USA 30 days to make payment. When should IMPORT USA actually purchase the Canadian dollars? (Use the Sample Interbank Rate Screen in the Exhibits for foreign exchange rates to be used in the options below.)

- ◇ One day prior to its need for Canadian dollars, IMPORT USA contacts a foreign exchange dealer (remember: if this transaction involved a different currency, the purchase would normally take two days) to execute a spot transaction.
- ◇ The foreign exchange dealer quotes a spot CAD/USD rate of 1.4276.

IMPORT USA agrees to purchase Canadian \$500,000 at 1.4276. On the same day, a bank confirmation is forwarded to IMPORT USA. On the value date of the spot contract, IMPORT USA delivers USD 350,238.16 and receives CAD 500,000. (The U.S. dollar amount is derived as follows: $CAD\ 500,000 \div 1.4276 = USD\ 350,238.16$.)

Sample Confirmation

 First Bank Minneapolis Telephone 612 370-4822 Cable: FIRSTBANK, MPS Telex: 29-0169 FIRBKFOREX, MPS S.W.I.F.T.: FNBM US44		CONTRACT NUMBER 123456		FORM CONTROL NUMBER 22165	
WE CONFIRM HAVING: Sold to you		CONTRACT DATE March 21, XX	VALUE DATE March 22, XX	OPTION No	FIRST DATE
BROKER	CURRENCY CAD	FOREIGN AMOUNT 500,000	RATE 1.4276	J.S. \$ 350,238.16	
R I M I I N E P A T I O N N O N - F I N A N C I A L S E R V I C E S	We debit your account		P R O C E S S I N G I N F O R M A T I O N	Canadian XYZ Bank Winnipeg, Canada	
M I M I I N E P A T I O N N O N - F I N A N C I A L S E R V I C E S	Ref Invoice #123		P R O C E S S I N G I N F O R M A T I O N	Canadian ABC Bank Toronto, Canada	
M I M I I N E P A T I O N N O N - F I N A N C I A L S E R V I C E S	IMPORT USA Corporation Minneapolis, Minnesota Attn: Mr. John Peterson, Treasurer		P R O C E S S I N G I N F O R M A T I O N	Sportsman Exports	
FIRST NATIONAL BANK OF MINNEAPOLIS INTERNATIONAL BANKING DEPARTMENT - P.O. Box A1567 Minneapolis, MN 55480 U.S.A.					
				AUTHORIZED SIGNATURE	
CONFIRMATION COPY - Please sign and return as confirmation of the contract.					

◆ Example 2: Forward Contract

When IMPORT USA received the invoice from its supplier for CAD 500,000, the company wondered if the Canadian dollar would strengthen or weaken, prior to making payment. The current spot rate was 1.4276 and current market trends indicated the Canadian dollar would strengthen.

- ◇ To fix its US dollar buying price and eliminate potential foreign exchange fluctuations, IMPORT USA decides to enter into a forward contract to purchase the Canadian dollar for delivery in one month.
- ◇ IMPORT USA contacts its foreign exchange dealer for a one-month CAD/USD forward rate. The dealer quotes IMPORT USA a rate of 1.4267.

IMPORT USA agrees to the forward rate of 1.4267 and a confirmation contract is forwarded to the company. On the value date, IMPORT USA delivers USD 350,459.10 and receives CAD 500,000. (The U.S. dollar amount is derived as follows: $\text{CAD } 500,000 \div 1.4267 = \text{USD } 350,459.10$.) If this transaction had not been hedged, the goods could have cost IMPORT USA more or less than planned.

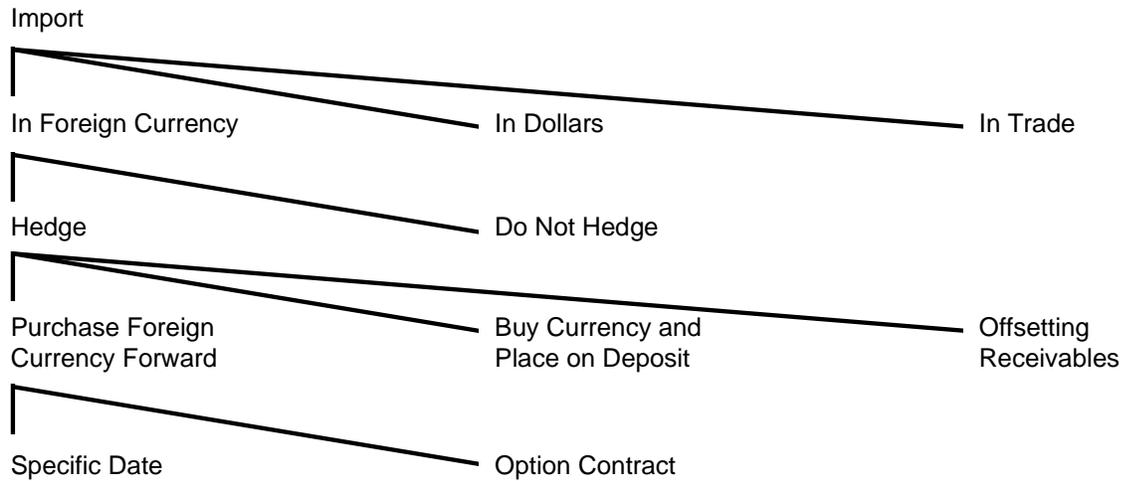
In summary, the forward contract eliminates IMPORT USA's foreign exchange fluctuation risk and provides the company with a convenient and sound cash management technique because its accounts are not debited or credited until the value date.

Sample Confirmation

 First Bank Minneapolis Telephone 612 370-4822 Cable: FIRSTBANK, MPS Telex: 29-0169 FIRBKFOREX, MPS S.W.I.F.T.: FNBM US44		CONTRACT NUMBER _____		FORM CONTROL NUMBER 22165	
WE CONFIRM HAVING: Sold to you		CONTRACT DATE March 28, XX	VALUE DATE April 29, XX	OPTION No	FIRST DATE _____
BROKER _____	CURRENCY CAD	FOREIGN AMOUNT 500,000	RATE 1.4267	U.S. \$ 350,459.10	_____
MEMBER- BANKERS INCORPORATED ST. PAUL, MN 55102	We debit your account		MEMBER- BANK INCORPORATED ST. PAUL, MN 55102	Canadian XYZ Bank Winnipeg, Canada	
HOLDEN BUSINESS FORMS CO., ST. PAUL, MN 55118 (H) 98978	IMPORT USA Corporation Minneapolis, Minnesota Attn: Mr. John Peterson, Treasurer		MEMBER- BANK INCORPORATED ST. PAUL, MN 55102	Canadian ABC Bank Toronto, Canada	
FIRST NATIONAL BANK OF MINNEAPOLIS INTERNATIONAL BANKING DEPARTMENT P.O. Box A1567 Minneapolis, MN 55480 U.S.A.			MEMBER- BANK INCORPORATED ST. PAUL, MN 55102	Sportsman Exports	
			AUTHORIZED SIGNATURE _____		F16 28

CONFIRMATION COPY - Please sign and return as confirmation of the contract.

Transaction For the Importer



An importer has many available options to consider in regard to managing potential foreign exchange risk. While the model above does not contain every alternative, it is illustrative of the decision-making process that is necessary for effective exposure management.

◆ FOREIGN EXCHANGE FOR THE EXPORTER

If you are an exporter and your buyer requires that you export in the buyer's currency, that sale will lead to a foreign exchange exposure for your company. What can you--the exporter--do about this exposure?

◆ Example 1: Spot Contract

EXPORT USA decides to export its merchandise for a total cost of Deutschemarks 500,000. EXPORT USA's selling terms are 60-days open account. Therefore, EXPORT USA knows it will receive Deutschemarks 500,000 approximately 60 days from the date of shipment. (Use the Sample Interbank Rate Screen in the Exhibits for foreign exchange rates to be used in the alternatives below.)

- ◇ EXPORT USA is notified by its buyer that the DEM 500,000 will be available in two days at a German Bank.
- ◇ EXPORT USA contacts its foreign exchange dealer to arrange for the sale of DEM 500,000. The dealer quotes a spot DEM/USD rate of 1.8018.

EXPORT USA agrees to the rate and tells its bank dealer where to pay the U.S. dollars. The dealer instructs EXPORT USA to wire the DEM 500,000 to its account with a German correspondent bank. The bank then forwards a confirming contract to EXPORT USA. On the value date of the contract, EXPORT USA delivers DEM 500,000 and receives USD 277,500.27. (The U.S. dollar amount is derived as follows: $DEM\ 500,000 \div 1.8018 = USD\ 277,500.27$.)

◆ Example 2: Forward Contract

EXPORT USA is uncertain whether the Deutschemark may weaken during the next two months, thus reducing its profit on the sale of goods. To insure the United States dollar value at the time of shipment, EXPORT USA decides to fix the rate of exchange on the DEM 500,000 it will receive in 60 days.

- ◇ EXPORT USA contacts its foreign exchange dealer for a rate and agrees to sell the Deutschemarks forward for two months at 1.7962.
- ◇ The foreign exchange dealer instructs EXPORT USA that the Deutschemarks are to be delivered, on the prescribed value date, to its account at a German correspondent bank. In turn, the dealer receives instructions on where to credit the U.S. dollars.
- ◇ A confirming contract is forwarded to EXPORT USA.

On the contract's value date, EXPORT USA delivers DEM 500,000 and receives USD 278,365.43. (The U.S. dollar amount is derived as follows: $\text{DEM } 500,000 \div 1.7962 = \text{USD } 278,365.43$.)

In summary, the forward contract eliminates EXPORT USA's foreign exchange fluctuation risk and provides the company with a convenient and sound cash management technique because its accounts are not debited or credited until the value date.

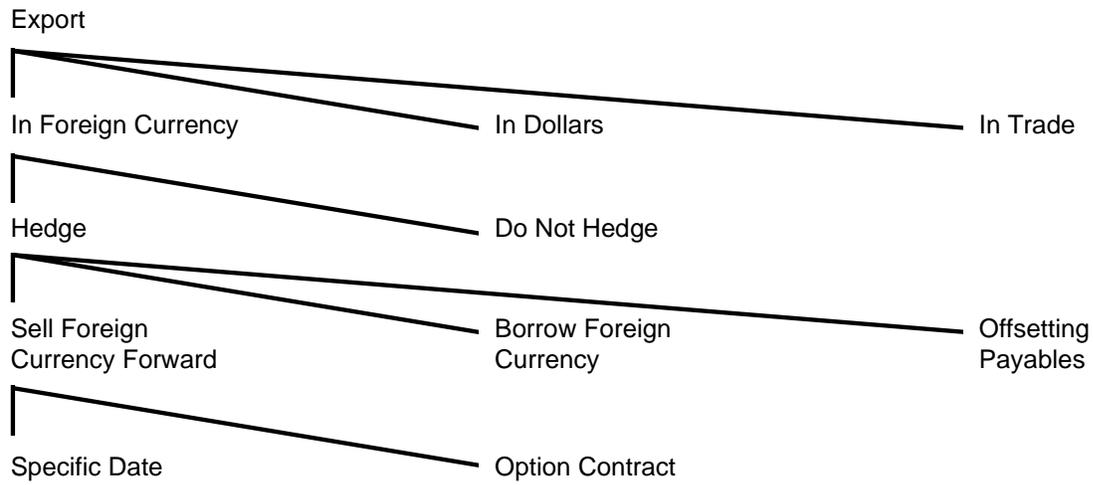
Sample Confirmation

 First Bank Minneapolis		Telephone 612 370-4822 Cable: FIRSTBANK, MPS Telex: 29-0169 FIRBKFOREX, MPS S.W.I.F.T.: FNBM US44		CONTRACT NUMBER <input type="text"/>		FORM CONTROL NUMBER 22165	
WE CONFIRM HAVING: Purchased from you				CONTRACT DATE March 15, XX	VALUE DATE May 17, XX	OPTION No	FIRST DATE
BROKER	CURRENCY DEM	FOREIGN AMOUNT 500,000	RATE 1.7962	J.S. \$ 278,365.43			
MEMBER-BANK OF THE INTERNATIONAL TRADE PAYMENT BANK	We credit your account		MEMBER-BANK OF THE INTERNATIONAL TRADE PAYMENT BANK	German XYZ Bank Frankfurt			
MEMBER-BANK OF THE INTERNATIONAL TRADE PAYMENT BANK			MEMBER-BANK OF THE INTERNATIONAL TRADE PAYMENT BANK	German ABC Bank Frankfurt			
MEMBER-BANK OF THE INTERNATIONAL TRADE PAYMENT BANK	EXPORT USA Corporation Minneapolis, Minnesota Attn: Mrs. Susan Smith, Treasurer		MEMBER-BANK OF THE INTERNATIONAL TRADE PAYMENT BANK	Ourselves			
FIRST NATIONAL BANK OF MINNEAPOLIS INTERNATIONAL BANKING DEPARTMENT P.O. Box A1567 Minneapolis, MN 55480 U.S.A.							
						AUTHORIZED SIGNATURE	
CONFIRMATION COPY - Please sign and return as confirmation of the contract.							

HOLDEN BUSINESS FORMS CO., ST. PAUL, MN 55118 (H) 98978

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Transaction For the Exporter



An exporter has many available options to consider in regard to managing foreign exchange risk. While the model above does not contain every alternative, it is illustrative of the decision-making process that is necessary for effective exposure management.

◆ OPTION DATE FORWARD CONTRACTS FOR IMPORTERS AND EXPORTERS

Frequently an importer or an exporter must make or receive a foreign currency payment at an unspecified future date. If the importer or exporter wishes to hedge these future payments or receipts, he may enter into an option date forward contract.

◆ **Example:**

EXPORT USA will receive DEM 500, 000 approximately 10 days from time of shipment.

- ◇ EXPORT USA contacts its bank for an option date forward contract rate.
- ◇ The bank quotes a rate of 1.8008, good for April 30 to May 10. This rate reflects the ability to deliver Deutschemarks over an 11-day period, meaning that EXPORT USA may deliver its Deutschemarks to the bank for USD 277,654.37 at any time between April 30 and May 10, inclusive. The bank forwards a confirming option date forward contract to EXPORT USA.

Sample Confirmation

 First Bank Minneapolis Telephone 612 370-4822 Cable: FIRSTBANK, MPS Telex: 29-0169 FIRBKFOREX, MPS S.W.I.F.T.: FNBMINUS44		CONTRACT NUMBER _____		FORM CONTROL NUMBER 22165	
WE CONFIRM HAVING:		Purchased from you			
		CONTRACT DATE April 28, XX	VALUE DATE May 10, XX	OPTION Yes	FIRST DATE April 30,
BROKER _____	CURRENCY DEM	FOREIGN AMOUNT 500,000	RATE 1.8008	J.S. \$ 277,654.37	
MEMBER- BANKERS ASSOCIATION OF MINNEAPOLIS	We credit your account		MEMBER- BANKERS ASSOCIATION OF MINNEAPOLIS	German XYZ Bank Frankfurt	
MEMBER- BANKERS ASSOCIATION OF MINNEAPOLIS			MEMBER- BANKERS ASSOCIATION OF MINNEAPOLIS	German ABC Bank Frankfurt	
MEMBER- BANKERS ASSOCIATION OF MINNEAPOLIS	EXPORT USA Minneapolis, Minnesota Attn: Mrs. Susan Smith, Treasurer		MEMBER- BANKERS ASSOCIATION OF MINNEAPOLIS	Ourselves	
FIRST NATIONAL BANK OF MINNEAPOLIS INTERNATIONAL BANKING DEPARTMENT P.O. Box A1567 Minneapolis, MN 55480 U.S.A.					
				AUTHORIZED SIGNATURE _____	
CONFIRMATION COPY - Please sign and return as confirmation of the contract.					

In summary, the "option" allows the exporter to deliver its foreign currency any day during the 11-day time span identified on the confirming contract. The contract delivery date is optional, but the sale of the foreign currency at the contracted rate is binding. The option date forward contract allows the importer or exporter flexibility in fixing an exchange rate for a specific amount for a given time period, because he does not know a specific settlement date. However, as indicated, the bank must adjust the option date forward contract foreign exchange rate to accommodate the "unknown" delivery date. Because a foreign exchange dealer does not know when a corporate customer will choose to settle an option date forward contract, he generally gives the company the least favorable forward premium or forward discount of the option period. The following example illustrates this point:

◆ Example:

EXPORT USA has sold merchandise for DEM 500,000 with 60 days open account terms and expects payment between April 30 and May 10. The company wants to sell the Deutschemark proceeds forward (and purchase U.S. dollars) on an option date forward contract. How does the bank determine the option date forward price?

DEM SPOT BID, USD OFFER	1.8018
April 30 USD Discount	.0010-
May 10 USD Discount	.0025-

The contract would be set at 1.8008 (least discount for U.S. dollars purchased anytime between April 30 and May 10, or $1.8018 - .00010 = 1.8008$).

It should be noted that an option date forward contract is different from the "true" option contracts.

◆ **ALTERNATIVES EXAMINED: USES OF OUTRIGHT FORWARD, COMPENSATING, AND SWAP CONTRACTS**

Outright forwards, compensations, and swaps are types of foreign exchange contracts that may be used in conjunction with each other. In order to help you better understand these contracts and their uses, they are briefly defined below.

- ◆ **OUTRIGHT FORWARDS** are simple purchases (or sales) of one currency against another for a single value date beyond two business days (beyond one business day for Canadian dollars).

- ◆ **COMPENSATING CONTRACTS** are used to offset an existing foreign exchange contract. If the original contract was a purchase, the compensating contract will be a sale, and vice-versa.
- ◆ **SWAPS** are simultaneous purchases and sales (or sales and purchases) of one currency against another for two different value dates.

This section of the handbook will discuss all three concepts and illustrate each with examples.

◆ OUTRIGHT FORWARDS

Outright forward contracts are commonly used to hedge future receivables, payables, dividends, royalties, or the value of permanent investments--such as foreign subsidiaries. Here is a brief example of an outright forward contract:

◆ Example: Outright Forward

IMPORT USA purchases a specialized piece of equipment from a German company. Estimated manufacturing and delivery time for the equipment is six months, with payment of DEM 300,000 due at the time of shipment.

On September 29, IMPORT USA contracts to buy DEM 300,000 for delivery April 1 (six months forward), at the exchange rate of 1.7837.

Spot - October 1	1.8010	
Six Month Adjustment	<u>173</u> -	USD Discount/DEM Premium
Outright Price for April 1	1.7837	

No further action is required until the April 1 settlement date, when the Deutschemarks and U.S. dollars will be delivered by both parties to the foreign exchange contract.

◆ COMPENSATING CONTRACTS

Compensating contracts are used to legally offset some of the obligations of an existing contract. Certain characteristics are common to compensation transactions:

- ◇ Both contracts must have the same value date.
- ◇ Both contracts should call for the exchange of the same two currencies.
- ◇ The compensating contract must contain a reference to the existing contract.

In the typical compensation transaction, one of the currencies of the two contracts is totally offset, with no delivery by either party. The second currency is delivered in full by both parties, or the two contracts are netted, with the difference of the second currency delivered to only one of the parties. (Partial compensations are less common but can be transacted.) If a contract is to be compensated, the process should be performed at least two business days prior to its maturity date (one business day for the Canadian dollar).

An example of a compensating contract follows:

◆ Example: Offsetting an Existing Forward Contract (Compensation)

Three months after entering into the hedge contract, IMPORT USA learns that the German firm has gone bankrupt and the ordered equipment will not be completed and shipped. (Refer to example on the previous page under "Outright Forwards.")

IMPORT USA contacts its bank on January 10 to "compensate" its outstanding Deutschemark hedge. The bank advises IMPORT USA, that the bank can repurchase the DEM 300,000 for settlement on April 1 at the exchange rate of 1.7890.

Spot - January 12	1.7980	
2½+ Month Adjustment	<u> 90</u>	- USD Discount/DEM Premium
Outright Price for April 1	1.7890	

Wording in the compensating contract will refer to the original contract. Generally, the delivery requirements of both contracts will be netted.

IMPORT USA bought	DEM 300,000	÷	1.7837	=	USD 168,189.71
IMPORT USA sold	DEM 300,000	÷	1.7890	=	USD 167,691.44
					NET LOSS = USD 498.27

The bank and IMPORT USA make no delivery of the Deutschemarks, and IMPORT USA pays the net U.S. dollar difference of USD 498.27 to the bank on April 1. Had the value of the Deutschemark gone up instead of down, the bank may have owed U.S. dollars to IMPORT USA. As seen in the example above, an effective hedge contract requires hedging a commitment of reasonable certainty.

◆ SWAPS

Swaps have long been used by banks to manage positions and currency account balances or to arbitrage interest rates. Now companies increasingly use swaps for their own special foreign currency trading problems. What follows are seven examples that demonstrate some of the ways companies engage in swap transactions.

SWAP EXAMPLES

- ◇ Early Settlement of a Forward Contract
- ◇ Extending a Forward Contract
- ◇ "Lending" Foreign Currency Account Balances.....
- ◇ "Borrowing" Foreign Currency Account Balances.....
- ◇ Hedging an Investment
- ◇ Forward-Forward Transactions.....
- ◇ Uncertain Delivery Date (Alternative to an Option Contract).....

◆ SWAP EXAMPLE #1: Early Settlement of a Forward Contract

A swap may be used for early settlement of an existing contract. One-half of the swap can be a compensation.

Refer to example on "Outright Forwards." Assume the German manufacturer does complete the manufacturing and actually delivers the equipment in four and one-half months instead of six months. IMPORT USA has an immediate obligation to pay, but the necessary Deutschemarks will not be available from its hedge contract for an additional one and one-half months.

On February 12, IMPORT USA contacts its bank to do a swap against its existing contract.

<u>February 12 Market</u>	<u>Bid</u>	<u>Offer</u>
Spot - February 14	1.8120	1.8125
1½ Month Adjustment	45-	40-

The bank agrees to sell DEM 300,000 to IMPORT USA at the bank's dollar bid of 1.8120 for delivery to the German company on February 14. Simultaneously, the bank purchases DEM 300,000 from IMPORT USA value April 1 at the current spot rate of 1.8120 adjusted by the appropriate U.S. dollar discount/Deutschemark premium of 40 points, for a net price of 1.8080. The latter contract is intended to be a "compensation" of IMPORT USA's original outright forward for April 1.

Note: The far date determines whether the bid or offer side of the forward adjustment is applied. In this example, IMPORT USA is buying U.S. dollars (selling Deutschemarks) at the bank's quoted 40 point discount.

Early Settlement of a Forward Contract (compensation)

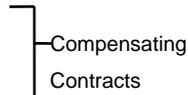
IMPORT USA Actions

Value Dates IMPORT USA Contract Positions

IMPORT USA agrees to purchase equipment from German company.

September 29

IMPORT USA purchases DEM 300,000 at 1.7837 value April 1st.



February 12

IMPORT USA sells DEM 300,000 at 1.8080 value April 1 as compensation.

February 12

IMPORT USA buys DEM 300,000 at 1.8120 for value February 14 as early settlement.

February 14

IMPORT USA has bank deliver DEM 300,000 to German company.
IMPORT USA pays bank USD 165,562.91

February 14 Bought DEM 300,000 ÷ 1.8120 = USD 165,562.91

April 1

IMPORT USA pays USD 2,260.51 compensation different to bank.

April 1 Bought DEM 300,000 ÷ 1.7837 = USD 168,189.71
 Sold DEM 300,000 ÷ 1.8080 = USD 165,929.20
 Compensation Difference = USD 2,260.51

To summarize, what are the cost/benefit implications of the above transactions?

Value February 14	IMPORT USA bought	DEM 300,000	÷ 1.7837	= USD 168,189.71
Value April 1	IMPORT USA bought	DEM 300,000	÷ 1.8120	= USD 165,562.91
	IMPORT USA sold	DEM 300,000	÷ 1.8080	= <u>USD 165,929.20</u>
	Difference owed to bank on April 1		=	2,260.51

In this swap transaction, the total adjusted cost for DEM 300,000 becomes USD 167,823.42 (USD 165,562.91 due on February 14 and USD 2,260.51 due on April 1), actually USD 366.29 less cost than originally planned. The savings result from taking early delivery of a currency (Deutschemarks) that is trading at a forward premium to the U.S. dollar. Under different circumstances, the cost and cash flow implications could have been of greater or lesser magnitude, or the opposite of the above example.

There are two main reasons for handling the above transactions as a swap and compensation instead of two (spot and outright forward) independent transactions.

- (1) IMPORT USA saves the "5 points" spread of the spot market.
- (2) IMPORT USA eliminates the cost and risk of unnecessary currency deliveries on April 1.

◆ SWAP EXAMPLE #2: Extending a Forward Contract

A swap may be used when extension of an existing contract is desired. One-half of the swap can be a compensation.

Refer to example under "Outright Forwards." Now assume that almost six months have passed and the German company advises IMPORT USA that two more months will be required to complete delivery of the ordered equipment. IMPORT USA, under its maturing forward contract with the bank, will soon have Deutschemarks available, but will not need them for two more months.

On Friday, March 29, IMPORT USA contacts its bank to do a swap against its existing contract.

<u>March 29 Market</u>	<u>Bid</u>	<u>Offer</u>
Spot - April 1	1.8220	1.8225
Two Month Adjustment	60-	56-

The bank agrees to purchase DEM 300,000 from IMPORT USA at the bank's dollar offer of 1.8225. This contract is in compensation of IMPORT USA's original "hedge" contract for April 1. Simultaneously, the bank sells DEM 300,000 to IMPORT USA for value June 1 at the net price of 1.8165, a rate that is based on the current spot rate of 1.8225 adjusted by the appropriate U.S. dollar discount/Deutschemark premium of 60 points.

◆ Extending a Forward Contract (compensation)

IMPORT USA Actions

IMPORT USA agrees to purchase equipment from German company.

September 29

IMPORT USA purchases DEM

Value Dates

IMPORT USA Contract Positions



two settlement dates, instead of simply applying the forward premium or discount "adjustment" to the historical contract rate. Cash would then have changed hands on one settlement date, instead of two. The reason is simple. Bank examiners frown on the historical rate approach in a swap because it generally defers or accelerates income or expense. Used improperly, the historical rate approach can hide cash flow difficulties for either party to the contract.

◆ **SWAP EXAMPLE #3: "Lending" Foreign Currency Account Balances**

A swap may be used to maintain a position in one currency when balances are not needed, while gaining the use of a second currency. The term "lending" balances is used to describe a swap transaction in which one currency is sold against another for one value date, then repurchased against the same currency for a subsequent value date. No "loan" is actually involved.

For example, EXPORT USA has both receivables and payables in Canadian dollars. The company maintains a Canadian dollar account with a bank in Winnipeg that is used to collect Canadian dollar receivables and to settle Canadian dollar payables. EXPORT USA has a significant receivable credited to its Canadian dollar account on April 14, bringing the Canadian dollar balance close to CAD 800,000. Most of these funds will not be used for payables until April 25.

To protect itself from foreign currency exposure, EXPORT USA prefers to net Canadian dollar receivables and payables. Therefore, the company does not want to sell the excess Canadian dollar balances in the current spot market, only to find it necessary to repurchase Canadian dollars in the spot market ten days later. In addition, EXPORT USA does not want to invest its excess Canadian dollar balances because it usually borrows U.S. dollars from its local bank.

EXPORT USA's solution is to swap a portion of its Canadian dollar balances from April 15 to April 25. Here is a hypothetical CAD/USD market on April 14:

	<u>Bid</u>	<u>Offer</u>
Spot - April 15	1.4276	1.4279
Ten Day Adjustment (April 15-25)	4-	2-

EXPORT USA sells CAD 750,000 value April 15 at the rate of 1.4279 to its bank. Simultaneously, EXPORT USA repurchases CAD 750,000 from its bank for value April 25 at the spot rate of 1.4279, adjusted by the appropriate U.S. dollar discount/Canadian dollar premium of 4 points, for a net price of 1.4275.

To summarize, what are the cost/benefit and cash flow implications of the above transaction?

Value April 15 EXPORT USA sold CAD 750,000 \div 1.4279 = USD 525,246.86
 Value April 25 EXPORT USA bought CAD 750,000 \div 1.4275 = USD 525,394.04

On April 15, EXPORT USA delivers CAD 750,000 to the contracting bank, and--in return--receives USD 525,246.86. On April 25, EXPORT USA receives CAD 750,000 from the contracting bank and must pay the bank USD 525,394.04. Through this swap transaction, EXPORT USA is able to

- ◇ maintain its net position in Canadian dollars,
- ◇ use USD 525,246.86 for ten days, and
- ◇ incur a slight cost of 4 points, or USD 147.18 (USD 525,394.04 less USD 525,246.86).
 This cost will be offset by the benefit of investing the USD for the period

◆ SWAP EXAMPLE #4: "Borrowing" Foreign Currency Account Balances

This swap technique is the exact opposite of "lending" balances explained in Example #3. The term "borrowing" is used to describe a swap transaction in which one currency is purchased against another for one value date, then resold against the same currency for a subsequent value date. No actual "borrowing" is involved.

Simply stated, a company that "borrows" currency through a swap transaction, gains the use of that currency (in exchange for another) for a predetermined period of time without changing its net position in the currency.

Assume, for example, that EXPORT USA has payables due before its receivables are collected. EXPORT USA could buy Canadian dollars against delivery of U.S. dollars for one date and simultaneously sell Canadian dollars against receipt of U.S. dollars for a later date. Again, EXPORT USA is able to offset its payables with receivables, while not changing its net position in Canadian dollars. For this, EXPORT USA sacrifices the use of a corresponding amount of U.S. dollars during the swap period. EXPORT USA may incur a swap cost or realize a benefit, depending upon forward market premiums and discounts.

◆ **SWAP EXAMPLE #5: Hedging an Investment**

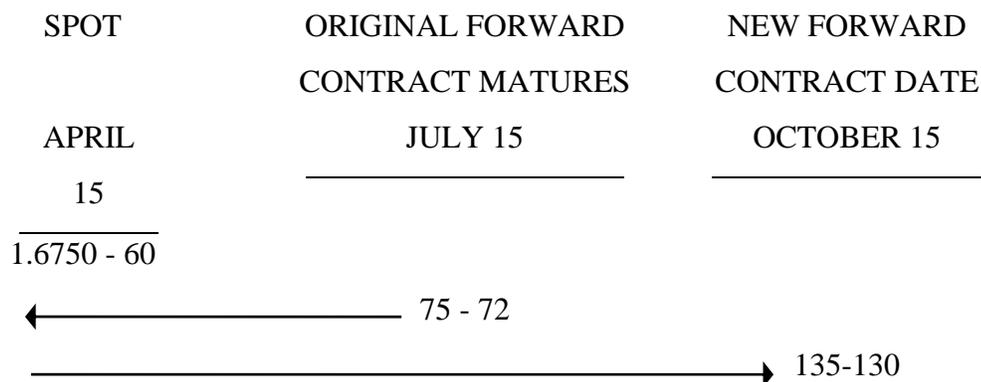
The investment manager of EXPORT USA discovers a fully-hedged interest rate advantage from investing in 60-day Canadian dollar Treasury Bills. To facilitate the transaction, he enters into a foreign exchange swap with his bank. EXPORT USA purchases the amount of spot Canadian dollars needed to acquire the T-bills, and simultaneously sells the expected Canadian principal and interest forward to complete the arbitrage.

Note: In a typical swap transaction, the spot and forward amounts of the primary currency are the same; however, many banks oblige their customers by buying or selling more currency for the forward date, thereby allowing them to also hedge an interest flow.

How does EXPORT USA determine what its costs or earnings will be on this forward-forward swap transaction? What follows is a brief explanation of how forward-forward swap prices are generally calculated. Conceptually, a forward-forward involves two swaps. First, EXPORT USA completes a swap to change its July 15 delivery obligation to April 15, spot. Second, EXPORT USA completes a swap to change its new spot delivery obligation to a revised receipt-of-payment date, October 15. (It is important to note here that positive or negative cash flows may result on July 15. See Extending a Forward Contract (Compensation) example for elaboration.)

APRIL 13 MARKET PRICES FOR USD/GBP

Spot	1.6750 - 60
1 Month	25 -24
2 Months	48 -47
3 Months	75 -72
6 Months	135 -130



EXPORT USA can sell GBP 2,000,000 to its bank for settlement April 15 and simultaneously purchase GBP 2,000,000 for settlement July 15 for a swap benefit to itself of 72 points. EXPORT USA has therefore "squared" its July 15 GBP position, but still needs to cover its anticipated receivables due on October 15. EXPORT USA would now purchase GBP 2,000,000 from its bank for settlement April 15, and simultaneously sell GBP 2,000,000 for settlement October 15, at a swap cost to itself of 135 points. The net cost of these two swaps to EXPORT USA is 63 points (135 cost minus 72 gain).

SWAP #1: April 15 - July 15
(Gain) Points 75 - 72

SWAP #2: April 15 - October 15
(Loss) Points 135 -130

In actual practice, a bank would probably execute one forward-forward swap from July 15 to October 15 at 63 points loss to EXPORT USA. Therefore, a forward-forward transaction reduces the need for executing two swaps and simplifies the process to executing one swap.

EXPORT USA also had another option. By waiting until July 13, EXPORT USA could have entered into a simple three-month swap. Because a forward-forward price is generally derived from the least favorable side of two swap markets for the customer (75 - 72, 135 - 132), waiting until the swap can be done from the spot date can frequently be the most cost-efficient option.

Determining whether to engage in a forward-forward swap or waiting to conduct an ordinary swap on the spot date is extremely complex, and beyond the intended scope of this handbook. Briefly, however, an analysis of relative interest rate curves, forecasts of future interest rate curves, and spot rate forecasts would be essential before making this decision. These interest rate analyses and forecasts would apply to forward premiums and discounts; the spot rate forecasts would reveal cash flow implications of compensating and extending contracts.

**◆ SWAP EXAMPLE #7 - Uncertain Delivery Date
(Alternative to an Option Date Forward Contract)**

The corporate currency manager should be aware of an alternative, that may reduce costs or increase earnings, to an option date forward contract discussed in this Module, Section C. Swap contracts are often used to reduce extreme price adjustments for premiums or discounts occurring in option date forward contracts.

Below is an example of how swap contracts can be used by the currency manager to hedge a payable (that has an uncertain delivery date), the same procedure can be used for a receivable.

In late September, IMPORT USA contracted to purchase a specialized piece of equipment from a Swiss company. Estimated manufacturing and delivery time for the equipment is six months (April 1) with payment of CHF 300,000 due at the time of shipment.

IMPORT USA believes the ordered equipment may be shipped as early as March 15. On September 29, IMPORT USA decides not to execute an option contract for the period March 15 to April 1. Instead IMPORT USA will make an outright forward purchase of CHF 300,000 for settlement on April 1. As a result, if the equipment is shipped early, IMPORT USA will use a swap to settle the CHF contract early. If the equipment is shipped later than April 1, IMPORT USA will use a swap to extend its CHF contract.

In making a decision on whether to use an option date forward or swaps for the uncertain delivery dates, IMPORT USA considered the following factors:

- (1) Through the option date forward contract, IMPORT USA would have paid the greatest USD discount (CHF premium) to purchase CHF between March 15 and April 1.
- (2) IMPORT USA believed its overall costs for purchase of the CHF 300,000 would be less if the CHF were purchased outright for April 1, and the company took early delivery of the contract.
- (3) IMPORT USA believed there would be no significant adverse shift in forward discounts or premiums.

- (4) IMPORT USA was not concerned with the more cumbersome cash flow mechanics of a swap versus an option contract.

In practice, there are so many unknowns to predict when making a swap versus an option contract decision, most choices are often simply a result of corporate preference.

◆ MISCELLANEOUS CONSIDERATIONS

◆ Per Annum Hedging Costs/Benefits

At times, it may be desirable to determine the cost or benefit of a specific period's hedge on an annualized basis. Two primary reasons for this calculation are:

1. A company can compare the cost or benefit of a forward contract with alternative forms of hedging that are also examined on a per annum basis.
2. A company can compare the relative costs of hedging at different time periods.

Formulas

The following formulas may be used to determine the annualized cost or benefit of a forward contract. Note that different formulas are used for transactions priced in American terms or European terms.

EUROPEAN TERMS

$$\frac{\text{FORWARD POINTS}}{\text{OUTRIGHT FORWARD}} \times \frac{360}{\text{DAYS}} = \text{PER ANNUM HEDGING COSTS}$$

AMERICAN TERMS

$$\frac{\text{FORWARD POINTS}}{\text{SPOT}} \times \frac{360}{\text{DAYS}} = \text{PER ANNUM HEDGING COSTS}$$

◇ **Calculation Examples**

On the following page are calculations using exchange rates for Swiss francs stated in both European and American terms to determine the annualized cost/benefit of a forward contract. For simplicity, a one-sided market is used:

	<u>EUROPEAN TERMS</u>	<u>AMERICAN TERMS</u>
SWISS FRANCS SPOT	1.4977	.6677
3 MONTH ADJUSTMENT (91 days)	<u>.0156-</u>	<u>.0070+</u>
3 MONTHS OUTRIGHT	1.4821	.6747
EUROPEAN TERMS	<u>.0156</u> <u>360</u>	
PER ANNUM COST/BENEFIT =	1.4977 X 91 = 4.12%	
AMERICAN TERMS	<u>.0070</u> <u>360</u>	
PER ANNUM COST/BENEFIT =	.6677 X 91 = 4.12%	

◇ **Information Uses**

The above formulas can also provide a quick, rough estimate of interest rate differentials between two countries. In the Derivation of Forward Premiums/Discounts example in Module 4, the interest rate differential between EuroSwiss francs and Eurodollars in the 6-month period is 4.3% (6.0%-1.7%). The above formulas provide a quick estimate of 4.0% in this way:

$$\frac{\text{FORWARD POINTS}}{\text{OUTRIGHT FORWARD}} \times \frac{360}{\text{DAYS}} = \frac{.0305}{1.4977} \times \frac{360}{182} = 4.02\%$$

When large sums are involved, however, we recommend using only the complete arbitrage formulas shown in Module 4.

One valid use of annualizing formulas is to compare the relative cost/benefit of different hedging periods. In the calculation example used earlier, the cost/benefit of a 3 month-Swiss franc hedge was about 4.1%. Referring to the Sample Interbank Rate Screen in the Exhibits, now compare the relative cost/benefit of three different hedging periods:

	SPOT	1.4977
SWISS	1 MONTH	..0053-
FRANCS	3 MONTHS	.0156- (4.1%)
	12 MONTHS	.0572-

$$\text{ONE MONTH} = \frac{.0053}{1.4977} \times \frac{360}{30} = 4.2\% \text{ Per Annum}$$

$$\text{TWELVE MONTHS} = \frac{.0572}{1.4977} \times \frac{360}{366} = 3.7\% \text{ Per Annum}$$

As you can see, the one-month period has a greater relative cost/benefit than either the three-month or twelve-month periods. If you wish to hedge a constant exposure (for permanent foreign investment, for example), you can use this information, along with your interest rate outlook for the two countries (Switzerland, USA) to determine a preferred hedging period. In fact, you may wish to develop your own calculations and conclusions regarding per annum hedging costs/benefits because bank dealers rarely examine exchange rates from this perspective.

For transactional exposures (except for comparisons with hedging alternatives) annualizing hedging costs and benefits may have limited value. For example, if you have receivables due in one week in a currency that trades at a 1% discount to spot rates for that period, the 52% annualized cost may seem prohibitive and discourage you from hedging. However, the only valid approach in this situation is to compare your direct cost with the possible or probable range for spot prices over the coming week. During unsettled times, in a one-week period the spot prices for many currencies may range 3 to 5% or more, vis-a-vis the U.S. dollar. Your own assessment of market conditions and trends, along with your company's hedging policies, will best determine whether a one-week hedge cost, as cited in this example, is appropriate.

◆ Hedging a Weak Currency

There could be significant, unexpected costs in hedging a "weak" currency, if the forward contract must be settled early, extended or offset. For example, if a country uses high interest rates to defend its own currency, that monetary policy can significantly affect forward rates, particularly short term rates.

◇ Example:

IMPORT USA must make a FRF 10,000,000 payment on June 1. Today is March 30. IMPORT USA contacts its foreign exchange dealer for a two-month forward rate. (This is an actual example illustrated with historic rates from a period of time when the French franc was under pressure to devalue.)

SPOT	7.0050	7.0100
TWO-MONTH FORWARD POINTS	<u>.0970+</u>	<u>.1050+</u>
OUTRIGHT TWO-MONTH PRICE	7.1020	7.1150

IMPORT USA's foreign exchange dealer quotes 7.1020 for delivery of French francs two months forward on June 1. IMPORT USA's benefit on the two-month forward hedge is as follows:

SPOT COST of FRF	10,000,000	at	7.0050	=	USD 1,427,551.75
FORWARD COST of FRF	10,000,000	at	7.1020	=	<u>USD 1,408,054.07</u>
HEDGING BENEFIT				=	USD 19,497.68

However, on May 30, IMPORT USA realizes the payment must be made on May 31 for contractual reasons. IMPORT USA contacts its foreign exchange dealer to make arrangements to deliver the FRF 10,000,000 on May 31, one day earlier than the outstanding foreign exchange contract indicates. IMPORT USA's foreign exchange dealer

reports that France has increased its short term interest rates substantially to defend the French franc against speculators. He adds that forward discounts for the franc against the U.S. dollar have also grown accordingly.

IMPORT USA decides it has no choice but to arrange a settlement one day earlier. Their foreign exchange dealer quotes the following rates on May 30:

SPOT	7.0220	7.0260
TOM/NEXT*	.0350+	.0450+

*"Tom/next" is dealer jargon for tomorrow/next, a type of one-day swap.

The foreign exchange dealer sells FRF 10,000,000 to IMPORT USA for delivery on May 31 at the exchange rate of 7.0220. The dealer simultaneously purchases FRF 10,000,000 for delivery on June 1 at the exchange rate of 7.0670, reflecting the "tom/next" adjustment. IMPORT USA's cost for this one-day swap is determined as follows:

COST OF MAY 31 FRF	10,000,000	at	7.0220	=	USD 1,424,095.70
PROCEEDS OF JUNE 1 FRF	10,000,000	at	7.0670	=	<u>USD 1,415,027.59</u>
			COST OF SWAP	=	USD 9,068.11

As you can see, the cost of a one-day adjustment was almost 50% of the hedging benefit (\$19,497.68) originally acquired in a two-month forward hedge.

When transacting in a currency that has historically been subject to periods of extreme weakness, and such weakness has been defended through high interest rates, note the following:

- ◇ Payables may present a significant risk when hedged for a date longer than necessary.
- ◇ Receivables may present a significant risk when hedged for a date shorter than necessary.

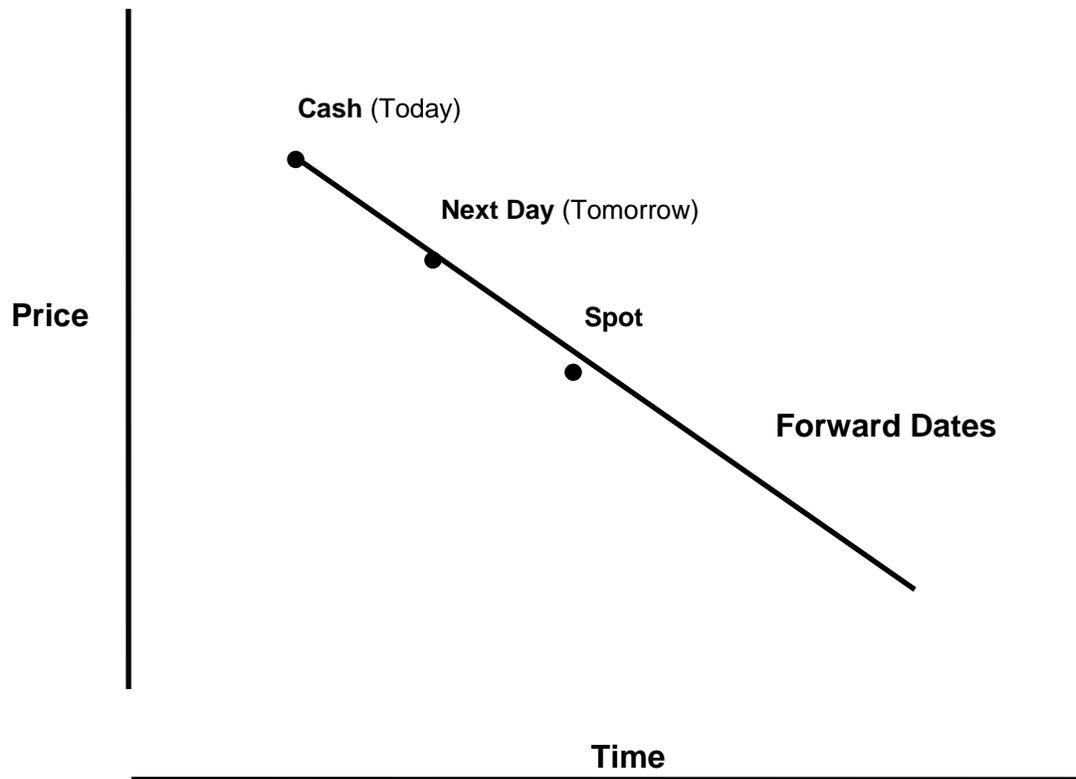
The above rules-of-thumb apply to forward-market conditions existing prior to selling pressure on a currency. If forward discounts are already substantial, the statements may be less valid.

◆ **Premiums/Discounts and Short Date Transactions**

If, in the previous example, the French franc had been selling at a premium to the U.S. dollar, IMPORT USA would have earned on the swap. The two graphs on these pages help in conceptualizing costs or earnings in short date transactions.

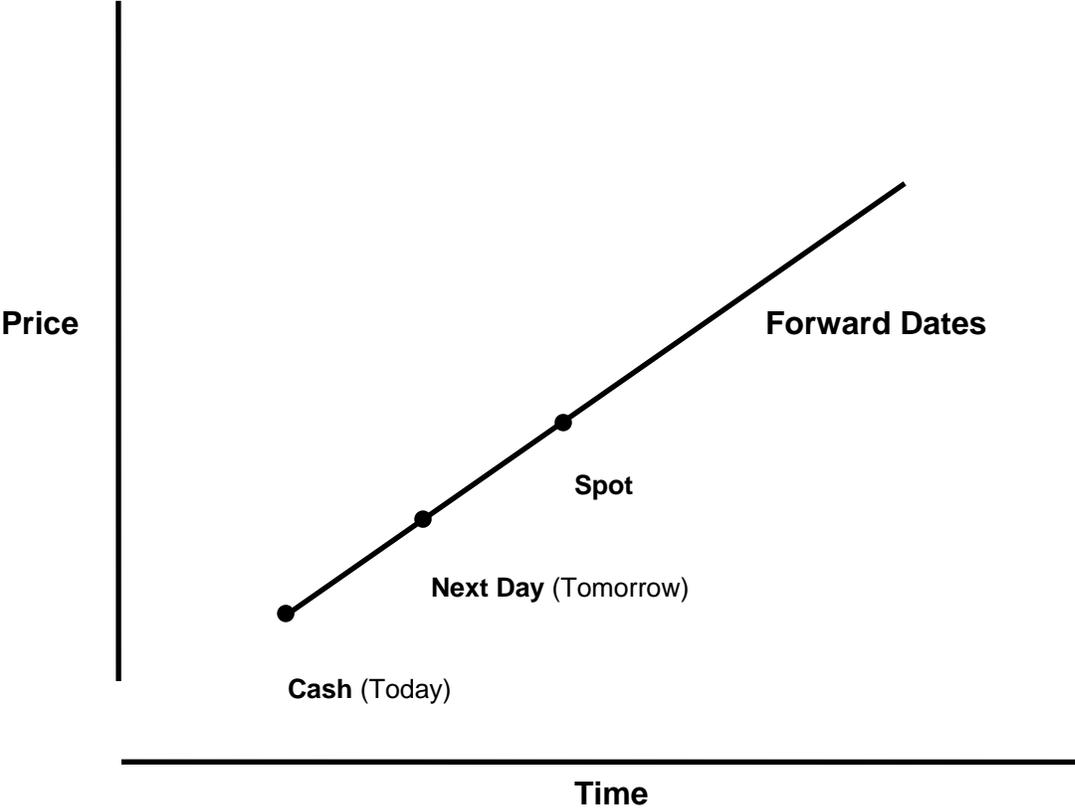
1. If, for example, you buy a currency for forward delivery that trades at a discount, it will cost you less than if purchased for spot delivery. However, if you buy for delivery prior to the spot date, it may cost more:

Short Date Transactions



2. Conversely, if you buy a currency for forward delivery that trades at a premium, it will cost more than for a spot delivery. If, on the other hand, you buy for delivery prior to the spot date, it may cost less.

Short Date Transactions



Please note: These graphs only indicate a probable trend. There may be instances where the above factors do not combine to form a straight line. This variance might occur when a currency sells at a premium for one time period and sells at a discount in the next.

SAMPLE INTERBANK RATE SCREEN

	SPOT	1 MONTH	2 MONTH	3 MONTH	6 MONTH	12 MONTH
USD/GBP	1.6754/59	26/24	51/48	77/73	150/142	300/290
CAD/USD	1.4276/79	9/8	17/15	26/23	51/46	102/94
USD/AUD	.6460/64	1/4	2/6	4/8	10/15	30/40
DEM/USD	1.8010/18	30/28	60/56	90/85	173/165	340/330
JPY/USD	132.10/15	55/52	110/104	169/165	338/330	680/670
ITL/USD	1781.00/ 1781.50	150/300	-150/+200	300/0	650/250	1200/700

WORKSHEET 4

HEDGING IMPORTS AND EXPORTS

IMPORT USA HAS A CAD 500,000 PAYABLE DUE IN 30 DAYS. REFER TO THE SAMPLE INTERBANK RATE SCREEN FOR RATES.

1. WHAT WOULD THE PRICE BE TODAY, IF THEY WERE TO BUY CAD 500,000 SPOT?

2. WHAT WOULD THE FORWARD PRICE BE TODAY IF THEY WERE TO BUY CAD 500,000 1 MONTH FORWARD?

3. IN EUROPEAN TERMS:
 - ◆ IS THIS A USD PREMIUM OR DISCOUNT?
 - ◆ WILL IMPORT USA BUY CAD FROM THE BANK AT THE BANK'S BID OR OFFER?
 - ◆ IS THIS A COST OR EARNINGS FOR IMPORT USA IN THE FORWARD MARKET?

EXPORT USA HAS A DEM RECEIVABLE DUE IN 60 DAYS.

1. WHAT WOULD THE PRICE BE TODAY IF THEY WERE TO SELL DEM 500,000 SPOT?

2. WHAT WOULD THE PRICE BE TODAY IF THEY WERE TO SELL DEM 500,000 2 MONTHS FORWARD?

3. IN EUROPEAN TERMS:

- ◆ IS THIS A USD PREMIUM OR DISCOUNT?
- ◆ WILL EXPORT USA SELL DEM TO THE BANK AT THE BID OR OFFER?
- ◆ IS THIS A COST OR EARNINGS FOR EXPORT USA IN THE FORWARD MARKETS?

WORKSHEET 5

OPTION DATED FORWARDS

JPY/USD

SPOT	132.10-15
1 MONTH	131.55-60
2 MONTH	131.05-10

EXPORT USA WILL RECEIVE 100 MM JPY 1 TO 2 MONTHS FROM NOW.

- ◆ IS THE DOLLAR AT A DISCOUNT OR PREMIUM ?
- ◆ WHAT RATE WOULD THE BANK QUOTE EXPORT USA FOR AN OPTION CONTRACT TO SELL JPY 100 MM BETWEEN 1 MONTH AND 2 MONTHS?
- ◆ IS THIS A COST OR EARNINGS FOR EXPORT USA IN THE FORWARD MARKETS?

IMPORT USA MUST PAY 100 MM JPY 1 TO 2 MONTHS FROM NOW.

- ◆ WHAT RATE WOULD THE BANK QUOTE IMPORT USA FOR AN OPTION CONTRACT TO BUY JPY 100 MM BETWEEN 1 MONTH AND 2 MONTHS?
- ◆ IS THIS A COST OR EARNINGS FOR IMPORT USA?

CASE STUDY EXPORTING

	APRIL 20 JPY/USD	MAY 20 JPY/USD
SPOT	132.10-15	133.20-25
1 MONTH	131.55-60	132.70-75
2 MONTH	131.05-10	132.30-35

ON APRIL 20 EXPORT USA MAKES A SALE TO A JAPANESE COMPANY FOR GOLF CLUBS VALUED AT JPY 100 MM. THE COMPANY PLANS TO SHIP IMMEDIATELY AND BE PAID IN 30 DAYS. THEY REALIZE THERE COULD BE DELAYS UP TO 60 DAYS AND WANT TO HEDGE THE JPY RECEIVABLE.

- ◆ WHAT WOULD BE THE RATE AND USD AMOUNT FOR A 1 MONTH FORWARD CONTRACT?**
- ◆ IF ON MAY 20 THEY NEED TO EXTEND THAT CONTRACT FOR 1 MORE MONTH, WHAT CONTRACTS WOULD THEY ENTER INTO WITH THE BANK AND WHAT WOULD BE THE NET USD THAT THEY WOULD RECEIVE?**
- ◆ WHAT WOULD BE THE RATE AND USD AMOUNT ON APRIL 20 FOR AN OPTION DATED CONTRACT BETWEEN 1 AND 2 MONTHS?**

DISCUSS THE ADVANTAGES AND DISADVANTAGES OF EACH HEDGING METHOD.

MODULE 4

EUROCURRENCY MARKET

MODULE OBJECTIVES

- ◆ UNDERSTAND MARKET PRACTICES AND MECHANICS.
- ◆ USE THE EUROCURRENCY MARKET FOR BORROWING, INVESTING AND HEDGING.
- ◆ KNOW RELATIONSHIP BETWEEN EUROCURRENCY RATES AND FORWARD EXCHANGE RATES
- ◆ CALCULATE AND RECOGNIZE ARBITRAGE POSSIBILITIES.

The Eurocurrency market is a worldwide market of currencies placed on deposit outside their respective countries of origin (i.e., a Eurodollar is a U.S. dollar held on deposit somewhere outside the United States or its territories). These deposits are generally used to fund "offshore" loans, or deposits placed with other banks. The definition applies to cross-border loans and deposits in bookkeeping form, not to the physical transfer of banknotes.

The fear of our government imposing capital controls is generally cited as the primary reason for the creation of the Eurodollar (and subsequently - the Eurocurrency) market during the 1950's. In addition, the November 1979 freeze of official Iranian assets held in the United States reinforced this attitude. This reality, along with pricing considerations and the existence of a well-developed market infrastructure maintains the Eurocurrency market as one of the foremost vehicles of international finance.

Unfortunately, no single description of the Eurocurrency market accurately defines today's range of activities. For example, a bank doing business within the United States can establish an International Banking Facility (IBF) and accept Eurodollar deposits without the need for a foreign office. An IBF is not a separate legal entity, merely a segregated set of books within the bank accepting the Eurodollar deposit from outside the United States.

Regardless of the exceptions to any description of Eurocurrencies, one element remains universal -- virtually all Eurocurrency trading takes place from cities/countries which do not impose reserve requirements on this activity. The rate on a Eurocurrency deposit will generally bear a relationship to the rate on a domestic deposit of the same currency adjusted for this lack of reserves, along with consideration of taxes, capital flow restrictions, risk perceptions, and other factors.

◆ **MARKET PRACTICES / MECHANICS**

◆ **Primary Currencies**

Primary currencies of the Eurocurrency deposit market are the U.S. dollar, Deutschemark, English pound, Swiss franc, and Japanese yen. A Eurocurrency deposit can be arranged in almost any other currency for which a foreign exchange forward market exists.

◆ **Eurocurrency Centers**

Eurocurrency deposits are generally traded from centers that offer tax and/or regulatory freedoms for such activity. Primary centers include London, Grand Cayman, Nassau, and Singapore; however, a large list of cities and countries are receptive to Eurocurrency deposit trading. London is the main center for the issuance of Eurodollar negotiable certificates of deposit.

◆ Eurocurrency Specifications

Most Eurocurrency trading involves fixed-rate, fixed-term, non-negotiable deposits. Negotiable Eurodollar certificates of deposit are available, but offer depositors lower yields in return for added liquidity.

Eurocurrency deposit quotes between banks are two-sided (bid, offer), they are usually in increments of eighths or sixteenths of one percent, and they are spread from one-eighth of one percent to one percent or more, depending upon market conditions and the currency being quoted. The accrual basis for Eurodollars and most other Eurocurrencies is actual days/360. The accrual basis for English pounds and a few other currencies is actual days/365.

Eurocurrency deposits and loans, like foreign exchange transactions, are quoted for settlement in two business days for periods of one month, two months, three months, and so on. Eurocurrency rates are not generally quoted for terms of 30 days, 60 days, and 90 days as are domestic U.S. dollar deposits. Fixed rate deposit and loan prices are readily available for periods up to six months and generally available for periods from seven months to one year. Maturities up to five years may be negotiated.

◆ Settlement Method

Settlement (payment and repayment) of Eurocurrency transactions takes place via the movement of funds in the home country of the currency involved. For example, a loan in Eurodollars made by a French bank to a German corporation is settled by the movement of funds between their respective accounts with banks located within the United States.

◆ Market Terminology

A term common to loans in Eurodollars is LIBOR--an acronym for "London Interbank Offered Rate." This represents the base rate (before spread or markup) of Eurodollar loans priced from interbank wholesale deposit trading among banks in London. With a worldwide market of Eurocurrency deposit trading, terms such as NIBOR (New York), SIBOR (Singapore), and even IBOR (no center designated) are used.

◆ USES OF THE MARKET

Corporations utilize the Eurocurrency market primarily to borrow funds, to invest funds, or to hedge foreign exchange exposures.

◆ Borrowing

Corporations frequently request a Eurocurrency financing option in loan agreements. The fixed-term, fixed-rate nature of Eurocurrencies offers both structural and pricing alternatives to floating rate domestic sources. At times, an offshore source of funding in a given currency may be the only source. This was, in fact, the case for foreign subsidiaries of U.S. corporations that required U.S. dollars during the capital flow control period of the late sixties and early seventies.

◆ Investing

The Eurocurrency market also offers an important investment alternative to domestic markets. For example, a U.S. company owning Canadian dollar deposits in Canada may find that "offshore" Canadian dollar deposits are more attractive because an interest withholding tax exists on Canadian dollar deposits held in that country, but not on EuroCanadian deposits. Therefore, even if domestic Canadian dollar deposits yield a higher gross rate, EuroCanadian deposits may well yield a higher net rate of return. (Also see arbitrage example, this module.) The Eurocurrency market also provides greater control over credit and political risks. A deposit denominated in the currency of one country may be placed in a second country, with a bank based in a third country (e.g., a Hong Kong dollar deposit placed with the London branch of an Australian bank).

◆ Hedging

Companies may use the Eurocurrency market as an alternative to the forward foreign exchange market for hedging purposes. By depositing or borrowing in a foreign currency, the company creates a future payable or receivable that may offset other foreign currency exposures. However, this is usually not a practical method of hedging unless the company has a natural interest in borrowing or depositing money. Because Eurocurrency deposit prices and forward foreign exchange prices are derived from each other, one method of hedging rarely yields an advantage over another. Any perceived differences are more likely to arise from comparisons calculated using domestic interest rates or from pricing differences based on banking relationship factors.

For example, if a company currently borrows fixed-rate domestic U.S. dollars, and simultaneously needs to sell Deutschemarks six months forward to cover receivables, the Treasurer might explore borrowing EuroDeutschemarks as an alternative. To do this, he or she would compare the combined net cost of borrowing U.S. dollars domestically and selling Deutschemarks forward, to the outright cost of borrowing EuroDeutschemarks. However, the comparison would be heavily influenced by (1) the current relationship of domestic source funding to Eurocurrency funding, and (2) the spread that the lending bank applies to each of the two borrowing options.

The following two sections will provide the basic information and the formula necessary to determine if it is preferable to hedge a given foreign currency exposure through a foreign exchange forward contract, or to hedge by arranging a loan or deposit in the relevant Eurocurrency. Factors not discussed in the text which may also weigh on that selection involve a comparison of balance sheet and off balance sheet considerations, as well as the tax implications of potential foreign exchange gains or losses with each alternative.

◆ **RELATIONSHIP BETWEEN EUROCURRENCY RATES AND FORWARD FOREIGN EXCHANGE RATES**

Eurocurrency interest rates play an important role in determining foreign exchange forward rates. This section will describe the derivation of forward premiums and discounts and put into perspective the movement of spot rates and forward premiums/discounts relative to the Eurocurrency markets. The section will further demonstrate that forward foreign exchange rates are not a forecast of where spot rates will be in the future, except in the most theoretical sense.

◆ **Spot Exchange Rates**

Spot exchange rates (for freely traded currencies) respond primarily to supply and demand. Supply and demand can be affected by political climate or occurrences, economics, technical or psychological factors, as well as numerous other considerations. In this regard, Eurocurrency interest rates are generally only an indirect factor in determining the level of spot rates.

◆ **Forward Premiums/Discounts**

Eurocurrency interest rates directly affect forward exchange rates because forward premiums and discounts are derived from Eurocurrency interest rate differentials. Please note the following:

A FORWARD PREMIUM OR DISCOUNT MERELY REPRESENTS THE COST OR EARNINGS OF CARRYING A SPOT COMMITMENT TO A FUTURE DATE.

◆ **Outright Forward Exchange Rates**

An outright forward exchange rate is merely a composite of a spot rate and a forward premium or discount. Any change in either the spot rate or forward premium/discount will cause a corresponding movement in the outright forward foreign exchange price.

◇ **Derivation of Forward Rates - Example**

Assume that a company needs to purchase SEK 10,000,000 for delivery in six months (182 days). If a bank does not have access to the forward foreign exchange markets, how can it set a fair price on a commitment to deliver Swedish kronar at a future date, while protecting itself from adverse exchange rate movements?

For the sake of illustration, assume four things:

- ◇ The spot SEK/USD exchange rate is 6.6200.
- ◇ The interest rate for six-month Eurodollars is $5 \frac{3}{8}$ percent.
- ◇ The interest rate for six-month Eurokronar is $8 \frac{3}{8}$ percent.
- ◇ A bank can deal in the Eurocurrency deposit market in small, odd amounts.

The bank can borrow six-month Eurodollars at $5 \frac{3}{8}$ percent to use in purchasing spot Swedish kronar at the exchange rate of 6.6200. The Swedish kronar can then be invested as Eurokronar for six months at the rate of $8 \frac{3}{8}$ percent. Because the bank earns 3 percent more on its investment in Eurokronar than its cost of borrowing Eurodollars ($8 \frac{3}{8}$ percent minus $5 \frac{3}{8}$ percent), the bank can sell Swedish kronar at a lower price for delivery in six months than for the spot date. The bank can offer 6.7177 Swedish kronar for delivery in six months for each U.S. dollar compared to only 6.6200 Swedish kronar per U.S. dollar for a spot date delivery. As you can see, the derivation of forward exchange rates from spot rates is purely mathematical.

What follows is a complete analysis of the above example:

DERIVATION OF FORWARD DISCOUNTS/PREMIUMS

	<u>EuroSwedish kronar</u>		<u>Spot</u>		<u>Eurodollars</u>
PRINCIPAL	SEK 9,593,796.01	÷	6.6200	=	\$ 1,449,213.90
INTEREST RATE	x 8.375%				x 5.375%
TERM IN DAYS	x 182				x 182
ACCRUAL BASIS	÷ 360				÷ <u>360</u>
INTEREST	SEK 406,203.99				\$ 39,380.37
PRINCIPAL	<u>9,593,796.01</u>				<u>1,449,213.90</u>
TOTAL	SEK 10,000,000.00				\$ 1,488,594.27

The bank purchased and invested enough Swedish kronar so that principal and interest equaled the customer's desired SEK 10,000,000 by the appropriate date. The bank needs \$1,488,594.27 to repay principal plus interest on its borrowing of Eurodollars. The available Swedish kronar divided by the needed U.S. dollars provides the break-even exchange rate of 6.7177 Swedish kronar francs for each U.S. dollar.

$$\frac{10,000,000.00}{1,488,594.27} = 6.7177 \text{ (rounded to four places)}$$

The forward premium for the U.S. dollar measured against the Swedish kronar is derived by subtracting the spot rate from the six-month forward rate, as follows:

$$\begin{array}{rclclcl} \text{FORWARD} & - & \text{SPOT} & = & \text{PREMIUM/DISCOUNT} \\ 6.7177 & - & 6.6200 & = & 0977 \text{ Points Premium} \end{array}$$

Generally, banks quote only forward premium or discount adjustments to other banks, and it is the outright forward price that must be calculated.

◆ ARBITRAGE

Earlier in this chapter, we said that because Eurocurrency deposit prices and forward foreign exchange prices are derived from each other, rarely will one method of hedging yield an advantage over another. The reason for this is interbank arbitrage. Webster's dictionary defines arbitrage as the "simultaneous purchase and sale of the same or equivalent security in order to profit from price discrepancies." While this is not a precise description of Eurocurrency/foreign exchange arbitrage, the concept of seeking profit from price discrepancies remains the same.

To see how arbitrage can be used in foreign exchange, refer to the example in the previous section. Assume that six-month Eurokronar has remained at an interest rate of 8 3/8 percent, the spot rate for Swedish kronar is 6.6200, and the six-month rate for Swedish kronar is 6.7177. However, six-month Eurodollars have declined to 4 3/8 percent. Banks can use the opportunity presented by this price discrepancy through arbitrage. For purposes of comparison, we will use the same currency amounts presented in the previous example, although banks would never arbitrage in odd or small amounts.

	<u>EuroSwedish kronar</u>		<u>Spot</u>		<u>Eurodollars</u>
PRINCIPAL	SEK 9,593,796.01	÷	6.6200	=	\$ 1,449,213.90
INTEREST RATE	x 8.375%				x 4.375%
TERM IN DAYS	x 182				x 182
ACCRUAL BASIS	÷ 360				÷ <u>360</u>
INTEREST	SEK 406,203.99				\$ 32,053.79
PRINCIPAL	<u>9,593,796.01</u>				<u>1,449,213.90</u>
TOTAL	SEK 10,000,000.00				\$ 1,481,267.69

The steps of the arbitrage are as follows:

- (1) The bank borrows six-month Eurodollars at $4 \frac{3}{8}$ percent.
- (2) The bank converts the Eurodollars to Swedish kronar at 6.6200.
- (3) The bank invests the Swedish kronar as Eurokronar at $8 \frac{3}{8}$ percent for six months.
- (4) The bank sells the expected Swedish kronar principal and interest six months forward at the rate of 6.7177.

Six Months Later:

- (1) The bank receives principal and interest from its Swedish kronar deposit.
- (2) The bank delivers the Swedish kronar on its forward foreign exchange contract in return for \$1,488,604.73 (\$10.46 difference with previous example from rounding of forward exchange rate).
- (3) The bank pays off principal and interest from its six-month Eurodollar borrowing, earning the \$7,337.04 difference as profit.

Banks will conduct these transactions as long as arbitrage exists. Ultimately, however, the pressure of these transactions would tend to:

- ◇ increase Eurodollar interest rates,
- ◇ raise the value of spot Swedish kronar,
- ◇ decrease Eurokronar interest rates,
- ◇ lower the SEK/USD six-month premium until equilibrium is achieved.

◆ **Arbitrage Formulas and Example**

For those who wish to do their own arbitrage calculations, we have constructed formulas that are in a format readily accepted by programmable calculators or personal computers. These formulas can be applied to any of the three primary unknowns in an arbitrage. One set of formulas should be used for currencies quoted in American terms, and the second set for currencies quoted in European terms, as follows:

The Formula

To Solve for Currencies Quoted in American Terms

$$I = [(S \cdot R \cdot T \div 36000 + S) \div (S + F) - 1] \cdot B \div T \cdot 100$$

$$R = [(I \cdot T \div B \div 100 + 1) \cdot (S + F) - S] \cdot 360 \div T \div S \cdot 100$$

$$F = (S \cdot R \cdot T \div 36000 + S) \div (I \cdot T \div B \div 100 + 1) - S$$

To Solve for Currencies Quoted in European Terms

$$I = [(R \cdot T \div 36000 + 1) \cdot (S + F) - S] \cdot B \cdot 100 \div T \div S$$

$$R = [(I \cdot S \cdot T \div B \div 100 + S) \div (S + F) - 1] \cdot 36000 \div T$$

$$F = (I \cdot S \cdot T \div B \div 100 + S) \div (R \cdot T \div 36000 + 1) - S$$

S = Spot

B = Basis of Accrual on Foreign Rate (360 or 365)

T = Term in Number of Days

I = Foreign Interest Rate-Input and Answer in Percentage Points

R = U.S. Interest Rate-Input and Answer in Percentage Points

F = Forward Discount or Premium in Decimal Terms

◆ Arbitrage Examples

The following is an example of how the formulas can be used to solve for forward points when interest rates for two Eurocurrencies are known. Please refer to DERIVATION OF FORWARD DISCOUNTS/PREMIUMS, Module 5. We know that the spot rate for Swedish kronar in European terms is 6.6200. The rate for six-month Eurokronar is 8 3/8%, and the rate for six-month Eurodollars is 5 3/8%. What is the implied six-month forward premium or discount for U.S. dollars?

The formula to use is:

$$F = (I \cdot S \cdot T \div B \div 100 + S) \div (R \cdot T \div 36000 + 1) - S$$

$$F = (8.375 \times 6.6200 \times 182 \div 360 \div 100 + 6.6200) \div (5.375 \times 182 \div 36000 + 1) - 6.6200$$

$$F = (6.9003) \div (1.0272) - 6.6200$$

$$F = 6.7177 - 6.6200 = .0977$$

$$F = 977 \text{ points premium}$$

Compare this answer with that in the previous example. Had the answer been negative - it would have indicated a discount. When "F" is known, and you are solving for "I" or "R" - be sure to enter forward discounts into the formula as negative numbers.

As an additional example, refer to the arbitrage problem in the previous section. If this arbitrage opportunity existed, assuming that a new equilibrium is achieved solely through adjustment of the forward rates, what would the new six-month forward premium/discount be for U.S. dollars?

Using the same formula as above:

$$F = (8.375 \times 6.6200 \times 182 \div 360 \div 100 + 6.6200) \div (4.375 \times 182 \div 36000 + 1) - 6.6200$$

$$F = (6.9003) \div (1.0221) - 7.5000$$

$$F = 6.7510 - 6.6200 = .1310$$

$$F = 1310 \text{ points premium}$$

These two examples demonstrate a basic foreign exchange axiom explained in the next section. As the interest rate differential between Eurokronar and Eurodollars grew from 3 percent ($8 \frac{3}{8}\%$ minus $5 \frac{3}{8}\%$) to 4 percent ($8 \frac{3}{8}\%$ minus $4 \frac{3}{8}\%$), the forward premium for U.S. dollars grew from 977 points to 1310 points.

Programming Considerations

If you do not wish to program all of the formulas shown, you can shorten the process by including only the formulas needed to solve for problems only in American terms, or only in European terms. You may then convert quotes received in European terms to American terms (or vice-versa) for use in your formulas by using the following procedures:

Step 1 - Spot

Divide the number "one" by the spot rate in European terms (ET) to derive spot in American terms (AT).

$$\frac{1}{\text{SPOT(ET)}} = \text{SPOT(AT)}$$

Step 2 - Forward premium or discount

Divide the number "one" by the outright forward price in European terms.

$$\frac{1}{\text{SPOT +/- FORWARD PREMIUM/DISCOUNT(ET)}} = \frac{\text{OUTRIGHT}}{\text{FORWARD(AT)}}$$

THEN: Subtract the spot rate(AT) calculated in Step 1 from the outright forward rate(AT) calculated in Step 2. This is the forward premium or discount that can be used in the arbitrage formulas. $\text{OUTRIGHT FORWARD(AT)} - \text{SPOT(AT)} = \text{PREMIUM OR DISCOUNT(AT)}$

◆ FOREIGN EXCHANGE AXIOMS

Certain axioms can be drawn from this study of arbitrage and the broad relationship between Eurocurrency interest rates and forward foreign exchange rates addressed in this handbook:

- (1) IF INTEREST RATES ARE HIGHER IN COUNTRY "A" THAN THEY ARE IN COUNTRY "B," FOREIGN EXCHANGE RATES IN COUNTRY "A" WILL BE AT A FORWARD DISCOUNT RELATIVE TO COUNTRY "B."
- (2) IF INTEREST RATES ARE LOWER IN COUNTRY "A" THAN THEY ARE IN COUNTRY "B," FOREIGN EXCHANGE RATES IN COUNTRY "A" WILL BE AT A FORWARD PREMIUM RELATIVE TO COUNTRY "B."
- (3) IF THE INTEREST RATE DIFFERENTIAL BETWEEN COUNTRY "A" AND COUNTRY "B" BECOMES SMALLER, FORWARD FOREIGN EXCHANGE DISCOUNTS OR PREMIUMS WILL BECOME SMALLER.
- (4) IF THE INTEREST RATE DIFFERENTIAL BETWEEN COUNTRY "A" AND COUNTRY "B" BECOMES LARGER, FORWARD FOREIGN EXCHANGE DISCOUNTS OR PREMIUMS WILL BECOME LARGER.

Remember, however, that the Eurocurrency and foreign exchange markets are highly interrelated and that changes in forward discounts or premiums can affect interest rates, just as interest rate changes affect forward rates.

◆ FORWARD-FORWARD DEPOSITS AND LOANS

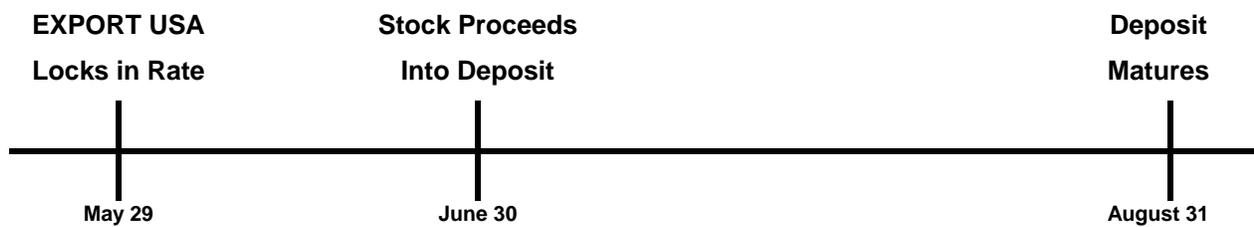
An additional feature of the Eurodollar market is the capability to borrow or invest on a forward-forward basis. A company may enter into a contract with a bank to deposit or borrow Eurodollars with a future starting date. The interest rate, start date, maturity date and amount are all fixed on the date the forward-forward agreement is signed. This service may be attractive to companies that require a hedge against future interest rate exposure or those that seek to lock in an interest rate today that is believed to be better than future rates.

◆ **Forward-Forward Deposits**

This option may be attractive, in general, to a company when interest rates are falling or if there is a positive sloping yield curve with the expectation that the curve will remain the same or flatten.

For example:

EXPORT USA will receive proceeds from a stock offering on June 30. Today is May 29. EXPORT USA believes there is a high probability that interest rates will fall between today and June 30. In addition, EXPORT USA knows it will not need the USD 10,000,000 until August 31. As a result, on May 29, EXPORT USA contacts the bank to arrange a forward-forward deposit rate for depositing USD 10,000,000 on June 30 through August 31. The bank sets the rate on May 29 for this deposit.



◆ Forward-Forward Loans

This option may be attractive to a company when, in general, interest rates are rising, or if there is a negative sloping yield curve and the expectation that this curve will remain the same or flatten.

For example:

EXPORT USA has working capital borrowing needs of USD 1,000,000 beginning on June 30 for two months. Today is May 29. EXPORT USA has decided that Eurodollar borrowing appears to be the most attractive vehicle. In addition, EXPORT USA believes there is a high probability that interest rates will rise over the next 30 days. EXPORT USA contacts the bank to arrange a forward-forward loan rate for USD 1,000,000 beginning June 30. The bank sets the rate on May 29 for this Eurodollar forward-forward loan.



WORKSHEET 6

ARBITRAGE

	INVEST EURO GBP	SPOT	BORROW EURODOLLAR
PRINCIPAL GBP	963,468.49	X 1.6300	1,570,453.64
INTEREST RATE	X 7.5%		X 5.5%
TERM IN DAYS	X 182		X 182
ACCRUAL BASIS	360		360
INTEREST	36,531.51		_____
PRINCIPAL	963,590.28		1,570,453.64
PRINCIPAL			
+ INTEREST	GBP 1,000,000		USD _____

- ◇ BANK BORROWS EURODOLLARS AT 5.5% TO BUY GBP SPOT AT 1.6300
- ◇ BANK INVESTS GBP AT 7.5% FOR 6 MONTHS
- ◇ BANK SELLS GBP PRINCIPAL AND INTEREST SIX MONTHS FORWARD AT 1.6164

- ◇ IN USD, WHAT WILL BE THE BANK'S PROFIT OR LOSS ON THIS ARBITRAGE?

CASE STUDY

HEDGING RECEIVABLES

BORROW OR SELL FORWARD?

SITUATION

YOU HAVE A CAD 5,000,000 RECEIVABLE 90 DAYS OPEN ACCOUNT. SINCE THE CANADIAN DOLLAR HAS BEEN WEAK AGAINST THE USD, CORPORATE POLICY HAS BEEN TO HEDGE ALL EXPOSURES. IN ADDITION, YOUR COMPANY HAS SHORT -TERM WORKING CAPITAL BORROWING NEEDS.

GIVEN

SPOT CAD/USD: 1.4335-40 3 MONTH FORWARD CAD/USD: 25-24

3 MONTH EURO-CAD BASE BORROWING RATE: 5.00%

3 MONTH LIBOR: 5.75%

YOUR COMPANY'S SPREAD ON DOMESTIC BORROWINGS: .75%

YOUR COMPANY'S SPREAD ON EUROCAD BORROWINGS: 1.00%

BASIS OF ACCRUAL: 360 DAYS

3 MONTHS: 90 DAYS

PROBLEM

YOU WANT TO EXPLORE THE RELATIVE COSTS OR EARNINGS OF TWO HEDGING ALTERNATIVES.

- ◆ WHAT ARE THE COSTS OR EARNINGS OF SELLING THE CAD FORWARD 3 MONTHS?
- ◆ WHAT ARE THE COSTS OR EARNINGS OF BORROWING EUROCAD, SELLING THE PROCEEDS SPOT TO USE FOR WORKING CAPITAL, THEN USING RECEIVABLES TO PAY OFF CAD BORROWING.

HINTS

- ◆ DETERMINE OUTRIGHT FORWARD RATE ON THE FORWARD CONTRACT.
- ◆ DETERMINE THE OUTRIGHT FORWARD RATE ON BORROWING USING THE FORMULA. YOU WILL BE SOLVING FOR FORWARD POINTS USING WHAT YOU KNOW ABOUT YOUR ALL-IN BORROWING COSTS FOR BOTH EUROCAD AND EURODOLLARS.

MODULE 5

CURRENCY OPTIONS

MODULE OBJECTIVES

- ◆ UNDERSTAND MECHANICS AND NATURE OF OPTION PUT AND CALL CONTRACTS
- ◆ UNDERSTAND THE COMPONENTS OF OPTION PRICING (INTRINSIC AND TIME VALUE)
- ◆ ANALYZE AN OPTION'S HEDGE CHARACTERISTICS
- ◆ BUILD DERIVATIVE HEDGING STRATEGIES

◆ INTRODUCTION

Foreign currency options provide alternatives for management of currency exposures. In the prior modules, we explored the use of forward contracts as a hedging tool. These work well to offset a particular exposure and eliminate risk, but because the exchange rate is set by the terms of the contract, any opportunity for gains is also eliminated should the markets move in a favorable direction. Using options as a hedging tool can provide an asymmetric risk profile, where for a fee the option buyer can have limited risk while participating in any favorable currency movements during the life of the option contract. They are uniquely suited to solve the hedging dilemmas where markets are volatile or exposures are uncertain.

The first section of this module provides the framework for understanding the unique nature of an option contract. The second section addresses the different terms which define the option contract and the market mechanics. Thirdly, it will cover the components of option premium pricing and the measures of price sensitivity. The last section will cover building derivative hedging strategies using simple put and call options.

◆ THE NATURE OF OPTION CONTRACTS

Option contracts provide a method for corporations with foreign exchange exposures to hedge the risk associated with changes in foreign exchange rates. Option contracts offer protection against exchange rate movements by guaranteeing a rate of exchange for some future period. A corporation importing from Japan will need to exchange their USD for JPY when payment for the Japanese goods is due in three months. If the JPY increases in value in the intervening time, those imports will become more expensive in USD terms. The corporation may want to guarantee the rate at which they will be able to exchange USD for JPY. They can accomplish this with a forward foreign exchange contract as discussed in previous modules, or they can enter into an option contract for the same period of time.

An option contract represents a right but not an obligation to exchange currencies. Option contracts are often compared to insurance policies; for an established fee which is paid in advance an option provides risk insurance to the holder. As in the insurance business, this fee is termed the premium. The option writer receives the premium to compensate them for taking over the currency risk during the life of the option. There are two types of options:

◇ CALL OPTIONS = THE RIGHT BUT NOT THE OBLIGATION TO BUY

◇ PUT OPTIONS = THE RIGHT BUT NOT THE OBLIGATION TO SELL

We will adopt the convention of terming a delivery of USD in exchange for another currency as a purchase of that currency. Likewise the receipt of USD in exchange for the delivery of another currency will represent a sale of that currency. An option to buy a currency and pay USD we will, by convention, term a call option on the currency. An option to sell a currency and receive USD we will term a put option. For the sake of clarity in our discussion, the non-USD will always be the option currency and the USD will be the counter-currency.

There are two parties to an option contract, the buyer of the option and the seller of the option. An option buyer purchases the right to exchange for a period of time at a fixed rate but is not required to do so. An option seller sells the promise to exchange at the fixed rate on demand of the option buyer. Option buyers are also referred to as holders of the contract and are said to have a “long” position in options. Option sellers are referred to as writers or grantors and are said to hold a “short” position in options.

- ◇ OPTION BUYERS PURCHASE A RIGHT TO EXCHANGE AT A FIXED RATE

- ◇ OPTION SELLERS SELL THEIR OBLIGATION TO EXCHANGE AT A FIXED RATE

- ◇ THE PRICE WHICH THE OPTION BUYER PAYS THE OPTION SELLER IS THE PREMIUM

There are potentially two transactions for each option contract. Initially when the option contract is entered into, the option seller gives the right to demand the exchange of currency to the option buyer, who in turn gives the seller the premium fee. The second transaction occurs if the option holder decides to demand the exchange of currencies; exercise the option. After the option is exercised, the option holder and writer are required to exchange currencies at the contracted rate.

◆ RIGHTS AND PERFORMANCE OBLIGATIONS

BUYER'S OBLIGATIONS

- ◇ The only performance obligation of an option buyer is payment of premium to the seller. After the premium has been paid, an option buyer has the right to exchange currency at a predetermined fixed rate called the strike price. After payment of the option premium all obligations of performance fall to the option seller.

BUYER'S RIGHTS

The buyer has three choices at contract expiration: exercise the option, allow the option to expire, or sell the option.

- ◇ **Exercise of the option**

If the buyer chooses to exchange currencies at the strike price, they inform the seller of the option. After this notice is given, both parties are obligated to exchange currencies at the fixed rate. This process is termed “exercise” and the option becomes a foreign exchange contract.

- ◇ **Allowing the option to expire**

If at the time exchange is desired, the market rate is preferential to the strike price, the option holder has no need to exchange at the strike price. The holder is free to exchange at the more advantageous market rate and simply “walk away” from the option contract.

- ◇ **Offsetting the option**

If prior to expiration, the option holder no longer has the need or the desire to hold the option

contract, the choice may be made to sell an offsetting option. This relieves the holder of the position and the holder receives premium back for the contract.

SELLER'S OBLIGATIONS

- ◇ An option seller must stand ready to exchange currency at the strike price if the option is exercised. Since option buyers will only exercise when it is to their advantage, the option sellers, being on the other side of the transaction, know that any exercise is to their disadvantage.

SELLER'S RIGHTS

It is the seller's right to receive and hold premium at the outset of the transaction. Since any exercise of the option is to the seller's disadvantage, it is in the seller's interest that exercise does not occur.

Just as there are bids and offers in the foreign exchange market, there are also these terms in the options market. Option bids and offers refer to the option contract, what premium amount the market maker will buy or sell a particular contract for. There are four distinct stances in relation to the underlying foreign exchange market.

- ◇ CALL BUYERS = PURCHASERS OF THE RIGHT TO BUY A CURRENCY; LONG CURRENCY AT THE STRIKE
- ◇ CALL SELLERS = SELLERS OF THE RIGHT TO BUY A CURRENCY; SHORT CURRENCY AT THE STRIKE
- ◇ PUT BUYERS = PURCHASERS OF THE RIGHT TO SELL A CURRENCY; SHORT CURRENCY AT THE STRIKE
- ◇ PUT SELLERS = SELLERS OF THE RIGHT TO SELL A CURRENCY; LONG CURRENCY AT THE STRIKE

◆ HOW OPTIONS AND FORWARD CONTRACTS DIFFER

Like a forward contract, an option contract guarantees its holder a fixed rate of exchange for some future period. Unlike forwards, option contracts grant the holder the choice of whether or not to exchange at the strike price. The option contract carries an explicit upfront cost which is not a factor for forwards. Following is a comparison of the differing nature of option contracts and forward contracts.

COMPARISON OF RIGHTS AND OBLIGATIONS

WHEN YOU PURCHASE AN OPTION YOU:	WHEN YOU ENTER INTO A FORWARD CONTRACT YOU:
HAVE THE OPTION TO EITHER BUY OR SELL CURRENCY	HAVE EITHER BOUGHT OR SOLD CURRENCY FOR FORWARD SETTLEMENT

NEED NOT DELIVERY OR RECEIVE
CURRENCY

MUST TAKE DELIVERY OR OFFSET AT
THE PREVAILING MARKET RATE

SET THE RATE OF EXCHANGE WHERE
YOU CHOOSE

USE THE CURRENT FORWARD RATE

PAY A PREMIUM CHARGE WHEN THE
OPTION IS GRANTED AND PAY
SETTLEMENT AMOUNT AT EXERCISE

PAY NO PREMIUM. PAY SETTLEMENT
AMOUNT AT MATURITY

◆ TERMS OF OPTION CONTRACTS

The conditions which define a given option contract are referred to as the terms of the contract and have direct impact on the option price. There are eight different terms which define a particular option contract.

- ◇ **BUY OR SELL** Determines which party is option holder and which is option writer
- ◇ **CURRENCY** The currency to be exchanged against the USD.
- ◇ **EXERCISE AMOUNT** The amount of currency to be exchanged i.e. CAD 1,000,000
- ◇ **STRIKE PRICE** The purchaser of an option generally indicates the strike price desired. Strike prices can be At The Money (equivalent to the spot or outright forward rate) In The Money (more advantageous than the market rate) or Out Of The Money (less favorable than the current market rate). The strike price determines the USD amount to be exchanged with the currency exercise amount. To simplify this discussion all strike prices will be quoted in American terms (USD/Currency unit).
- ◇ **PUT OR CALL** Those who wish to guarantee a rate at which to buy currency would purchase a call. The purchase of a put would suit a seller of currency. Option sellers would reverse their interest.
- ◇ **EXPIRATION DATE** Expiration times as well as dates must be determined. The rights and obligations of the option contract remain in effect until that point in time. After that the option is worthless.
- ◇ **EXERCISE TERMS** The exercise term is the period during the option's life when exercise may occur. There are two standard types, American style and European style exercise terms. American style allows exercise anytime from when the option is granted

until it expires. European exercise terms allow for exercise only on the expiration date before the expiration time of the option.

- ◇ **PREMIUM AMOUNT AND DATE** The price of the option contract. It is the amount of money that the buyer pays the seller for the right without the obligation to exchange currency at a fixed rate. It may be quoted in US cents per unit of foreign currency, as a percent of the USD exercise amount, or as a total dollar cost. The premium is usually due on the spot date of the currency traded; two business days out for most currencies, one day for CAD.

EXAMPLE: CONVERTING A PREMIUM QUOTED IN CENTS / CURRENCY TO TOTAL USD

$$\text{CENTS PER CURRENCY} / 100 \times \text{OPTION EXERCISE AMOUNT} = \text{TOTAL USD}$$

Export USA will be receiving CAD 1,000,000 and would like to guarantee a minimum price of .6900 USD/ CAD. They contact their bank and receive a quote of 2.86 cents per CAD on a put option. What would be the total USD cost of hedging CAD 1,000,000 at .6900?

$$.0286 \text{ USD} / \text{CAD} \times \text{CAD } 1,000,000 = \text{USD } 28,600$$

EXAMPLE: CONVERTING A PREMIUM QUOTED IN PERCENT OF USD TO TOTAL USD

$$\text{CURRENCY AMOUNT} \times \text{STRIKE} = \text{USD EXERCISE AMOUNT}$$

$$\text{USD EXERCISE AMOUNT} \times \text{PREMIUM AS \%} / 100 = \text{TOTAL PREMIUM IN USD}$$

$$\text{OR: CURRENCY AMOUNT} \times \text{STRIKE} \times \text{PREMIUM AS \%} = \text{TOTAL USD}$$

Import USA must hedge a DEM 5,000,000 payable due in three months with a call option. For a strike price of .6250 they are quoted 5% premium. What is the total USD cost of the option?

$$\text{DEM } 5,000,000 \times .6250 \times .05 = \text{USD } 156,250$$

EXAMPLE: CONVERTING A PREMIUM QUOTED AS A TOTAL USD TO A PERCENT
TOTAL USD PREMIUM COST / TOTAL USD EXERCISE AMOUNT =
PREMIUM AS A PERCENT OF USD

Using the same scenario as the previous example, the calculations are as follows:

$$\text{USD } 156,250 / \text{USD } 3,125,000 = .05 \text{ OR } 5\%$$

EXAMPLE : CONVERTING A PREMIUM QUOTED AS TOTAL USD TO CENTS PER
FOREIGN CURRENCY UNIT

TOTAL USD PREMIUM COST / FOREIGN CURRENCY UNITS X 100 =
PREMIUM IN CENTS PER CURRENCY UNIT

$$\text{USD } 156,250 / \text{DEM } 5,000,000 \times 100 = 3.125 \text{ CENTS}$$

◆ OPTION PRICING - THE COMPONENTS OF PREMIUM

Premium costs are a crucial factor in determining the effectiveness of foreign currency options as a hedge. The size of the premium is the prime determinant of the break even level for an option hedger. An option with a premium that is more expensive than the expected currency movement will not look attractive in comparison with a forward contract.

The price of an option represents a complex interaction of several considerations. There are two separate components of an option's premium price: intrinsic value and time value. Four main factors have an impact on these two components: the difference between market price and strike price, time to expiration, volatility, and interest rates. In order to determine an estimated value of option premium, it is necessary to isolate the two components of premium value, time value and intrinsic value. The premium quote which is received represents the total of these two separate valuations.

$$\text{TIME VALUE} + \text{INTRINSIC VALUE} = \text{OPTION PREMIUM}$$

Intrinsic value is simply the difference between the strike price and the market price if the strike price is more advantageous to the holder of the option. With European style options the strike price is compared to the forward price to determine intrinsic value. If there is no advantage to the option holder, the option will have no intrinsic value, only time value. Time value is the incremental cost of owning the time to decide whether or not to exchange. Time value approaches zero at expiration.

◆ INTRINSIC VALUE

◆ **INTRINSIC VALUE** It is dependent on the relationship between the option strike price and the current market price in one of the following ways:

- ◇ **AT THE MONEY** An option with a strike price equal to the current market. This can be measured by the spot or forward market rate.
- ◇ **OUT OF THE MONEY** A call option with a strike price above the current market or a put option with a strike price below the current market. There is no intrinsic value in an out of the money option.
- ◇ **IN THE MONEY** a call option with a strike price below the current market or a put option with a strike price above the current market. These options have intrinsic value.

INTRINSIC VALUE OF PUTS = STRIKE PRICE - MARKET PRICE

INTRINSIC VALUE OF CALLS = MARKET PRICE - STRIKE PRICE

OPTION PREMIUM - INTRINSIC VALUE = TIME VALUE

Determining the amount of intrinsic value is the starting point for assessing an option premium. Once intrinsic value has been determined it can be subtracted from the total premium cost in order to isolate the time value component. Because intrinsic value represents the advantage the option holder would have by exercising, and since the holder has no obligation to exercise an option that is not an improvement over the current market, intrinsic value can never be less than zero.

When market prices are below the strike price, call options will have no intrinsic value. As the market price moves above a call's strike price, the option will gain intrinsic value point for point with the increases in the market price. Put options with a strike price below the market price will have no intrinsic value since there is no advantage to selling the currency at a lower than market price. As the market price moves below the strike price, the intrinsic value of the put option gains a point for each point that the market decreases. When the strike price of an option is equal to the current market price, the option is said to be at-the-money. If an option purchaser does not want to pay intrinsic value at the setting of the strike price, they would choose a value that is at-the-money or out-of-the-money.

◆ FACTORS AFFECTING INTRINSIC VALUE : USING SPOT OR FORWARD MARKET PRICES

The intrinsic value of European style options is always calculated against the outright forward rate. American style options are compared to the most advantageous market price, either the spot or the forward rate. Intrinsic value always represents the most that would be realized should the option be exercised to the holder's greatest advantage. Since American style options allow early exercise they may be compared to spot bids and offers when it is advantageous to do so. When a currency sells at a forward discount to USD, a call will have less intrinsic value in the future, as the forward discount decreases the market rate in relation to the strike. Likewise, when a currency sells at a forward premium to the dollar, a put will have less intrinsic value in the future as the forward premium moves the market price higher in relation to the strike.

FOR AMERICAN CALLS WHEN CURRENCY IS AT A DISCOUNT TO USD
INTRINSIC VALUE = SPOT BID - STRIKE PRICE

FOR AMERICAN PUTS WHEN THE CURRENCY IS AT A PREMIUM TO USD
INTRINSIC VALUE = STRIKE PRICE - SPOT OFFER

These are the only situations when a strike should be compared to the spot rate. Additionally, these are the only two situations where it could be advantageous to exercise an American style option before expiration.

EXAMPLE : AMERICAN PUT OPTION ON AUD

Spot AUD is quoted at .6465/ .6470. The six month price is .6495/ .6505. A six month put on AUD 2,000,000 with a strike price of .6800 has intrinsic value of USD 66,000.

$$(.6800 - .6470) \times \text{AUD } 2,000,000 = \text{USD } 66,000$$

If the strike were compared with the forward, intrinsic value would only be equal to USD 59,000.

EXAMPLE: AMERICAN PUT OPTION ON GBP

Consider a put option on GBP 2,000,000 with a strike of 1.6750 and three months to expiration. Spot GBP is quoted at 1.6760 / 1.6765 and three months is 1.6680 / 1.6690. This option has total intrinsic value of USD 12,000 when compared to the forward offer. It has no intrinsic value when compared to the spot.

◆ TIME VALUE

The difference between total option premium and the intrinsic value of the option is the **time value** of the option. It is simple to calculate as a derivative value.

$$\text{TOTAL OPTION PREMIUM} - \text{INTRINSIC VALUE} = \text{TIME VALUE}$$

Arriving at an estimate of time value to add to intrinsic value is much more complex.. Central to understanding the factors which effect time value is an understanding of its theoretical origins. Time value can be thought of as the option writer's cost of hedging the option. It is the risk premium in the option. To the option writer this risk premium is the highest, when the option is at-the-money, because at this point there is the greatest uncertainty over whether the option will expire worthless or have some value at maturity. If the option moves in-the-money, the writer can be more sure of exercise and as it moves out-of-the money, no exercise is more certain. In simple terms the longer the time to expiry the more an option is worth. But as time passes, the

option writer can define the risk more accurately, and in the last few days before expiry the time value diminishes or decays rapidly.

Time value is a function of many variables :

- ◇ The relationship between strike price and market rate
- ◇ The time to maturity
- ◇ The interest rate difference between the two currencies
- ◇ The volatility of the currency pair

An option writer's risk is that the option will be exercised. The risk of exercise changes as the market price changes relative to the option's strike price. Therefore an option writer desiring to hedge with spot transactions must adjust the hedge as the market changes. These adjustments involve market costs. The time value which the option writer demands reflects an estimate of the future costs of hedging. This is the basis for all option pricing models.

The variables which constitute time value are described below along with their impact on an option's premium.

COMPONENT OF TIME VALUE	DIRECTION OF COMPONENT	CALL OPTION TIME VALUE	PUT OPTION TIME VALUE
VOLATILITY	INCREASES	INCREASES	INCREASES
VOLATILITY	DECREASES	DECREASES	DECREASES
DOMESTIC INTEREST RATES	INCREASE	INCREASES	DECREASES
DOMESTIC INTEREST RATES	DECREASE	DECREASES	INCREASES
FOREIGN INTEREST RATES	INCREASE	DECREASES	INCREASES
FOREIGN INTEREST RATES	DECREASE	INCREASES	DECREASES
TIME TO EXPIRY	INCREASES	INCREASES	INCREASES

TIME TO EXPIRY	DECREASES	DECREASES	DECREASES
DIFFERENCE BETWEEN STRIKE AND MARKET	INCREASES	DECREASES	DECREASES
DIFFERENCE BETWEEN STRIKE AND MARKET	DECREASES	INCREASES	INCREASES

◆ VOLATILITY

There is a direct relationship between volatility and time value. As volatility increases, time value increases for both put and call options. This makes sense intuitively. If prices are stagnant, the potential for an out-of-the-money strike to become in-the-money is low. If volatility increases, the potential for the option to be in-the-money at expiration increases. Volatility is the single most important component of time value. Assessing volatility is an important consideration for option buyers or sellers. There are two different methods of assessing volatility levels.

HISTORICAL VOLATILITY: This is sometimes termed actual volatility and measures the component over some past period of time. This measure is a function of the average price of a currency, the daily price change, and the number of observations. These variables when analyzed as a standard deviation, yield an assessment of volatility over some past period. Such a measure would lead to a good price for time value if volatility remained constant over an option period. Foreign currencies, like other commodities, have less stable volatilities. Relying solely on this measure would lead to considerable inaccuracies in option pricing.

IMPLIED VOLATILITY: In an attempt to improve the predictive ability of historical volatility, various weighting factors have been applied to the standard deviation formula. These are based on the premise that recent experience is a better predictor of the future than is more distant price action. Implied volatility is an alternative to historical volatility. It lets the market

decide where volatility will be in the future. The Black/Scholes model was constructed to use volatility to solve for an option's value. Using the model, one can calculate the implied volatility associated with a given option price.

INTEREST RATES: Changes in relative interest rates have an effect on both the intrinsic and time value components of option premium. As foreign interest rates change relative to domestic rates, the intrinsic value of all European style options and some American style options will be affected. This will in turn affect their time value by increasing or decreasing the distance between the market price and the strike price. Remember, at-the-money options have the greatest time or risk value. An additional effect of interest rate increases is to decrease the premium costs overall. Because an option writer is paid up front and has the ability to invest that premium over the life of the option, an increase of domestic interest rates improve the rate of return on the investment of premium income. This is only a minor consideration in determining time value for currency options.

TIME TO EXPIRATION: Time value decreases as expiration approaches. However the decay of time value is not linear but tends to accelerate as expiration approaches. A general relationship is that the square root of the number of months remaining for a given option multiplied by the one month time value of the identical option will approximately equal that period's premium. All other things being equal if a one month option costs \$1,000, then a four month option would cost \$2,000 and a nine month option would cost \$3,000. In any case the rate of decay of an option's time value accelerates sharply, becoming zero at expiration.

MARKET'S DISTANCE FROM STRIKE: As the underlying market price moves farther from the strike, time value will decrease. The effect is the same whether the option moves further in or out of the money. The probability of exercise either approaches zero or 100%. At-the-money options have the greatest uncertainty of exercise and the highest time value. Deep in or out-of-the money options have the least time value, Time value decreases as intrinsic value increases, which has important implications for option buyers. Although intrinsic value is increasing point for point as an option moves through the strike, time value is simultaneously

decreasing. The consequence for option hedgers is that initially options will not gain value as fast as their underlying exposures are losing value.

◆ OPTION TRADING RISKS

The first theoretical option pricing model was developed in 1972 by Fischer Black and Myron Scholes. The original model was concerned with the valuation of equity options and was published in the *Journal of Political Economy*, although it has gone through many modifications. The Black-Scholes model works by using the underlying asset to hedge a call option. In the original model, the asset was equity. As the equity price changes, the amount of the underlying asset required to hedge the option position has to be adjusted. But a financial cost is incurred each time that the hedge is altered. The total cost should be covered exactly by the income from investing the premium. Otherwise, riskless profits will occur, and arbitrage will arise to enforce the equality between income and expense. If the cost of hedging equity with options is less than the income from the premium, then it is worth writing options to collect the premium. On the other hand if the expense exceeds the income from the option premium, it is worth paying the premium to buy the call option and hedging the long option position by selling the equity. This model has been modified several times to work more effectively with currency options. The binomial model and the Garman-Kohlhagen version are widely used in pricing systems today.

In an earlier section, we looked at the various components of determining premium or option value that are input into the option pricing model. The mathematical model used to price an option can also be used to compute the sensitivity of the option premium to changes in these input parameters. These sensitivity measures are commonly referred to as the “Greeks” as they are named by letters of the Greek alphabet.

◆ MEASURES OF PRICE SENSITIVITY

- ◇ **DELTA:** By determining the relationship between the change in the underlying exchange rate and the change in its option price, a pricing model will implicitly calculate the amount of currency required to hedge the exposure. The delta is sometimes known as the “hedge ratio”. An option that is far out-of-the-money will have a delta of zero. One that is deep in-the-money will have a delta that approaches 100% or unity. An at-the-money option has a delta of 50% or .5. If you have written a call option, the amount of the underlying asset that you should hold varies with the market price changes. As the option moves deeper in-the-money, more cash hedge is required to meet the certain call. Delta can also be thought of as the probability of exercise at expiration. An out-of-the money option has a low probability of exercise, but an at-the-money option has a 50% chance of being in-the-money at maturity. Option positions that are paired with the appropriate offsetting cash position are said to be delta neutral or delta hedged.

- ◇ **GAMMA:** This is the rate of change of delta. Mathematically, gamma is to delta as acceleration is to speed. Gamma measures how quickly the delta will change, with movements of the underlying exchange rate. The higher the gamma, the more often the hedge will need to be adjusted. Assuming there is a financial cost associated with each adjustment, option writers prefer fewer adjustments while option holders who earn on each change, look to own high gamma positions. Gamma is usually expressed as positive or negative depending on whether the movement is good or bad from the perspective of the party concerned. Long options positions have positive gamma, short positions have negative; the former will gain by delta change, the latter will lose. The nearer the strike to the market rate, the higher the gamma; the nearer the option to maturity, the higher the gamma; the lower the volatility, the higher the gamma . The first two relationships are fairly intuitive. The volatility factor influences gamma in that if there is low volatility with a low probability of rate change, the movement in delta will be more severe if rates do move, the result of which is higher gamma.

- ◇ **VEGA:** This is a rate of change in an option’s value relative to a change in the volatility factor. A change in volatility can result in a change of premium so vega measures the

sensitivity of an options price to a one percent change in implied volatility. Vega increases with time, so longer dated options have higher vega than those with shorter maturities.

- ◇ **THETA:** This is the measurement of the sensitivity of an option's value to the elapse of time. Theta is usually measured as a loss of premium value over one day, given that no other factors change. An option with a theta of .025% would lose USD 250.00 over the next day for every USD 1,000,000 of face value. Theta is highest, as is the time value component, when an option is at-the-money. It is also non-linear, losing value rapidly as the option nears expiration. Theta is also referred to as positive or negative depending on whether you are an option writer(positive) or an option holder (negative).
- ◇ **RHO:** The sensitivity of an option's value to change in interest rates. Although not considered significant compared to the other option risks, rho is usually measured as the change in premium due to a 1 % change in the interest rate differentials.
- ◇ **LAMBDA:** Another obscure measurement of sensitivity, lambda indicates the leverage of an option, usually measured against a 1% movement in the exchange rate. Low delta and short dated options carry the highest lambda. The premium of an option with a 25 lambda will increase 25% for a 1% move in the underlying rate.

All of these risks are derived from the option pricing model, but are only models of reality. To use any model effectively, it is important to understand the simplifying assumptions. One key assumption is that the spot exchange rate moves in a random fashion around a trend line. It is assumed that a scatter of possible outcomes will follow a log-normal representation, which rarely happens in reality. This is called dispersion and is equal to volatility. A higher volatility implies a greater dispersion of prices on expiry and therefore a greater possibility of profitable exercise by the option holder.

◆ ANALYZING AN OPTION'S HEDGE CHARACTERISTICS

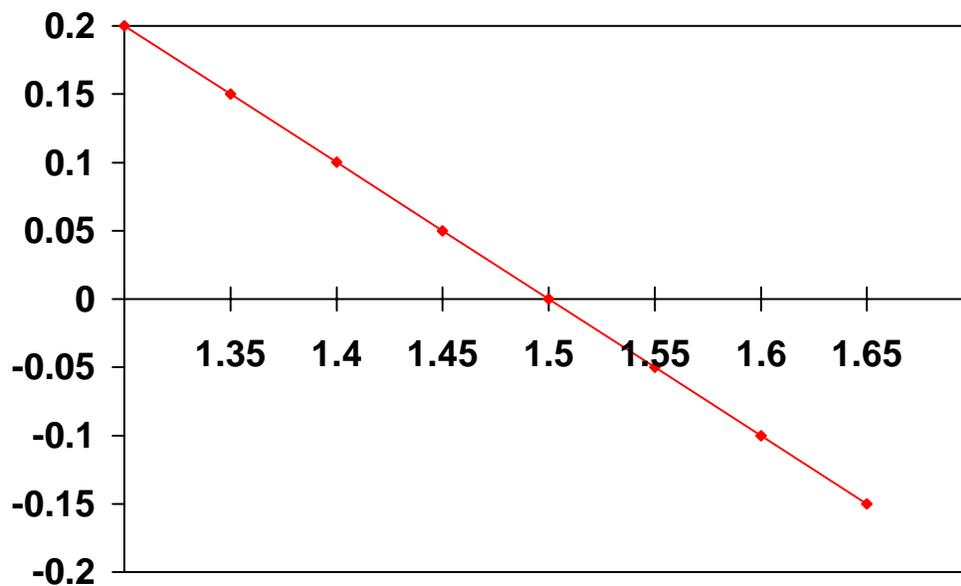
The first step in analyzing an option's hedge characteristics is knowing how to read a profit and loss graph. A profit and loss graph provides the picture of how the profit and loss of a foreign exchange position changes as the exchange rate varies. These graphs are represented in a standard X,Y, format.

An X,Y, format tracks the relationship between two variables. The vertical axis represents a range of values for one of the two variables. The horizontal or X axis represents a range of values for the other variable. The curve or line which appears between the two axis represents the relationship between the two variables. This allows the reader of the graph to determine the value of the second variable once the value of the first is known.

The two variables of interest to those with foreign exchange exposures are the relationship between profit or loss and exchange rate movements. These generally measure profit or loss on the vertical or "Y" axis. Exchange rates are shown increasing from left to right on the horizontal or "X" axis. This means moving from left to right represents appreciation of the currency in USD terms. Often, a second horizontal line is drawn directly through the midpoint of the "Y" axis. This represents the break-even or zero profit/loss line. When the points on the curve fall above this line, it represents a profit. When the points on the curve fall below the line the position is showing a loss.

◆ GRAPH OF A SHORT OUTFRIGHT POSITION

As an introduction to reading the profit and loss graphs examine the profile for a familiar position. Below is the graph for a short currency position. To be short a currency means that one has to buy the currency. If the price increases, a loss results and as the price decreases, there is increasing profit. The downward sloping line represents this relationship.

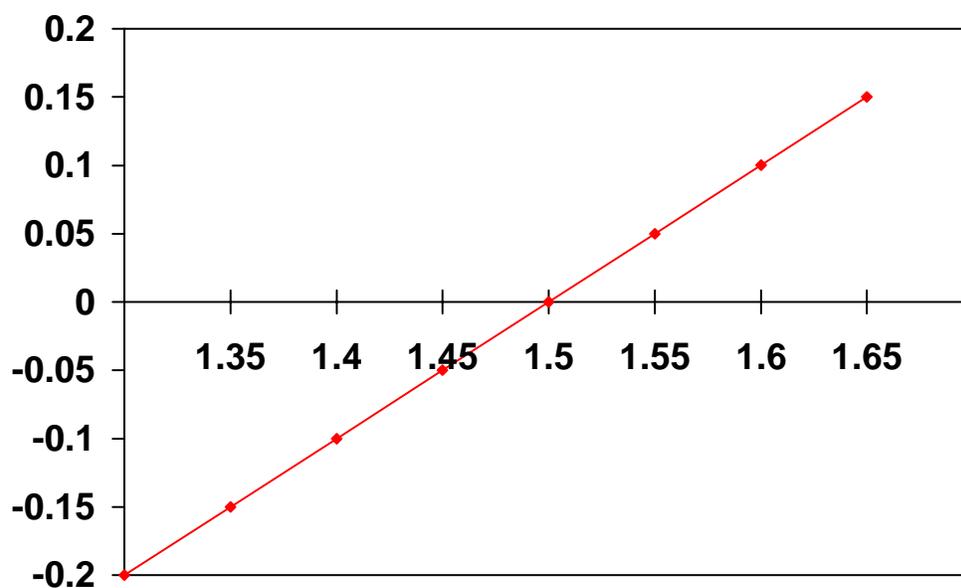


The preceding graph could represent the situation of an importer who was required to pay GBP at some future date. At the time that the contract was signed the rate for GBP was 1.5000. The importer figured the total USD cost of the imports using this rate. If the rate is 1.4500 when payment on the contract is required, the importer will pay .0500 USD less per GBP. This represents additional profit to the importer. If the rate is 1.5500 when the bill is due, the importer must pay .0500 USD more per GBP than the original estimated cost. This represents a

loss to the importer. If the rate is 1.5000 at the time of payment the importer will pay exactly what was estimated. This is the break even rate.

◆ GRAPH OF A LONG CURRENCY POSITION

A long currency position has a profit and loss graph which is a mirror image of a short currency position. To be long a currency means to own the currency. If one owns the currency and its price increases one experiences a gain. Below is the profit and loss graph for a long currency position. The upward sloping line indicates that the position gains value as the price of currency increases in terms of the USD.



The same scenario as the previous example except for an exporter with GBP receivables would be depicted by this graph.

◆ DERIVING GRAPHS FOR OPTION POSITIONS

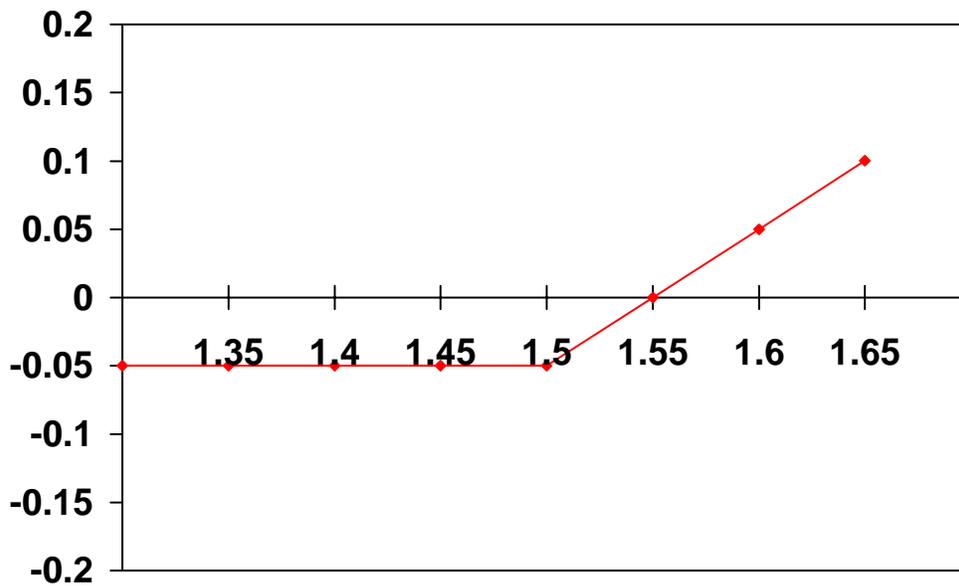
Like long and short currency positions, option positions can be depicted using a profit and loss graph. These graphs are particularly useful when applied to currency options because here profit and loss do not have a constant relationship with the market price. This is what gives options an asymmetrical risk profile which is best understood graphically. In addition, these graphs are very useful to option strategists because they provide a means of tracking the wide variety of

possible market positions. As discussed in the first section, there are four basic option positions : long a call option, short a call option, long a put option, and short a put option. Each of these four positions has a unique profit and loss profile.

◆ **GRAPH FOR LONG CALL OPTION POSITION**

A call option purchaser has the right but not the obligation to buy currency at a contractually determined price for which the buyer pays a flat premium fee. Assuming that at expiration the option may be exercised or allowed to expire, the profit or loss of the position can be determined for each underlying market price. Calls will not be exercised if the strike price is less than the market price. The loss on the position is equal to the cost of premium (measured in USD points per currency unit on the graphs). Call holders will exercise if the strike price is greater than the market price. The gain which will be captured will be the intrinsic value of the option, however, to receive a true picture of profit, the premium price must be deducted from the proceeds. A call holder will have a net profit if the market price less the strike price exceeds the premium price. A call holder's break-even price is equivalent to the strike price plus the premium.

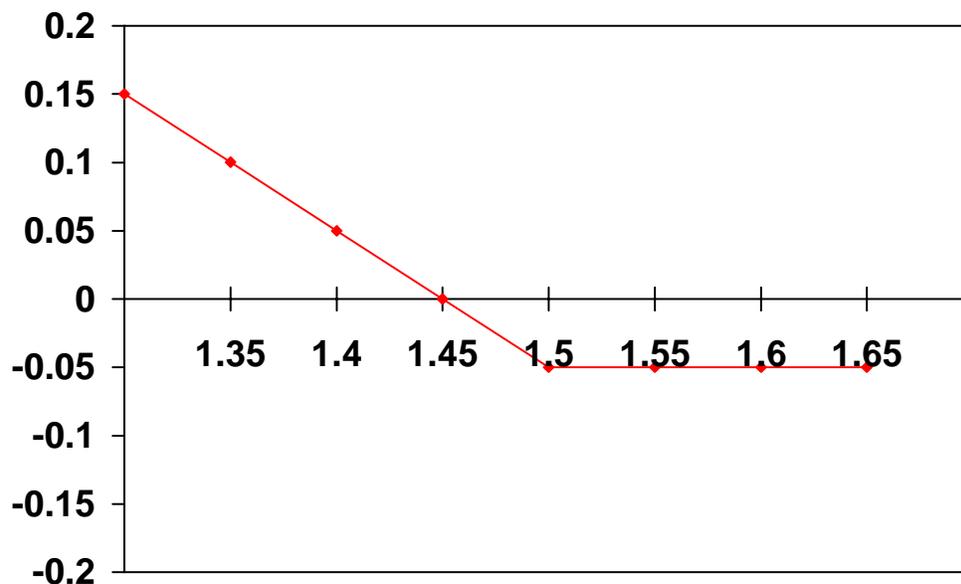
The next graph depicts the profit and loss profile of a holder of a GBP call with a strike price of 1.5000 and a premium price of .0500.



- ◇ If at expiration the GBP is trading at 1.4000, the holder would have no reason to exercise the call and it will expire worthless. The loss will be equal to the premium paid, .05.
- ◇ If at expiration the market price for GBP is 1.5200, the option holder will exercise, however the premium cost exceeds the option profit so there is still a net loss of .03.
- ◇ If at expiration the market price is 1.6000, the option will be exercised and profit will be equal to market price less the strike price less the premium price or +.05.

◆ GRAPH FOR A LONG PUT POSITION

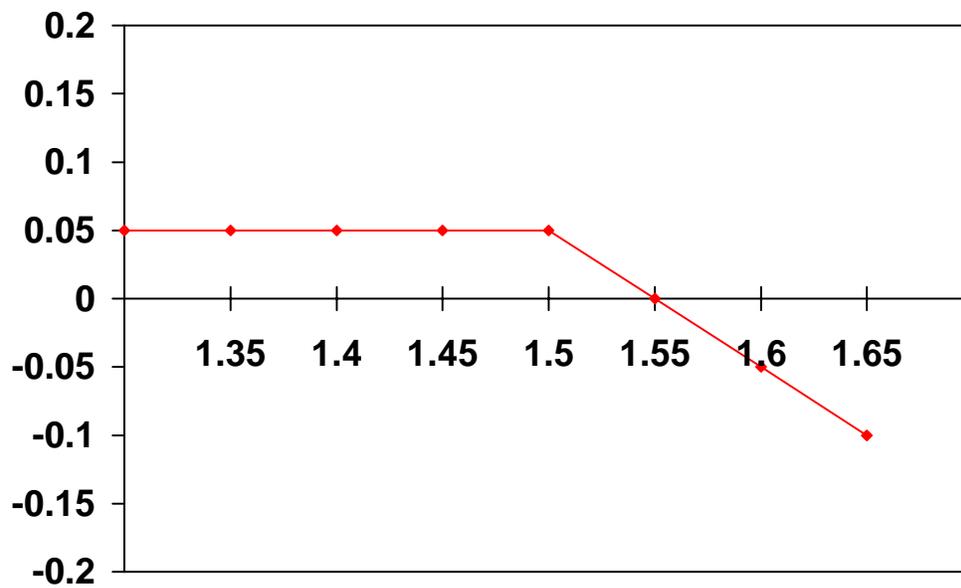
A put option purchaser has the right but not the obligation to sell a currency at a given strike price for which a flat premium fee is paid. This graph is for a put option struck at 1.5000 with a premium of .05. The graph will be a mirror image of that of a call holder since a put holder experiences gains as a currency depreciates. Assuming a currency can't have a negative value, these gains are not unlimited like a call holder's gains could be in theory. The loss on a put option will be limited to the cost of the premium. The profit is calculated by subtracting the market price from the strike price and then subtracting the premium. Again the position will break even when the difference between the strike price and the market price is equal to the premium.



- ◇ If at expiration the GBP is selling for 1.6000, the holder will have no reason to exercise and the loss is limited to the premium or .05.
- ◇ If at expiration the GBP is selling for 1.4500, the holder will have recovered his premium with the option exercise and will break even.
- ◇ If at expiration the GBP is trading at 1.3500, the option will be exercised with a net profit of .10 ($1.5000 - 1.3500 - .0500$).

◆ PROFIT AND LOSS FOR SHORT CALL OPTION POSITION

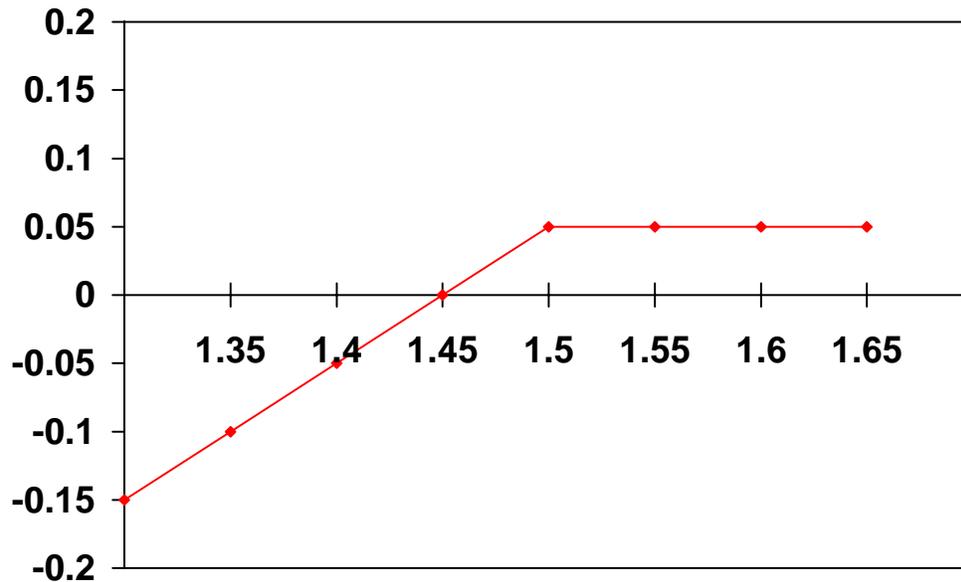
A call option seller holds a short position in the option and has sold another party the right to buy a currency at a given price for which the writer or seller receives the premium fee. Therefore the call option seller is short the currency at the discretion of the other party. Since the call writer will be required to sell the currency if the call is exercised, the writer will only profit if the option expires worthless; the market price is less than the strike price. Thus, the call writer's maximum gain is the premium and they can experience unlimited losses as the graph depicts. The break-even point is the same for call buyers or sellers.



- ◇ If at expiration the GBP is trading at 1.4000 the option will not be exercised and the holder will receive maximum gain, the retention of the .05 premium fee.
- ◇ If at expiration the GBP is trading at 1.5200, the option will be exercised, but the writer will still realize a profit of .03 because the loss on the option exercise was less than the premium received.
- ◇ If at expiration, the GBP is trading at 1.6500 the option seller experiences a loss of .10 ($1.6500 - 1.5000 + .0500$).

◆ GRAPH FOR A SHORT PUT POSITION

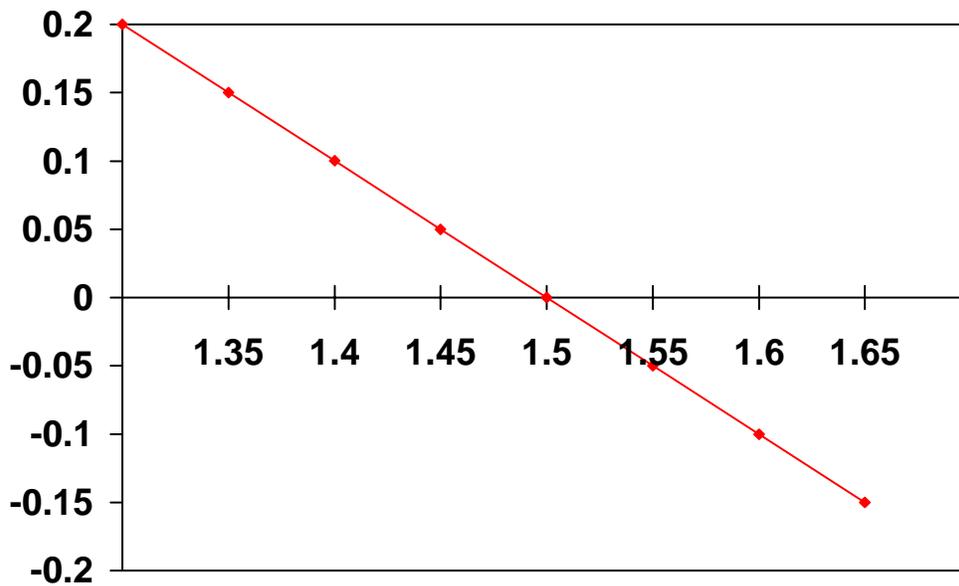
The reverse image is generated for a short option position on GBP with a strike price of 1.5000 and a premium value of .05. Put sellers, like call sellers achieve maximum potential of a gain equal to the premium price and can experience substantial losses.



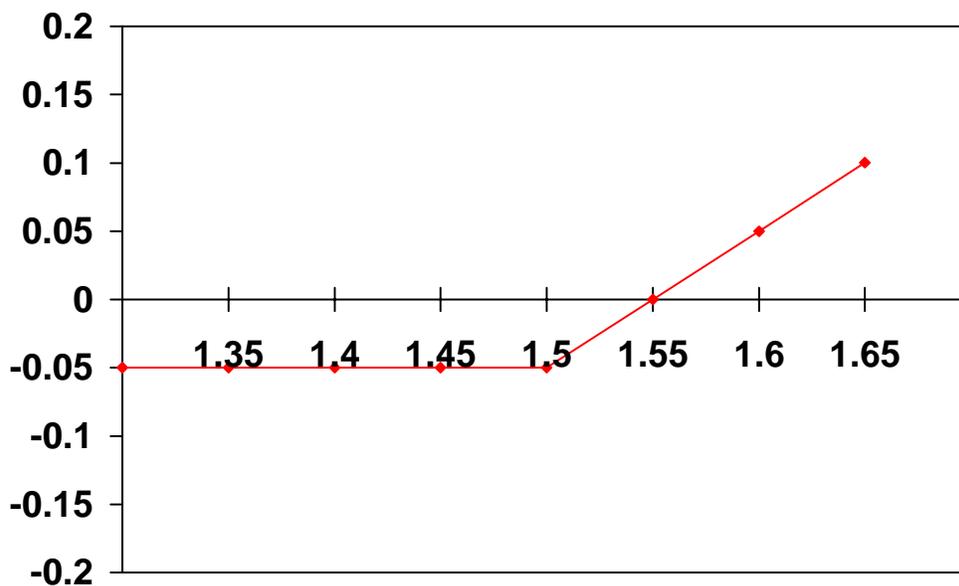
- ◇ If at expiration the GBP is trading at 1.6000, the option will expire and the writer will gain .05, the premium amount.
- ◇ If at expiration the GBP is trading at 1.4500, the option will be exercised, but the seller of the option will break even as the premium equals the difference between the market and strike prices. (The buyer of this option would break even as well!)
- ◇ If at expiration the GBP price is 1.3500, the option will be exercised and the seller will lose .10 ($1.5000 - (1.3500 + .0500)$)

◆ AN OPTION STRATEGY FOR IMPORTERS ----BUYING CALLS

Let's return to the situation of the importer who had to pay for goods in GBP. The importer had entered into the agreement when the GBP was valued at 1.5000 and as the price of GBP increases, he experiences a loss; if it decreases below that price he experiences a gain by reducing the costs involved with purchasing goods. The SHORT CURRENCY POSITION graph illustrates his situation.



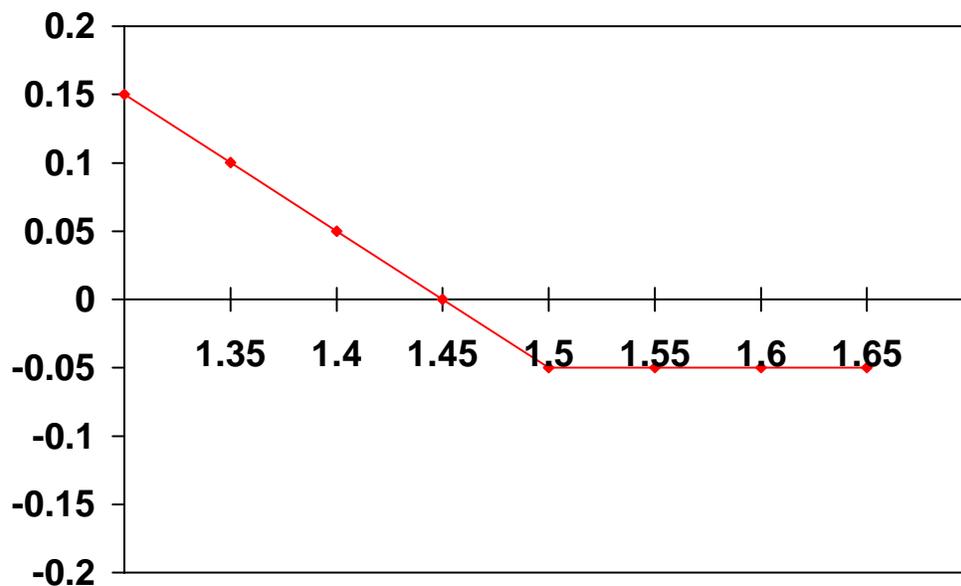
The appropriate option position to hedge this exposure is the purchase of a call option, which would cost the importer .0500 for a 3 month option with a strike price set at 1.5000. Recall that the graph of a long call option position by itself had the following characteristics:



However, when you combine the SHORT CURRENCY POSITION with the LONG CALL POSITION you create a very different profit and loss profile. Now the firm considers the net

effect of these two transactions. When the price of GBP rises, they lose point for point on the underlying short GBP exposure. But at the same time, their call option gains. The net effect is a cost equal to the premium paid which is constant as the GBP rises. As the GBP weakens, the gain on the short position will increase for each point that the GBP falls below 1.5000. Since the option is not losing value at the same rate, once the GBP has weakened enough to recover the premium cost, they gain a point for each point the GBP weakens. The graph of this combination of a short currency position hedged with a call option probably looks familiar. It is the graph of a long put option position. In fact when a long call option is combined with a short outright position it is referred to as a synthetic put .

GRAPH OF IMPORTER HEDGED WITH A CALL OPTION



A similar scenario could be shown for exporters hedged with a put option. The combination of their underlying long currency position and the long put position would look like the graph for a long call option position and they would receive maximum profit as the currency appreciates.

◆ DEVELOPING DERIVATIVE STRATEGIES

Now that we have examined different basic currency positions and their unique profit and loss characteristics, let us expand on this idea to develop new strategies that are built from the basic building blocks of put and call options.

The situation that will be addressed is the importer from the previous examples who is importing goods from Britain, with payment of GBP 1,000,000 due in three months. At the time that the transaction was entered into, the spot rate for GBP was 1.5000 and the three month discount was -.0075. The corporation, IMPORT USA, has a foreign exchange policy in place that requires hedging protection of some nature on all transactional currency exposures. Depending on market conditions and IMPORT USA's appetite for risk, there are several alternatives to explore. To analyze each strategy a corporation has to have a view on the risk associated with the exposure. Since IMPORT USA has a payable in GBP they have a short position in the currency and the risk is that the GBP will appreciate against the USD in the next three months and the cost of the goods will be more expensive in USD terms. It is also possible that the GBP will go down in value during the time frame which would represent an opportunity to IMPORT USA to reduce their USD expenses. The corporation has to make an assumption or take a view on the market to determine which strategy is most appropriate for the situation at hand. The next decision involves determining what is their objective for the hedge; do they want to eliminate all of the risk of an unfavorable market movement or do they foresee some opportunities for profit with a favorable market change? They next have to weigh the advantages and disadvantages of each strategy and how the tools fit with their corporate philosophy. The cost of hedging, whether in hard dollars or opportunity costs is also a consideration to be weighed.

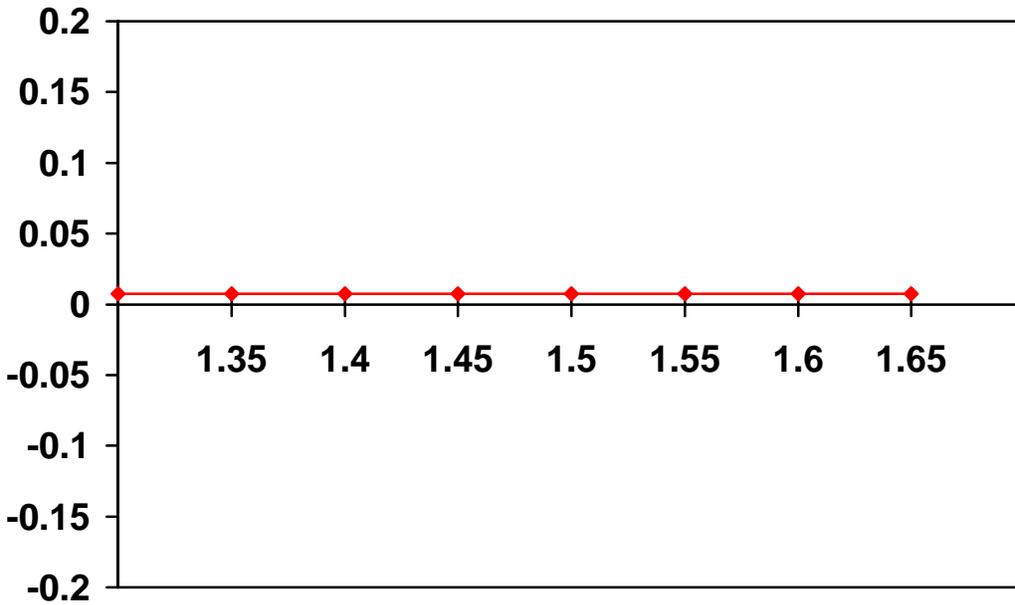
The next section of this module will walk through that decision process with IMPORT USA using a variety of hedging strategies that are available for corporations with foreign payables. A similar series of tools would be available to an exporter with foreign receivables.

◆ FORWARD FOREIGN EXCHANGE CONTRACT

IMPORT USA could simply contract to purchase the GBP 1,000,000 for delivery in three months at a rate of 1.4925. A forward contract is a commitment to exchange currencies at a fixed rate on a set date. The forward rate represents a combination of today's spot rate plus or minus a differential for interest rate variations between the countries, termed "forward points". Because the GBP interest rates are higher than the USD rates, the GBP trades at a discount to the USD in the forward market and the forward points are subtracted from the spot rate. This is an advantage to IMPORT USA as a buyer of GBP.

- ◇ **Assumption:** GBP is expected to strengthen against the USD
- ◇ **Objective:** IMPORT USA wants to lock in a rate to protect itself from adverse movements in the GBP, at no cost.
- ◇ **Advantage:** No upfront fee. IMPORT USA earns the forward points and they are protected should the GBP strengthen.
- ◇ **Disadvantage:** IMPORT USA is "locked in" and unable to take advantage of a favorable move in the GBP.
- ◇ **Cost of Goods:** Fixed at USD 1,492,500.

**PROFIT/ LOSS GRAPH FOR A SHORT GBP POSITION HEDGED WITH A
FORWARD CONTRACT**



Import USA could also enter into an **option date forward contract** which is a commitment to exchange currencies at a fixed rate within a window of future dates. This tool is appropriate for situations when you know approximately, but not exactly, when your transaction will occur, and represents an alternative to swapping a contract. While it provides flexibility, there is a cost to the client in that it is priced at the least advantageous of the window dates. If IMPORT USA wanted a two to three month window, they would only earn .0050 discount points for an all in rate of 1.4950.

◆ CALL OPTION

A call option insures the buyer of the option the right to purchase currency at a fixed rate without the obligation to do so. IMPORT USA would pay an additional premium fee for the option. This tool is a good choice if you are uncertain about your currency need or market direction. Option prices are determined by a pricing model that takes into consideration the duration of the option, the “moneyness” of the strike price, and the implied volatility of the currency.

Spot GBP: 1.5000 3 Month Forward: 1.4925

3 Month Call Option

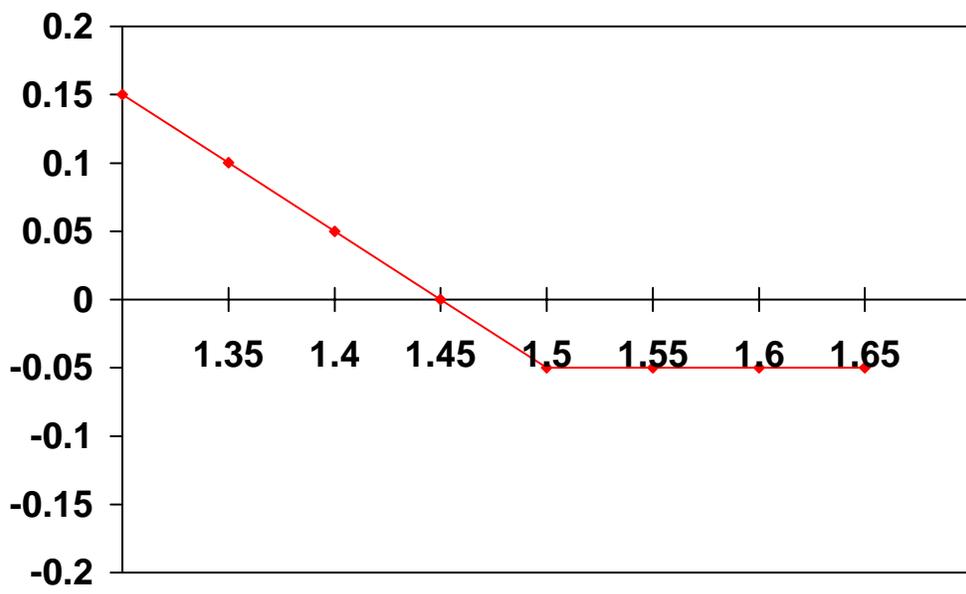
Strike Price	Option Premium in USD Points
1.5000	.0500
1.5250	.0300
1.5500	.0100

- ◇ **Assumption:** GBP is expected to weaken against the USD.
- ◇ **Objective:** IMPORT USA wants to protect itself from adverse currency movement but participate fully if GBP should weaken.
- ◇ **Advantage:** There is protection should the GBP strengthen, yet unlimited opportunity if it weakens during the life of the option contract.
- ◇ **Disadvantage:** Upfront fee to purchase call option. Strike price may be set at a less favorable rate than the forward price.
- ◇ **Cost of Goods:** Choosing the strike price of 1.5000, worst case is USD 1,550,000 (Strike + Premium). Best case is a lower market rate i.e. 1.4000 + Premium or USD 1,450,000 or better.

*** This strategy works well for contingent exposures or when implied volatility is at low levels.

It will not be as attractive when volatility is high.

PROFIT AND LOSS GRAPH FOR A SHORT GBP POSITION HEDGED WITH A CALL OPTION



◆ RANGE FORWARD

A range forward contract is a commitment to exchange currencies within a band of rates at a set future date. This tool allows you to profit on currency moves while limiting risk. It can be designed with no or reduced upfront premium payment. The components of a range forward are put and call options. If IMPORT USA is a buyer of GBP, you structure a range forward by buying an out-of-the-money call option and selling an out-of-the-money put option. If these options are designed to be of equal value, there is no upfront premium payment. It is a zero cost strategy.

IMPORT USA could choose the protection or “pain” level for the strike price of the call and the profit or “gain” level will be calculated for the strike price of the put options. At maturity, IMPORT USA will buy GBP at the current rate but never higher than your ceiling or lower than your floor. The alternative is to choose the “gain” level and calculate the “pain” level. Another way to use the strategy is for IMPORT USA to choose both sides and the premium price of the reduced, but not necessarily zero cost, will be calculated.

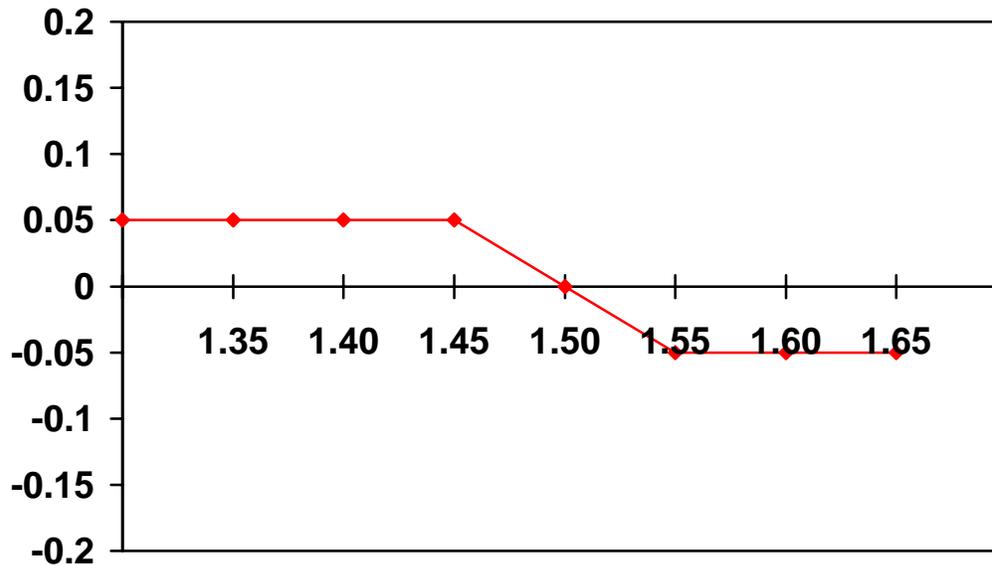
Spot GBP: 1.5000 3 Month Forward: 1.4925

3 Month Range Forward

BUY CALL	SELL PUT	PREMIUM
1.5500	1.4500	0
1.6000	1.4000	0
1.5500	1.4000	.01 USD/GBP

- ◇ **Assumption:** GBP is expected to range trade without extended movement in any one direction.
- ◇ **Objective:** IMPORT USA wants protection from adverse movements plus take advantage of a favorable move in the GBP at no or reduced upfront cost.
- ◇ **Advantage:** IMPORT USA can minimize the premium paid for this strategy. The underlying exposure is hedged, and you do not believe there is much additional profit potential beyond the level at which you cap the upside.
- ◇ **Disadvantage:** The protection level is worse than the corresponding forward rate. The opportunity is capped at the cap strike price.
- ◇ **Total Cost of Goods:** Choosing the first zero cost option the cost will range between USD 1,450,000 and USD 1,550,000.

PROFIT AND LOSS GRAPH FOR A SHORT GBP EXPOSURE HEDGED WITH A RANGE FORWARD



◆ PARTICIPATING FORWARD

A participating forward contract sets a firm “worst case” rate of exchange but allows you to participate in a certain percentage of favorable foreign exchange market movement. This tool is most effective if you expect the market to move broadly in your favor and do not want to pay an upfront premium. IMPORT USA determines the percentage of favorable market movement in which you wish to participate. The bank provides you with the corresponding rate of exchange. Typically a client chooses 40%, 50%, or 60% participation. A lesser level of participation gives you a more favorable strike price but smaller upside potential. A high level of participation gives a worse protection level.

The marketing concept is that IMPORT USA exchange the full amount of the contract at either the protection level if the market has moved against your position or at a rate that is X% of the difference of the strike price and the current spot price. In other words, you participate in the

chosen percentage of a positive move. The mechanics of the contract are that you buy a GBP call for the full amount and sell a GBP put for a smaller amount at the same strike price.

	BUY CALL	SELL PUT
40% Participation	1,000,000 GBP	600,000 GBP
50% Participation	1,000,000 GBP	500,000 GBP
60% Participation	1,000,000 GBP	400,000 GBP

For a zero cost participating forward, the premium value of what you purchase must be equivalent to the premium value of the option you sell. The strike price is calculated by the mathematics of the pricing model.

Spot GBP: 1.5000	3 Month Forward: 1.4925
40% Participation = 1.5400	
50% Participation = 1.5500	
60% Participation = 1.5600	

If GBP is trading at 1.6000 at expiration, you will buy GBP 1,000,000 at the strike price (1.5400, 1.5500, or 1.5600)

If GBP is trading at 1.4000 at expiration you will buy GBP 1,000,000 at:

40% Participation : 1.4840 (600,000 at 1.5400 and 400,000 at 1.4000)

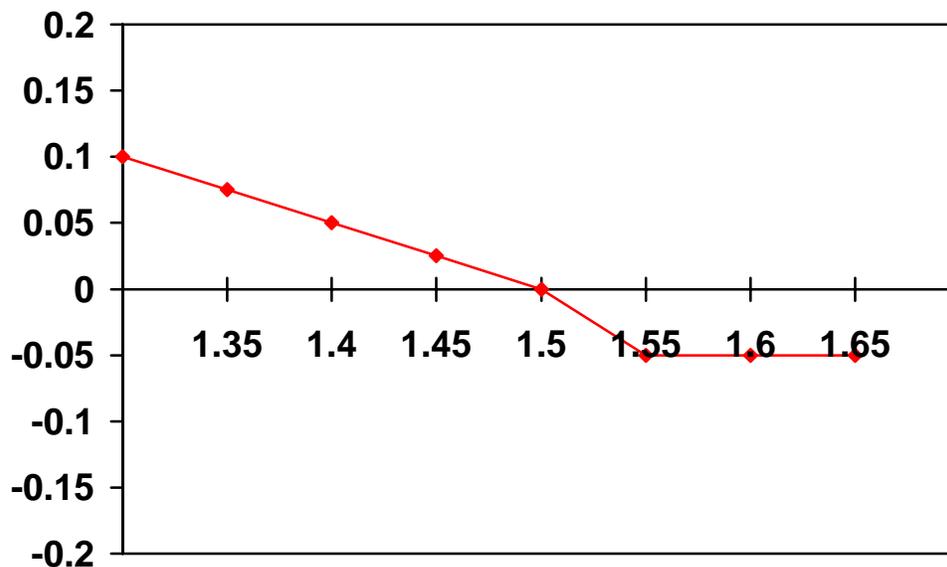
50% Participation : 1.4750 (500,000 at 1.5500 and 500,000 at 1.4000)

60% Participation : 1.4640 (400,000 at 1.5600 and 600,000 at 1.4000)

- ◇ **Assumption:** GBP is expected to weaken significantly against the dollar.
- ◇ **Objective:** IMPORT USA wants to protect itself from adverse currency movement but participate partially in a favorable move. They wish to do this with no upfront premium.
- ◇ **Advantage:** There is no upfront fee. IMPORT USA participates in a percentage of favorable currency movement while being hedged should the GBP strengthen.

- ◇ **Disadvantage:** If GBP strengthens, IMPORT USA will have to exchange at a rate less favorable than the historical forward price. IMPORT USA only participates in a percentage of a favorable move.
- ◇ **Total Cost of Goods:** Worst case is USD 1,550,000 with a 50% participation. Best depends on current spot price; at 1.4000 the cost would be USD 1,475,000.

PROFIT LOSS GRAPH FOR A SHORT GBP POSITION HEDGED WITH A PARTICIPATING FORWARD



◆ INVESTING IN A FOREIGN CURRENCY

IMPORT USA may use the Eurocurrency market as an alternative to the forward foreign exchange market for hedging purposes. By depositing in a foreign currency, the company creates a future receivable that may offset the future payable. However this is not usually a practical method of hedging unless the company has a natural interest in investing. Because Eurocurrency deposit prices and forward foreign exchange prices are derived from each other, one method of hedging rarely yields an advantage over another. Any perceived differences are

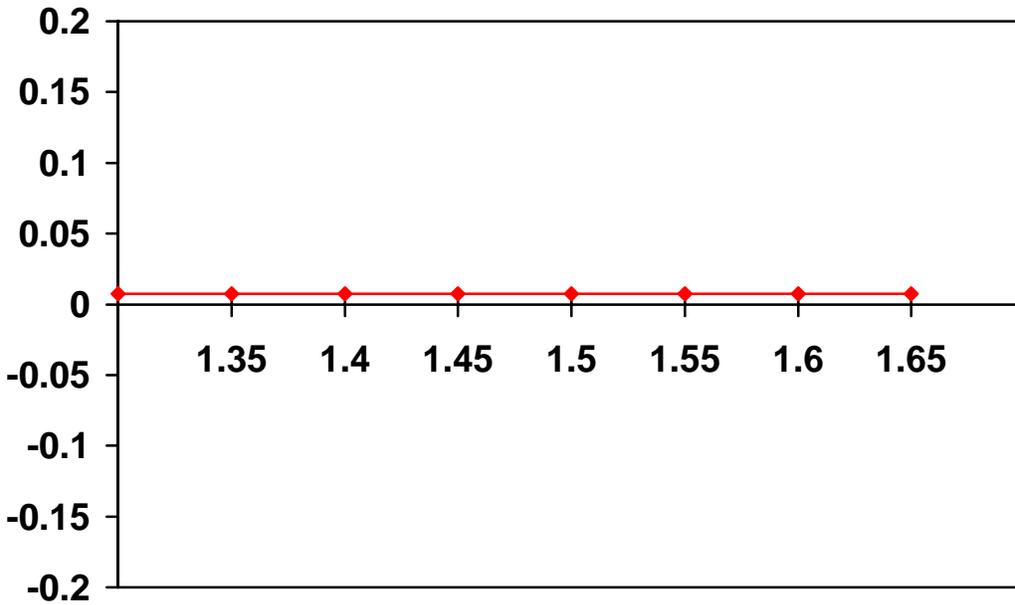
more likely to arise from comparisons calculated using domestic interest rates or from pricing differences based on banking relationship factors.

IMPORT USA may use the Eurocurrency deposit market as an alternative to buying GBP on a forward contract. By depositing in Euro-GBP, IMPORT USA creates a future receivable that may offset the other GBP exposure. IMPORT USA could buy GBP in the spot market and invest it for 3 months as a Euro-GBP deposit, using the proceeds to cover its GBP payables.

Spot GBP: 1.5000 3 Month Eurodollar Rate: 5% 3 Month Euro-GBP Rate: 7%

- ◇ **Assumption:** GBP is expected to strengthen against the USD.
- ◇ **Objective:** IMPORT USA wants to lock in a rate to protect itself from adverse currency movements at no cost.
- ◇ **Advantage:** No upfront fee. IMPORT USA is protected should the GBP strengthen. They earn a better rate of return on their investment than a dollar investment.
- ◇ **Disadvantage:** IMPORT USA is “locked in” and unable to take advantage of a favorable move in the GBP.
- ◇ **Total Cost of Goods:** If they buy a discounted amount of GBP and invest it at 7% for three months then apply principal and interest to the payment, the cost is the same as a forward contract, USD 1,492,500.

GRAPH OF A SHORT GBP EXPOSURE HEDGED WITH A GBP DEPOSIT



These are just a few of the strategies that a corporation could choose to hedge foreign payables. A similar set of strategies would apply to an exporter that was trying to retain value or maximize profits on their foreign receivables.

WORKSHEET 7

QUOTING PREMIUMS

Use the given information to solve for the missing data on the table. Refer to Module 5 in the manual for the formulas.

Currency Amount	Strike Price	Percent USD	Cents/Currency	Total Cost
GBP 1MM	1.6000		2.50	
CAD 2MM	.7500	4.0		
AUD 5MM	.6000			\$150,000

DEM 4MM	.5500		3.00	
JPY 200MM	.0072	2.0		
CHF 3MM	.5800			\$60,900

WORKSHEET 8
INTRINSIC VALUE

Calculate the intrinsic value of the following options.

Style	Type	Currency 1MM	Strike	Intrinsic Value
European	Put	CAD	.7200	
European	Call	CAD	.6850	
European	Put	GBP	1.5900	
European	Call	GBP	1.5800	
European	Put	CAD	.6900	
American	Put	CAD	.7200	
American	Call	CAD	.7000	
American	Put	GBP	1.6000	
American	Call	GBP	1.5900	
American	Call	GBP	1.6200	

Spot CAD .7100 6 month CAD .7150

Spot GBP 1.6000 6 month GBP 1.5900

CASE STUDY
DERIVATIVE HEDGING STRATEGIES

Export USA sold goods to a Canadian client which generate CAD 5 MM in receivables due in 3 months.

Spot CAD: .7000 3 Month CAD: .7035

3 Month Put Option .7035 Price .0200

3 Month Put Option .6900 Price .0100

3 Month LIBOR: 6% 3 Month Euro-CAD: 4%

Discuss the following hedging strategies for EXPORT USA. In each case analyze market assumption, objective, advantages, disadvantages, and value of goods sold.

- ◆ Forward Contract
- ◆ Put Option
- ◆ Range Forward
- ◆ Participating Forward
- ◆ Borrowing Euro- CAD

MODULE 6

EXCHANGE TRADED CONTRACTS - FUTURES

MODULE OBJECTIVES

- ◆ KNOW THE CONTRACT SPECIFICATIONS ,
TRADING PRACTICES, AND SETTLEMENT OF
CURRENCY FUTURES
- ◆ KNOW THE CONTRACT SPECIFICATIONS, TRADING
PRACTICES, AND SETTLEMENT OF OPTIONS ON
FUTURES
- ◆ KNOW THE CONTRACT SPECIFICATIONS, TRADING
PRACTICES, AND SETTLEMENT FOR INTEREST
RATE FUTURES

The previous modules have focused on the interbank and over-the-counter markets. Currencies, options, financial instruments, as well as many commodities are also traded on regulated exchanges throughout the world. There are numerous active exchanges that have evolved in the last few decades (See appendices for a partial listing), but this module will focus on contracts traded on the Chicago Mercantile Exchange (CME), specifically the International Monetary Market.

◆ TRADING IN CURRENCY FUTURES

In simplest terms, futures markets bring a vast pool of participants together to speculate or hedge. In doing so, they discover the future price of certain financial instruments or commodities. In the process of generating precise price information, hedgers, who wish to shed risk, are able to transfer it to speculators, who are willing to assume it. Price discovery and risk transfer are essential benefits of the futures market.

Futures markets also afford a large measure of flexibility in managing financial risk. Markets such as the CME's give hedgers and speculators room to maneuver, to offset buying positions in one contract with selling positions in another.

A futures contract differs from a forward contract, the kind that supports most day-to-day transactions. Forward contracts, such as the bank to client currency contracts discussed in previous modules, are commitments between two parties to exchange a specific product or service at a specific price on a specific date. Unlike futures, forward contracts, which are negotiated privately, are not actively traded, nor must they necessarily be standardized. Forward contracts do carry some risk. For example, one or the other side could be negotiated in bad faith or without sufficient creditworthiness. And subsequent, unforeseen events might prevent one of the parties from fulfilling a forward contract.

Futures contracts are standardized. All of the terms under which the commodity, service, or financial instrument is to be transferred are established before active trading begins, so neither

side is hampered by any ambiguity. Only the price and identity of the buyer and seller are unknown before the actual contract is made.

Standardization opens futures markets to any commercial entity wishing to manage business risk. Absent the need to access the credit of the other party or to find the original party to offset the transaction, hedgers, whether pension funds, corporations, farmers, or food processors, can concentrate on maintaining profitability in their primary business, while speculators can concentrate on trading for their own profit. In performing these roles, they generate the liquidity necessary to permit the market to absorb all orders with a minimum of price disturbance.

When liquidity exists, it serves to prime the pump for volume. By contrast, without liquidity, futures markets cannot fulfill their vital risk-transfer function. Hence, the larger the pool of risk capital --the greater the number of speculators-- the greater the liquidity. And the greater the liquidity, the more accessible the market is to the broadest possible range of trading interests. the speculative aspect of the futures market is one of the distinguishing features from the interbank market, which is primarily geared for corporate hedging.

◆ THE ROLE OF THE EXCHANGE

Like stock exchanges, futures exchanges are membership organizations. They do not set market prices, nor do they own or trade contracts. As centralized locations for the trading of specific futures contracts and options, they do disseminate the sales prices of contracts and guarantee fulfillment of their terms.

As stated previously, while a futures contract does represent a commitment between buyer and seller to conduct a cash transaction for a specific commodity at a future date, the buyer and seller do not actually deal with each other. They may face each other in the pit, but the actual financial transaction is conducted by a third party, the exchange's Clearing House. The Clearing House, which only deals with its clearing member firms, settles all transactions at the end of each day's trading. By interposing itself between the two transacting parties, it guarantees the contractual obligations of the transaction.

The CME is a not-for-profit corporation owned by approximately 2,700 members. It provides a location for trading futures and options on futures. The Exchange comprises three membership divisions: A full CME seat entitles its owner to execute trades in any contract listed on the Exchange; the IMM membership, established in 1972, gives its owner the right to trade all of the Exchange's currency, interest rate and stock index futures and options; the Index and Option Market (IOM) membership instituted in 1982, entitles its owner to trade any of the Exchange's index-futures contracts, random-length lumber contracts and all options listed on the Exchange. The emphasis of this module will be on the IMM contracts.

◆ FLOOR TRADERS AND FLOOR BROKERS

The CME counts individual traders as well as most of the world's largest banks, brokerages, and investment houses among its members. Of the 90 clearing-member firms at the Exchange, approximately 40% are owned by non-U.S. entities.

Many firms and individuals at the "Merc" execute trades for customers. These Futures Commissions Merchants, or FCM's must register with the Commodity Futures Trading Commission (CFTC), the federal agency that regulates the futures industry in the United States. No member can conduct business on the floor of the CME unless qualified by one of the Exchange's clearing firms. Functioning as guarantor, the clearing firm certifies performance to the Clearing House for every trade made by each member it qualifies to trade.

Exchange members conduct their business via a process called open outcry. Using voice and hand signals, each trader or broker becomes his or her own auctioneer, openly declaring bids and offers. The seemingly chaotic open outcry system fosters an extremely efficient market environment. By facilitating full and unimpeded competition, it enables participants to arrive at the best possible price at all times. Most trades do not involve actual delivery, but are closed out during the life of a contract with an offsetting trade. Some contracts, such as Eurodollars can only be settled with cash payment.

The marketplace encompasses floor traders and floor brokers. Floor brokers execute orders for the accounts of the Exchange member firms, either for the firms themselves or their clients. As stated previously, individual floor traders are necessary to accommodate institutional orders. Although the traders themselves may make or lose money, they create the market breadth to protect the hedgers from price instability. One of the differences between traders and brokers is that traders take on the risk of price movement while brokers execute orders on behalf of a third party.

◆ THE ROLE OF THE SPECULATOR

Without the speculator, the market simply would not exist for the hedger. In assuming the risk that already exists for producers and consumers, speculators help to ensure market stability, while contributing much of the capital that ensures a large pool of liquidity.

Speculators use the market to profit from price fluctuations that occur naturally. They focus on the change in actual price levels. The potential for profit motivates them to gather information on supply and demand, to give them insight as whether to buy or sell the commodity. The price of a contract represents all of the information on expected future demand that speculators have brought to the market place at any given time.

◆ THE ROLE OF THE CLEARING HOUSE

Accounts of individual members and non-member customers doing business on the CME must be carried and guaranteed through the Clearing House, an operating division within the Exchange, by an Exchange clearing member. Clearing members assume full financial and performance responsibility for every transaction executed through them and each position carried by them. The Clearing House, which deals exclusively with the clearing members, holds each firm accountable for all positions it carries, whether for its own account or on behalf of individual members or non-member customers. Conversely, as the contra-side to every transaction, the Clearing House is held accountable to the clearing members for the net settlement and performance bonds from all transactions, as provided in the rules of the exchange.

◆ HOW ORDERS ARE EXECUTED

Buy and sell orders are transmitted directly to the CME floor to the appropriate member firms by telephone or via the Trade Order Processing System (TOPS). Upon receipt, the orders are either routed electronically to a CME Universal Broker Station (CUBS) in the appropriate trading area, or time stamped and delivered to the pit by an order clerk or runner.

Customers may give a variety of instructions to floor brokers. Examples are limit, market-if-touched, stop, open, good-til-cancelled, etc. However, the CME does reserve the right to prohibit the use of certain types of orders at various times so as to maintain fair and orderly markets. Different contracts generally are traded in separate pits, and each pit is divided into a number of sections designated for trading in particular contract months.

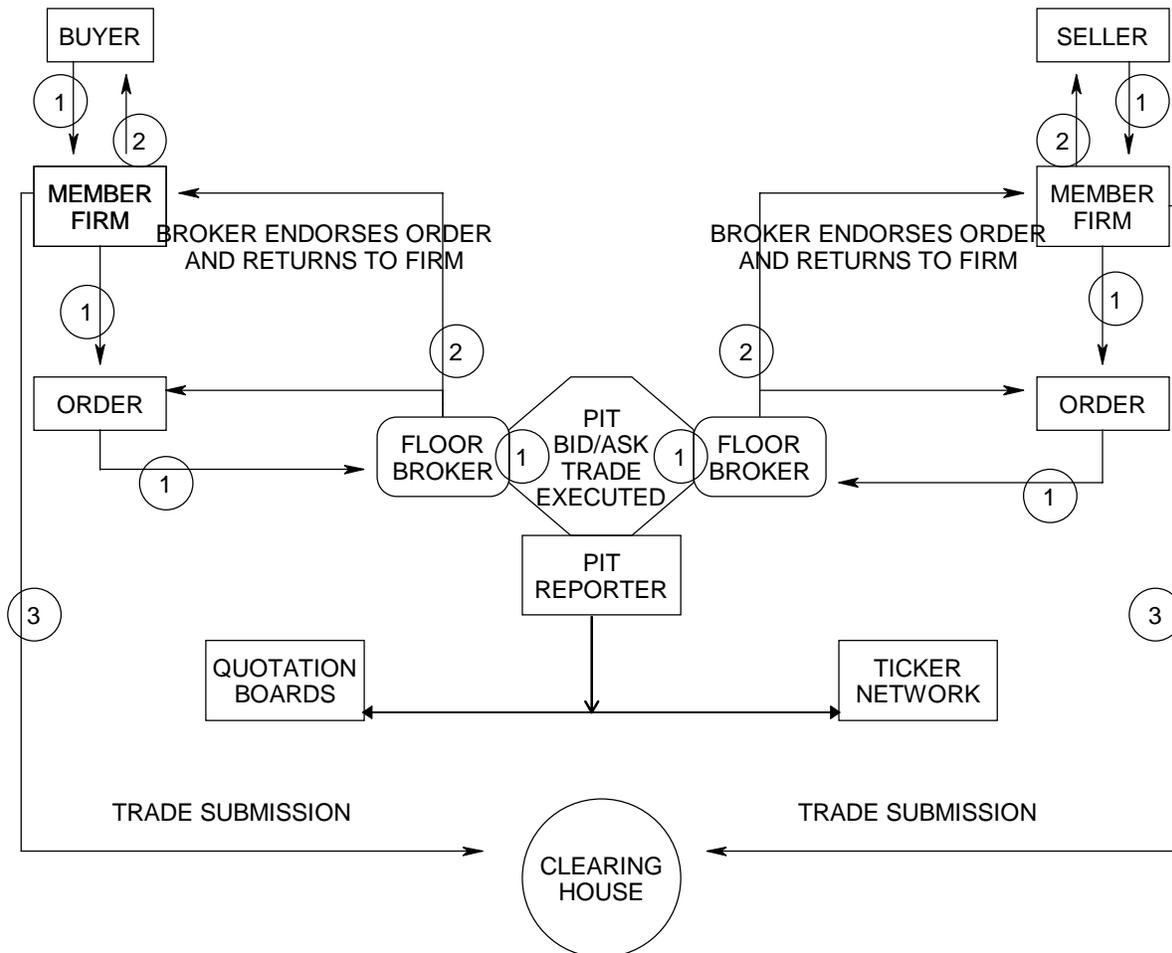
The individual broker responsible for handling a firm's orders for a specific contract is responsible for executing the order. If it is a market order, the broker attempts to fill it immediately. If it carries contingent instructions with respect to price or time of execution, the order is held in the floor broker's deck.

In compliance with Exchange rules, floor brokers and traders may announce bids and offers only when they are equal to or better than the existing market for a specific contract. Thus, customers have the benefit of the highest available bid and lowest available offer. All bids and offers can be accepted immediately, in full or in part, by any other trader.

When a trade is consummated, participants make a written record showing the contract traded and the time of the trade, the delivery month, the price and number of contracts. At the same time a trained pit observer employed by the CME reports the price of the transaction, and the information is entered into the CME's computerized price recording system. Price information is then displayed on the price quotation boards on the floor, transmitted to investors and brokers via wire services, and stored for later use in recording trades.

Once executed, an order is endorsed by the broker and returned to the member firm's communications desk. There it is again time stamped and reported to the customer. For a market order, the entire order handling process usually takes less than three minutes. Regular trading hours at the CME are 7 AM to 2 PM Central Time for currency and interest rate products. The following diagram illustrates how a trade is made.

HOW A TRADE IS MADE



◆ COMPARISON OF FUTURES AND FORWARDS

Before covering the specifics of currency futures traded on the IMM, it is important to compare the differences between these contracts and the forward foreign exchange contracts with which you are already familiar. Price is not usually a difference, as arbitrage between the two markets ensures a close relationship.

FORWARD CONTRACTS	FUTURES CONTRACTS
Informal trading, no physical location	Traded on organized exchange
No uniformity of trading instruments; any size, longer maturities available	Standardized contracts with fixed maturities
No explicit collateral; credit lines required	Initial margin required; settlement via clearinghouse
Prices quoted as bid and offer 24 hour trading	Prices determined via open outcry Trades limited to exchange hours
Contracts normally delivered upon Gains/ losses realized at maturity	Contracts usually offset Daily resettlement, gains /losses realized immediately
Liquid, high volume	Liquid, low volume
Usually quoted European terms	Quoted in American terms

Foreign currency futures are available on the IMM on six major currencies, AUD, GBP, DEM, CAD, CHF, and JPY. There are numerous minor currencies such as the MXP, NZD, and ZAR which are also traded with new contracts being planned all of the time. There is already a Euro contract being planned to coincide with the introduction of the EMU. This section will cover the major currencies.

A number of important points need to be made with regard to the use of futures.

- ◇ There is the ability to close out a contract at any time by transacting an equal and opposite contract.
- ◇ All contracts are guaranteed by the clearing house
- ◇ Prices are publicly quoted.
- ◇ Members are required to deposit cash margins in respect to all outstanding open contracts. They in turn require the same margin from their clients. The margin consists of initial margin which is fixed and a variation margin which covers any unrealized losses on

outstanding contracts and is calculated daily. If unrealized profits arise the variation margin is paid back to the client.

- ◇ Each futures contract has three key dates: the delivery month, the delivery day, and the last trading day. This is the last day in a delivery month on which a contract can be bought or sold. On the IMM, the delivery months are March, June, September, and December. The delivery day is usually the third Wednesday of that month, and the last trading date is the spot date that coincides with delivery for that currency. For most currencies it is two days prior to delivery; for CAD, it is one day.
- ◇ Futures contracts are not usually settled by delivery of the currency. The majority are closed out by an offsetting contract. They can be rolled to the next delivery month.

The following chart shows the contract size and tick value (minimum fluctuation) for each major currency contract.

CURRENCY	CONTRACT SIZE	MINIMUM FLUCTUATION	TICK VALUE
AUD	100,000	.0001	\$10.00
CAD	100,000	.0001	\$10.00
CHF	125,000	.0001	\$12.50
DEM	125,000	.0001	\$12.50
GBP	62,500	.0002	\$12.50
JPY	12,500,000	.000001	\$12.50

◇ **EXAMPLE:** A corporation has a payable of CAD 5,000,000 due in June, They choose to hedge it by purchasing 50 June CAD futures at a rate of .6950. By the last trading date, the contract has a price of .7025. They close it out at that time by selling 50 contracts.

Buy rate per contract	.6950	Sell rate per contract	.7025
Profit in ticks per contract	75	Tick value	\$10.00
Number of contracts	50	Profit (50 X 75 X \$10)	\$37,500

The company can then buy the CAD in the market at the prevailing spot rate.

◆ READING FUTURES QUOTATIONS

The Wall Street Journal as well as other financial newspapers have a section devoted to current prices on the IMM traded currencies. The diagram below describes the information that is available on a daily basis.

prices represent the open, high, low, and settlement price for the previous day

One day's change in the settlement price

The extreme prices recorded for the contract over its trading life

The number of contracts still in effect at the end of the previous day's trading session. Each unit represents a buyer and a seller who still have a contract position

W. GERMAN MARK (IMM) - 125,000 marks; \$ per mark

	Open	High	Low	Settle	Chg	Lifetime High	Lifetime Low	Open Interest
Mar.	.5415	.5452	.5401	.5436	-.0011	.5520	.4370	56,576
June	.5435	.5472	.5422	.5459	-.0011	.5538	.4850	1,839
Sep.	.5460	.5494	.5460	.5483	-.0010	.5525	.4868	270

Est. vol. 26,426; vol. Thur. 35,278; open interest 58,706. -1.399

Contract delivery months that are currently traded

Number of trades transacted in the two previous trading sessions

Total of the right column, and change from prior trading day

◆ HOW MARGIN WORKS

Initial Margin is set at the initial trade, then variation margin applies each day after that until the contract is either offset or settled. Suppose the initial margin on CHF contracts is 5%. An investor purchases one contract (CHF 125,000) for \$.7500/CHF.

$$\text{Contract Value} = 125,000 \text{ CHF} \times .7500 = \$93,750$$

$$\text{Initial Margin} = .05 \times 93,750 = \$4,687.50$$

$$\text{Maintenance Margin} = .80 \times \$4,687.50$$

TIME	PRICE	CASH FLOW	TOTAL IN MARGIN ACCOUNT
TUES. MORNING	.7500	\$4,687.50 MARGIN	\$4,687.50
TUES. CLOSE	.7550	50 X 12.50 = \$625 +	\$5,312.50
WED. CLOSE	.7520	-30 X 12.50 = \$375-	\$4,937.50
THUR. CLOSE	.7400	-120 X 12.50 = \$1500-	\$3,437.50

The investor has fallen below the maintenance margin level at this time, so must either close out the contract at a loss or add more cash to the margin account. This analysis does not include the fees paid to the broker for executing the trades.

◆ OPTIONS ON FUTURES

The two principle markets are the PHLX and the CME, but there are other exchanges quoting local currencies although with little volume. For the purposes of this module, the CME contracts will be featured. The method of trading customer orders in a pit setting by open outcry is identical to the futures trading at the CME. Until 1992, all prices were quoted in U.S. cents with premiums payable in that currency. With the advent of cross-currency options premium payment in other currencies is now permissible, but low in volume of trades.

Because prices are quoted in terms of value, rather than volatility, an option's implied volatility has to be calculated to compare it to the Over-the-counter market. The CME options differ from OTC options also in that exercise results in the delivery of a futures contract instead of a spot delivery of currency. While futures are traded for only four delivery dates; March, June, September, and December, options are traded for maturities in other months, usually the two near months plus the quarter months when the future delivers. So on October 1st, options will be listed for October, November, December, March, June, and September. Exercise in October would result in delivery of a December futures contract, as will the exercise of options maturing in November and December. Contract sizes for options traded on the CME are identical to the futures contracts. There are also options on several of the more exotic futures such as Mexican Pesos and Russian Rubles.

When a new quarterly contract month is listed for trading, there will be nine put and call strike prices: the nearest strike to the underlying futures price, the next four higher, and the next four lower. Intervals vary by currency. AUD, DEM, CHF have .01 \$/ Currency intervals, i.e. \$.62, \$.63, etc. CAD trades in .005 \$/ CAD intervals; .7000,.7050. GBP uses .025 intervals such as 1.6000, 1.6250 while JPY uses .0001; .0072,.0073. Expiration takes place at 7 PM (Chicago Time) on the second Friday prior to the third Wednesday of the contract month, which is also the last trading day for a contract.

Option buyers may exercise on any trading day. Exercise results in a long futures position for call buyers or put sellers and a short futures position for a put buyer or a call seller. The futures position is effective on the trading day immediately following exercise and is marked-to-market to the settlement that day. Initial margin will be required before trading begins on the second day following the long option holder's notice of exercise. The futures position must be offset prior to the expiration of trading in the futures contract. By process of random selection, the Clearing House assigns exercise to Clearing members. There is no automatic exercise of expiring in-the-money options.

Margin does not apply to option buyers, the full payment of premium is applied. Option sellers must meet additional margin requirements as determined by the Standard Portfolio Analysis of Risk (SPAN) margin system.

The exchanges will appeal to those who are familiar with equities or futures as arenas for investing, hedging, or speculating. The exchanges are open to all, albeit through a broker, and offer very competitive, open pricing for large or small amounts giving the small player access to interbank rates. Against this feature one has to evaluate the costs of brokers' commissions, exchange fees, and margin requirements.

◆ COMPARISON OF OTC TO EXCHANGE TRADED OPTIONS

Just as we compared futures to forward contracts for foreign exchange, there are many differences to look at between the OTC options market and the Exchange traded options on futures.

	OTC	Exchange Listed
Amount	Any, subject to minimum	Fixed by multiple of contract size
Maturity	Overnight to 5 years	one day per month, limited months per year
Strike	Any, within reason	Only those listed per schedule
Rate quotation	American or European	American terms
Currency	Any with forward market	Only those listed
Margins	None, credit line required	Yes, on sales only
Price Quotation	As required. usually in %	USD per currency
Style	American or European	European only

It is up to the consumer to weigh the advantages and disadvantages of the two vehicles. The CME is focused on introducing new contracts to increase flexibility. In 1992, it introduced foreign exchange options and futures on Globex - the electronic dealing system developed jointly with Reuters. This system allows for after hours trading in certain CME contracts. Coupling with other exchanges such as SIMEX in Singapore is also providing a longer trading day for the CME.

- ◆ **EXAMPLE:** An investor wants to take a long position in the CAD on July 1. He does so by purchasing 5 call option contracts valued at CAD 500,000 expiring in August on the September futures contract. The CAD is trading at .7040 for that contract at the time, so the investor chooses an out-of-the money strike of .7200 and pays a premium of .0035 or \$1,750 for the option. If on the expiry date on the second Friday of August the CAD futures price is less than .7200, the option will expire worthless. The investor's loss is equal to the premium. If however the CAD is trading at .7300 for the September contract, the holder of the option will exercise and take ownership of the futures contract. Initial margin will be paid on the second day after exercise and it will be marked to market on each subsequent day. The investor has until the last trading day of the futures contract in September to sell the contract. If he were to offset immediately, his profit on the speculation will be equal to $(.7300 - .7200 - .0035) \times 5 \times 100,000$ That would be \$3,250 less commissions and fees. This illustrates the leverage power of trading options.

◆ FUTURES ON INTEREST RATES

◆ MARKET BASICS

Although all previous discussion has been on foreign exchange trading and the related products it is worthwhile to spend some time on the interest rate products, particularly the Eurodollar contracts to compare futures contracts to Eurodollar loans and deposits. The money market comprises the markets for short-term, heavily traded credit instruments with maturities of less than one year. The three-month eurodollar contract is just one of these instruments. Eurodollar deposits were described in detail in Module 4. The CME's Eurodollar time deposit futures contract reflects LIBOR for a three-month, \$1,000,000 offshore deposit. A total of 40 quarterly contracts, spanning ten years, plus the two nearest serial (non-quarterly) months are listed at all times. Eurodollar futures are the cornerstone of the Exchange's interest rate quadrant and are the most liquid exchange traded contract in the world when measured in terms of open interest. The contracts are listed for all calendar months. A contract month identifies the month and year in which the futures contract ceases to exist. It is also known as the delivery month. this procedure ensures that the futures price converges with the cash market price. Most positions are closed out or rolled over prior to expiration.

Below are the contract month symbols:

CONTRACT MONTH SYMBOLS			
JANUARY	F	JULY	N
FEBRUARY	G	AUGUST	Q
MARCH	H	SEPTEMBER	U
APRIL	J	OCTOBER	V
MAY	K	NOVEMBER	X
JUNE	M	DECEMBER	Z

Eurodollar futures contracts are traded using a price index, which is derived by subtracting the future's interest rate from 100.00. For instance an interest rate of 5.00 % translates to an index price of 95.00 ($100.00 - 5.00 = 95.00$). Given this price index construction, if interest rates rise the price of the index falls and vice versa. Therefore, to profit from declining interest rates you would buy the futures contract and maintain a long position; to profit from a rise in interest rates, you would sell the contract or go short. In either case, you would be able to offset or liquidate your original position and realize a gain or a loss from the trade.

Most CME interest rate futures contracts features a minimum price move, or "tick" of 0.01 or \$25.00. The first two quarterly and the two serial contracts have a minimum "tick" of .005 or \$12.50. If a contract moves from 95.01 to 95.02, a buyer would gain \$25.00 per contract while a seller would lose an equal amount. The final settlement of Eurodollar futures are much like FRAs in that delivery of the face value of the contract never takes place. They are cash settled upon expiration. positions are marked to market to a final settlement price as determined by British Bankers Association Interest Settlement Rate for 3 month deposits at 11 AM London time on the last trading day of the contract. Expiration is two business days before the third Wednesday of the contract month.

◆ HEDGING WITH INTEREST RATE FUTURES

Interest rate futures can be used to hedge against an existing or future interest rate risk. This is accomplished by maintaining a futures position that will generate profits to cover (or offset) the losses associated with an adverse move in interest rates. It is important to note that a properly constructed futures hedge can also generate losses that will offset the effects of a beneficial interest rate move. In addition, because futures are quoted in terms of price rather than interest rates, futures exhibit an inverse relationship between rates and price. A borrower would sell futures to protect against an interest rate rise, i.e. to profit from a decrease in the futures price and a lender or investor would buy futures to hedge against a decline in interest rates.

◆ **EXAMPLE :** In late September a treasurer projects that cash flows will require a \$1,000,000 bank loan on December 16th. The contractual loan rate will be 1% over the three month LIBOR rate on that date. LIBOR is currently at 5.56%. the December Eurodollar futures, which can be used to lock in the forward borrowing rate, are trading at 94.24, implying a forward Eurodollar rate of 5.76%. By selling one December Eurodollar futures contract, the treasurer ensures a borrowing rate of 6.76% for the three month period beginning December 16. This rate includes the bank's 1 % spread above the rate implied by the contract. If the rates do increase in the interval before December, the treasurer's gain on the contract will offset the loss incurred by a higher borrowing rate.

Whether you are using interest futures to hedge an upcoming interest rate exposure or to capitalize on an anticipated interest rate move, the CME products offer a myriad of expirations and combinations covering exposure from 1 day to 10 years. There are options on futures, bundles or packs of consecutive contracts, called strips, and many others beyond the scope of this course.

WORKSHEET 9

FUTURES TRADING

YOU HAVE JUST PURCHASED 10 CONTRACTS IN SEPTEMBER CAD AT A PRICE OF .6900. THE INITIAL MARGIN IS 5%. SHOW THE CASH FLOW (MARK TO MARKET) FOR THE NEXT 5 DAYS OF TRADING.

TIME	PRICE	CASH FLOW	MARGIN
TRADE	.6900	0	
DAY 1	.6930		
DAY 2	.6920		
DAY 3	.6910		
DAY 4	.6940		
DAY 5	.6970		

ASSUMING YOU CLOSE OUT THE TRADE AT THE CLOSE OF DAY 5, WHAT IS YOUR PROFIT /LOSS ON THE TRANSACTION ? _____

WORKSHEET 10

OPTIONS ON FUTURES

1. YOU BELIEVE THAT GBP IS GOING TO APPRECIATE IN THE NEXT FEW MONTHS, SO YOU PURCHASE AN OPTIONS CONTRACT WITH A DECEMBER EXPIRY. DO YOU BUY A PUT OR A CALL? _____. THE STRIKE PRICE IS 1.6500 AND THE PREMIUM IS .0200. AT WHICH PRICE DO YOU BREAK EVEN? _____

2. YOU HAVE A GBP 250,000 PAYABLE DUE IN A FEW MONTHS WHICH YOU WANT TO HEDGE WITH FUTURES. HOW MANY CONTRACTS OF WHAT TYPE OF OPTION WOULD YOU PURCHASE FOR THE HEDGE? _____
AT WHAT PRICE WOULD YOU BREAK EVEN ON THE STRATEGY USING THE 1.6500 STRIKE AND THE .0200 PREMIUM IF YOUR SHORT GBP EXPOSURE IS AT 1.6500? _____

3. YOU ANTICIPATE HIGHER VOLATILITY IN GBP DUE TO THE UPCOMING ELECTIONS. YOU PURCHASE A STRADDLE (PUT AND CALL CONTRACTS) WITH A STRIKE PRICE OF 1.6500 AND A PREMIUM OF .0200 EACH. AT WHAT LEVELS DO YOU BREAK EVEN? _____

WORKSHEET 11

EURODOLLAR FUTURES

1. YOU HAVE SOLD 10 3 MONTH EURODOLLAR FUTURES AT 91.27, WHICH YOU BUY BACK AT 91.49. DID INTEREST RATES RISE OR FALL DURING THE TIME PERIOD? _____ WHAT WAS YOUR PROFIT OR LOSS ON THE TRANSACTION? _____

2. YOU BUY DEC FUTURES AT 94.55. WHAT IS YOUR INTEREST RATE VIEW? _____ YOU ARE LONG OR SHORT WHAT INTEREST RATE EQUIVALENT? _____

3. TODAY'S DATE IS JAN 23. A TREASURER NEEDS TO BORROW GBP 5 MM ON MAR 18 FOR THREE MONTHS. HIS VIEW IS THAT THE GBP LIBOR WHICH IS CURRENTLY AT 14% WILL MOVE TO 15% BY MAR 18. SHOW THE OUTCOME ON MAR 18 OF A FUTURES HEDGE WHICH LOCKS IN A RATE OF 14% USING THE 3 MONTHS FUTURES CONTRACT, ASSUMING THE RATES DO GO TO 15%. TICK VALUE IS GBP 12.50 AND CONTRACT SIZE IS GBP 500,000.

BUY OR SELL _____ (NUMBER) OF CONTRACTS

PROFIT OR LOSS ON HEDGE _____ GBP

ASSUMING 91 DAYS IN THREE MONTHS,

PROFIT OR LOSS ON LOAN COST _____

DOES THE HEDGE WORK? _____

MODULE 7

CURRENCY AND INTEREST RATE SWAPS

MODULE OBJECTIVES

- ◆ UNDERSTAND THE MECHANICS OF A SIMPLE INTEREST RATE SWAP
- ◆ UNDERSTAND THE MECHANICS OF A CURRENCY SWAP
- ◆ UNDERSTAND THE BENEFITS AND USES OF SWAPS

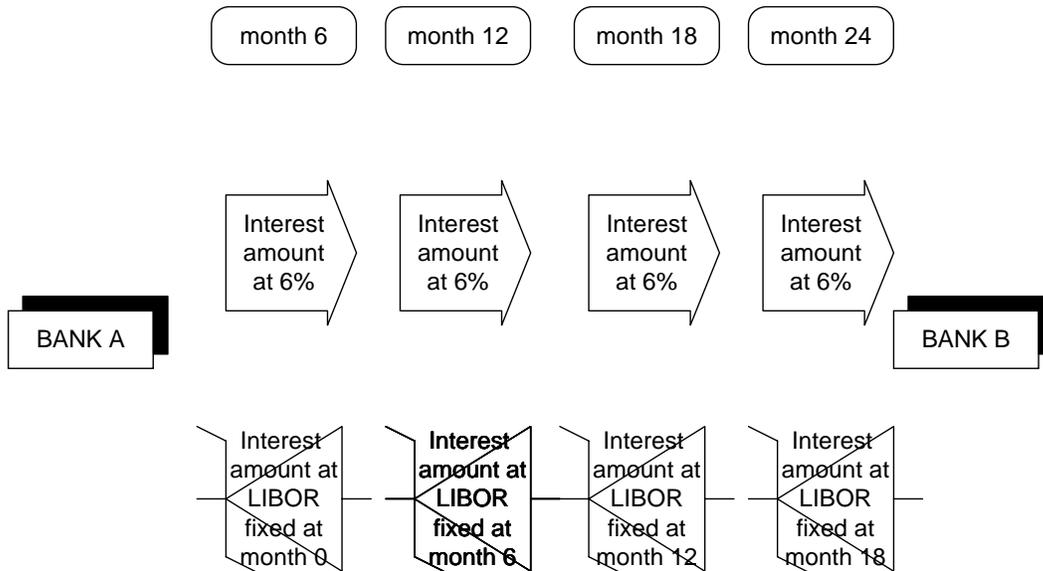
◆ INTEREST RATE SWAPS

A swap is exactly what its name implies: an exchange of two streams of payments. The most common type of financial swap is between streams of payments which are denominated in the same currency, but are calculated using different interest rates. This is called an interest rate swap. It is a contract which commits two counterparties to exchange, over an agreed period of time, two streams of payments, each calculated using a different type of interest rate, but the same notional principal amount. The principle is referred to as notional because it is used in the calculations, but is usually not exchanged as part of the swap. Swaps exist because markets are not perfect. Imperfect markets lead to firms having comparative advantages in different markets. If each firm transacts in the market where they have an advantage, a net benefit will be created which can be divided between the firms.

◆ HOW DOES AN INTEREST RATE SWAP WORK?

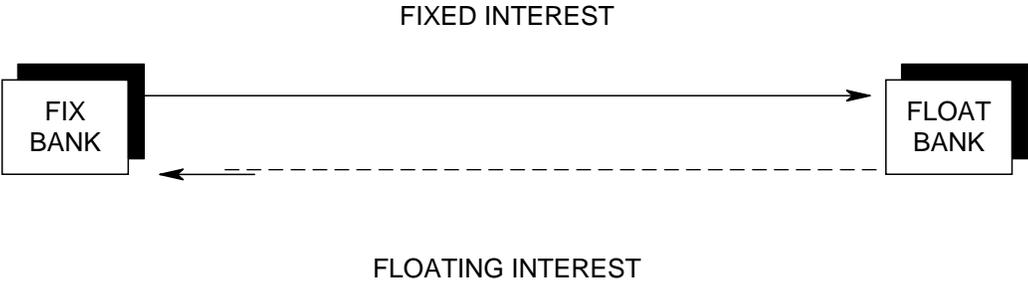
Bank A and Bank B agree to an interest rate swap over two years on a notional principle amount of USD 100 MM. The payments made by Bank A are to be calculated at a fixed rate of 6% per annum to be paid semi-annually. Bank B's payments will be calculated using periodic fixings of six month LIBOR, therefore are floating rate or variable payments over the two years.

PATTERNS OF CASHFLOWS



Note that an interest rate is normally fixed at the start of the period to which it applies, while the payment calculated using this fixing is made at the end of the period. Interest is fixed in advance but paid in arrears.

The basic structure of a swap is usually illustrated with a box and arrow diagram. The continuous line between the counterparties represents the stream of fixed rate interest payments and the broken line represents the counterstream of floating rate interest payments.



The cash flows for the previous example on a notional amount of USD 100 MM are set out in the following table. Assume 180 days in each period and a 360 day basis. Where swap counterparties are due to make payments to each other on the same date, the payments are usually netted with only the difference settled. In this diagram a + represents a payment to Bank A and a - is a payment to Bank B.

time from start of swap	payments by Bank A		payments by Bank B		net settlement payments
	fixed interest rate at start	payment amount at end	LIBOR fixed at start	payment amount at end	+ to Bank A - to Bank B
0	6%		5.75%		
6 months	6%	3,000,000	6.125%	2,875,000	-125,000
12 months	6%	3,000,000	6.00%	3,062,500	+62,500
18 months	6%	3,000,000	5.50%	3,000,000	0
24 months		3,000,000		2,750,000	-250,000
Total		12,000,000		11,687,500	-312,500

For example the 6 month floating rate payment is calculated as

$$\text{USD } 100 \text{ MM} \times .0575 \times 180/360 = 2,875,000$$

Because an interest rate swap does not involve an exchange of principal, it does not impact the balance sheets of the swap counterparties and are therefore classed as off-balance sheet instruments. They are also classed as derivative financial instruments. The term “derivative” stems from the fact that this type of instrument makes payments calculated using prices or interest rates “derived” from ongoing cash instruments, but it does not have to employ those instruments to fund payments. The cash instruments in this example were a 2 year fixed rate bond and a 6 month Eurodollar deposit. Netting the payments through a swap reduces delivery risk

◆ WHAT DOES AN INTEREST RATE SWAP DO?

Interest rate swaps create interest rate risk. In the previous example, the interest rate used to calculate the payments by Bank A were fixed at the start of the swap. The 6 month LIBOR rate used to calculate the payments by Bank B was adjusted each 6 month period and is a floating rate that changes continuously between fixing dates. This means that the stream of payments for Bank B consists of variable amounts which change every 6 months. Only the first of these is known at the start of the swap.

Because it pays fixed and receives floating interest through the swap Bank A is exposed to risk that LIBOR will fall during the life of the swap, decreasing the payments it receives through the swap. Bank B on the other hand, is exposed to the risk that LIBOR will rise during the life of the swap. In other words an interest rate swap exposes both parties to interest rate risk. The swap can be used as an instrument to take risk. In this example if Bank A was anticipating a rise in interest rates and Bank B was anticipating a fall in interest rates, they would become counterparties in the swap as described in the example. Swaps can also be used to hedge against another source of interest rate exposure. Bank A could have used the swap to hedge a floating rate loan. Bank B could have used the swap to hedge a floating rate investment.

The exchange of cashflows in a swap can be used to restructure the cashflows on other instruments, by replacing existing streams of payments with different streams of payments. In this way, swaps can be used to synthesize instruments which are not readily available. The synthesis of instruments is the basis of financial engineering and provides access to different markets that might not be open to a counterparty or which may not exist at all. Prior to the existence of swaps, cash instruments were used to achieve the same results of creating interest rate risk. Swaps offer numerous advantages because they do not impact the balance sheets of the counterparties as cash instruments do.

- ◇ Swaps pose less credit risk. Only interest payments are at risk on a swap, whereas assets and liabilities are at risk for their full principal amount.
- ◇ Swaps are subject to lower capital adequacy requirements.
- ◇ Swaps have lower transaction costs.
- ◇ Swaps offer greater flexibility. The use of cash instruments can interfere with other uses of the balance sheet, such as normal lending operations.

Although there are many types of interest rate swaps; the only one that we will discuss in this course is the fixed -against-floating rate swap which is also called a coupon swap.

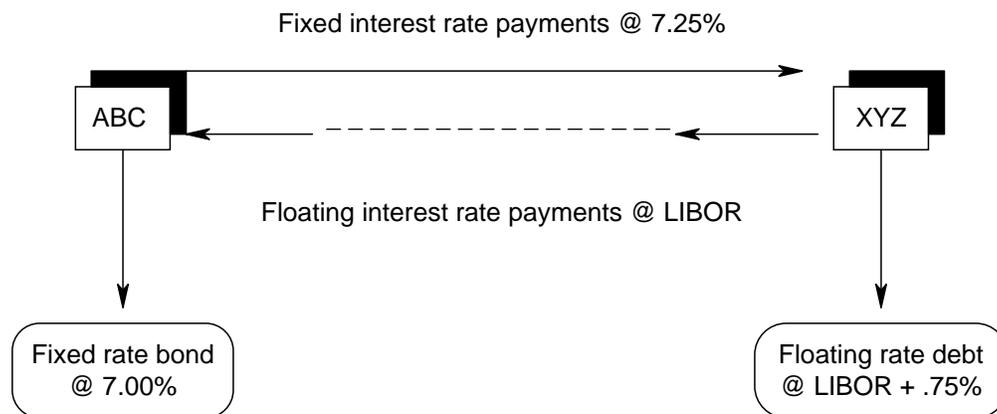
◆ USING INTEREST RATE SWAPS

We will introduce the mechanics of a coupon swap through the use of a simple example. this example will show using swaps to reduce the borrowing costs of two companies. assume the two companies, ABC and XYZ both want to borrow \$10,000,000 for a period of three years. ABC is a well established firm with a high credit rating. XYZ, however is a newer firm with volatile earnings and a lower credit rating. ABC wants to borrow floating rate money while XYZ wants to borrow fixed rate money. They have access to different borrowing costs and different objectives as follows:

	ABC	XYZ
Notional principal amount	\$10,000,000	\$10,000,000
Term	3 years	3 years
Fixed interest rate	7.00%	8.50%
Floating interest rate	LIBOR + .25%	LIBOR + .75%
Interest payment frequency	6 months	6 months
Wants to borrow	Floating rate	Fixed rate

Can ABC and XYZ use a swap to their mutual benefit? ABC can borrow floating rate money at LIBOR + .25% and XYZ can borrow fixed rate money at 8.5% to meet their needs. However if ABC would borrow fixed rate money and XYZ were to borrow floating rate money and then enter into a swap with each other there would be further benefits which could be shared between the parties. ABC could borrow fixed at 7% and XYZ could borrow floating rate money at LIBOR + .75 %.

CASH FLOWS UNDER A SIMPLE SWAP



The cash flows would now appear as shown above. ABC pays out 7% to its bondholders but it receives 7.25% from XYZ, giving it a 25 basis point positive spread. It then pays out LIBOR flat to XYZ. The net result for ABC is an effective cost of borrowing of LIBOR - .25%. This is .50 less than it would have had to pay if it borrowed floating rate money in the market at LIBOR + .25 %. XYZ pays out LIBOR + .75% to its bondholders, but it receives in LIBOR from ABC. XYZ's net cost of borrowing is now 7.25% + .75% or 8.00%. This is .50 less than if it had borrowed fixed rate money in the market at 8.5%. The swap has saved each company .50 on their borrowing costs. Note that the floating rate paid by ABC to XYZ is shown as LIBOR. That is the usual assumption, with adjustments made to the fixed rate flows. The total benefit to be divided between ABC and XYZ can be calculated by subtracting the difference in the floating rate market from the difference in the fixed rate market.

	XYZ	ABC	Difference
Fixed rate	8.5%	7.0%	1.50%
Floating rate	LIBOR + .75%	LIBOR + .25%	.50%
Net difference			1.00%

To capture the 1.00% net benefit available, each firm must borrow where it has a comparative advantage. ABC can borrow 1.50% cheaper in the fixed rate market, but only .50% cheaper in the floating rate market. Therefore ABC is said to have a comparative advantage in the fixed rate market. XYZ has a comparative advantage in the floating rate market. Delivery risk could be reduced in this example by the netting of payments.

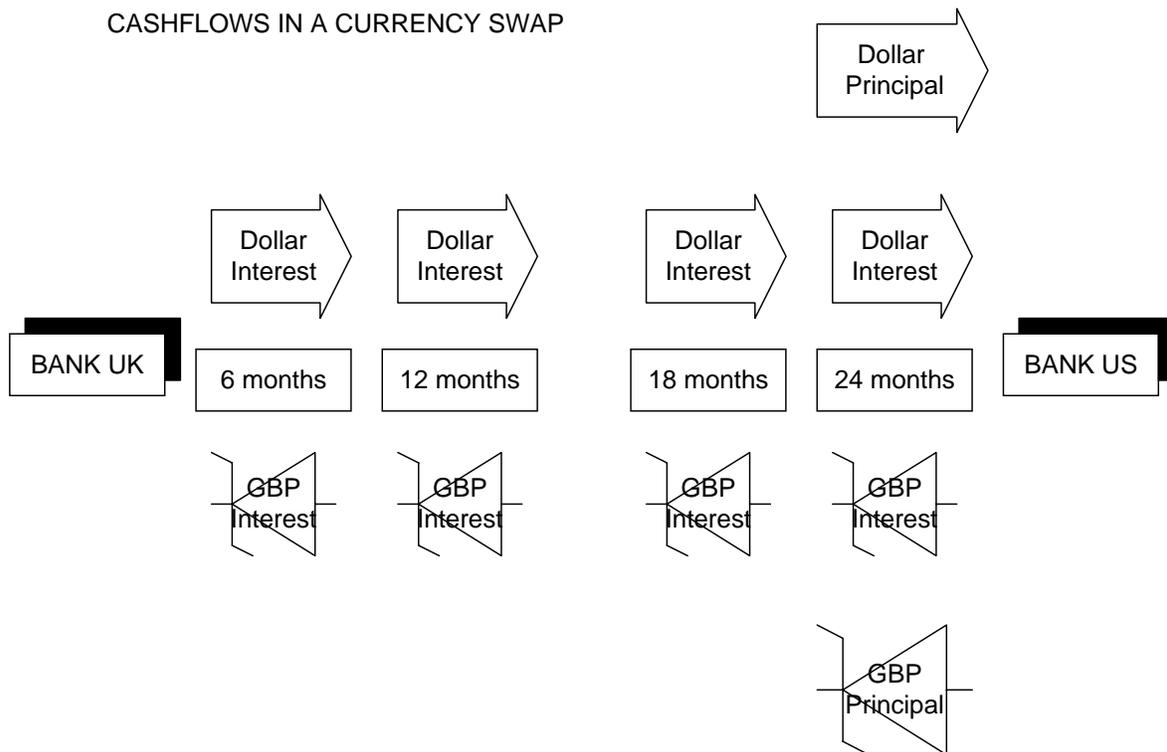
◆ CURRENCY SWAPS

Currency swaps are similar to interest rate swaps in that they involve an exchange of interest rate flows but they add two additional components. In a currency swap, the interest rate flows are paid in different currencies and there is an exchange of principal at the maturity date of the swap. However, because the exchange of principal is usually done at the exchange rate fixed at the start of the swap, it allows both parties to fix their currency exposure over the life of the swap.

◆ HOW DOES A CURRENCY SWAP WORK?

Consider a currency swap in which Bank UK commits to pay Bank US, over a period of 2 years, a stream of interest rate payments on USD 17 MM. at a negotiated interest rate. In exchange bank US agrees to pay Bank UK over the same period, a counterstream of GBP interest on

GBP 10 MM at another negotiated rate. The banks commit to exchange the principal amounts of USD 17 MM and GBP 10 MM at the end of the 2 years. The exchange rate of 1.7000 is set at the start of the swap.



Currency swaps differ from interest rate swaps in that the exchange of payments are in two currencies and there is an exchange of principal at the end. Although principal is exchanged, like forward foreign exchange, the impact on the balance sheet occurs only at maturity.

Currency swaps are classified as off-balance sheet instruments. They are not derivative instruments because of the actual delivery of principal. The interest rate payments exchanged through the currency swaps can be calculated using:

- ◇ a fixed interest rate versus a floating interest rate index
- ◇ two floating rate indexes
- ◇ two fixed interest rates

Like the exchange rate, the interest rates used in currency swaps are set by negotiation between the counterparties. It is possible, therefore, for those rates to diverge from market levels.

Currency swaps can be used to take on currency risk, but are more usually applied to a hedging situation.

Strictly speaking and for the purposes of this course, currency swaps involve the exchange of two fixed rate streams of payments in different currencies. The exchange of a fixed rate against a floating rate is called a cross currency coupon swap. The exchange of two floating rates is a cross currency basis swap. A cash swap involves the initial exchange of principal as well as at the end.

◆ WHAT DOES A CURRENCY SWAP DO?

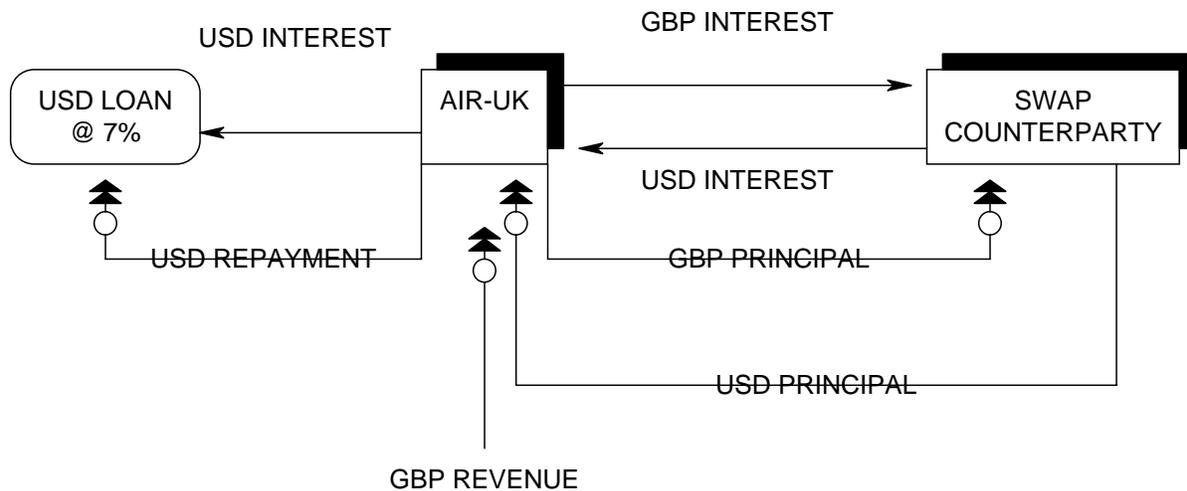
Currency swaps create currency risk and can create interest rate risk. The examples in this module will focus on swaps with fixed interest rates and therefore no interest rate risk. Each counterparty in a currency swap is committed to pay the other counterparty a stream of interest plus a principal amount in one currency in exchange for a counterstream of interest plus a principal amount in another currency. The exchange rate for the payment of principal is fixed at the start of the swap; usually the spot exchange rate prevailing at the time. The exchange rate between the two currencies is likely to change before maturity. The counterparty paying the currency that appreciates during this time experiences a foreign exchange loss on the position and the counterparty receiving the appreciating currency experiences a gain.

A currency swap has all of the advantages over cash instruments as other interest rate swaps as explained in the previous section.

◆ USING CURRENCY SWAPS

Again a simple example will show the mechanics and cash flows of a typical currency swap. Assume that a British based company AIR-UK has borrowed USD at a fixed rate of 7 % over the next 5 years to purchase aircraft from the United States. It now expects the USD to appreciate against the GBP from its current rate of 1.7000. The loan is for USD 17 MM. The GBP cost of principal and of the interest rate payments that are due semi-annually will increase under this scenario. The airline could hedge its exposure by entering into a GBP/USD currency swap. The currency swap would fix the rate at which AIR-UK could exchange its accumulated GBP receivables for the USD needed to repay the borrowing. The interest rates would be set at the start of the swap at 7% for the USD and 9% for the GBP. This will increase AIR-UK's cost of borrowing to 9% which is similar to current domestic GBP rates.

CURRENCY SWAP



At the start of the swap the GBP/USD is agreed on at 1.7000. At the same time the interest rates are set as 7% for USD and 9% for GBP. The stream of payments will take place every 6 months to coincide with the payments on the USD loan. The USD payments from the swap will service the loan and the GBP payments will be funded from earnings. At maturity in 5 years the USD principal from the swap will be used to repay the principal of the loan. The GBP principal will be paid from accumulated earnings.

There are many other uses of currency swaps to create or hedge foreign exchange exposure.

WORKSHEET 12 CALCULATING SWAP BENEFITS

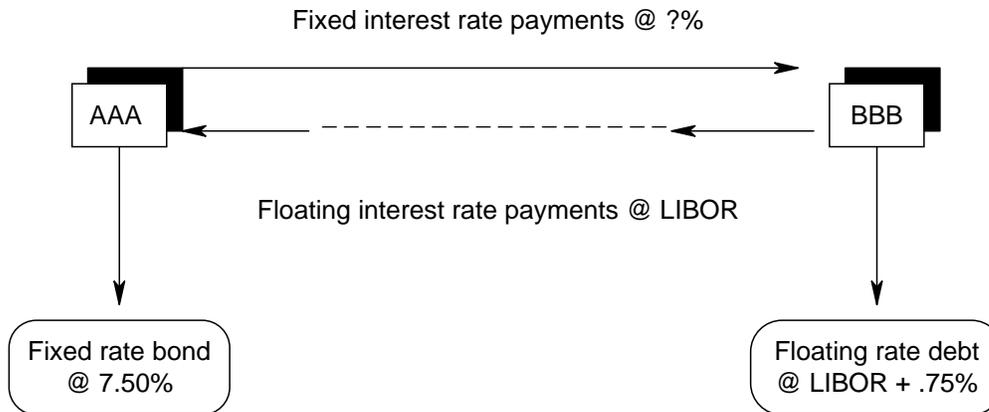
AAA IS A BANK WHICH CAN ISSUE A 5 YEAR EUROBOND AT 7.5% OR TAKE A 5 YEAR BANK LOAN AT LIBOR + .25%.

BBB IS A BANK WHICH CAN ISSUE A 5 YEAR EUROBOND AT 9% OR TAKE A 5 YEAR BANK LOAN AT LIBOR + .75%

AAA WANTS 3/4 OF ANY SWAP BENEFIT AND BBB IS WILLING TO ACCEPT 1/4.

WHAT WOULD BE THE PRICE OF THE SWAP (THE FIXED INTEREST RATE)?

CASH FLOWS UNDER A SIMPLE SWAP

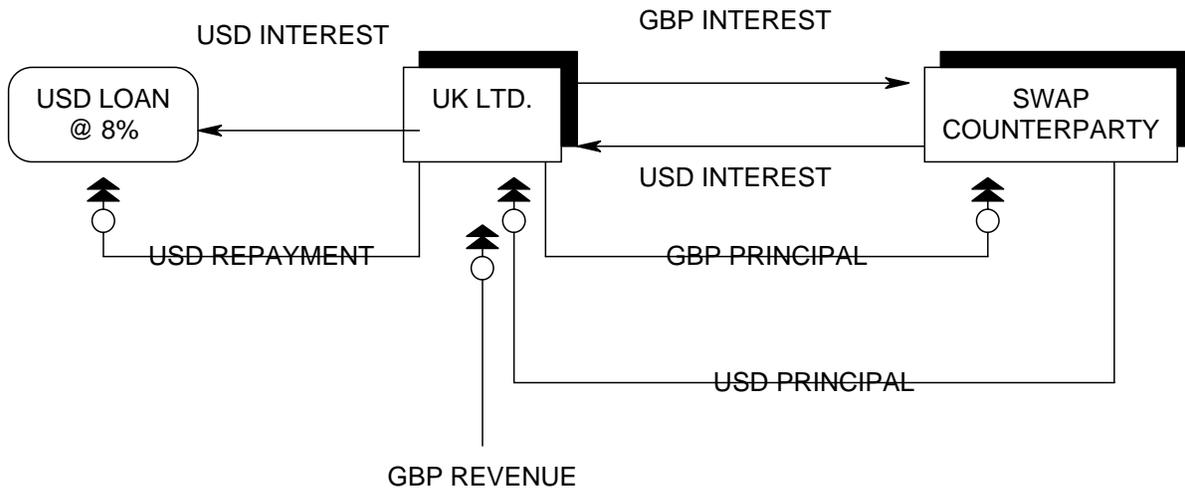


	BBB	AAA	DIFFERENCE
FIXED RATE	9%	7.5%	
FLOATING RATE	LIBOR +.75%	LIBOR + .25%	
NET DIFFERENCE			

WORKSHEET 13

HEDGING WITH CURRENCY SWAPS

A UK BASED COMPANY, UK LTD., HAS A FIXED BORROWING IN USD AT 8% OVER TWO YEARS. CURRENT DOMESTIC GBP FIXED RATES FOR THE SAME PERIOD ARE 10% THE USD LOAN IS FOR USD 15 MM. STRUCTURE A CURRENCY SWAP USING THE EXCHANGE RATE OF 1.5000 TO HEDGE THE USD BORROWING WITH GBP.



ASSUME PAYMENTS ARE MADE SEMI-ANNUALLY, 180 DAYS PER PERIOD AND 360 DAY BASIS FOR BOTH THE LOAN AND THE SWAP.

WHAT IS THE TOTAL INTEREST ON THE LOAN? _____

WHAT IS THE TOTAL INTEREST ON THE DOLLAR SWAP USING 8% ? _____

WHAT IS THE TOTAL INTEREST ON THE GBP SWAP USING 10% ? _____

WHAT IS THE COST OF BORROWING IN % PER ANNUM? _____

IF THE EXCHANGE RATE IS 1.4000 AT MATURITY IS THE HEDGE PROFITABLE?

ROLE PLAY

NEGOTIATING A COUPON SWAP WITH A BANK

ABC WANTS TO BORROW USD 10 MM ON A FIXED RATE BASIS FOR 2 YEARS. XYZ WANTS TO BORROW THE SAME AMOUNT ON A FLOATING RATE BASIS FOR THE SAME PERIOD OF TIME. FOR CREDIT REASONS, THEY USE MEGA BANK AS AN INTERMEDIARY.

FIXED RATE LOANS ARE SET AT 1% OVER THE TREASURY BOND RATE OF 6 %. FLOATING RATE LOANS ARE RESET EVERY 6 MONTHS AT 1% OVER LIBOR, CURRENTLY AT 5.5%. ASSUME THE BANK CAN FUND ITSELF AT THE BASE RATES.

EACH COMPANY MUST NEGOTIATE THE TERMS OF THE SWAP USING THE BANK. LIST THE KEY POINTS OF THE SWAP CONTRACT.

WHAT IS THE BANK'S PROFIT ON THE TRANSACTIONS AS YOU SET THEM UP?

MODULE 8

FACTORS INFLUENCING FOREIGN EXCHANGE MARKETS

MODULE OBJECTIVES

- ◆ IDENTIFY TYPES OF FOREIGN EXCHANGE EXPOSURE
- ◆ UNDERSTAND INFLUENCING FACTORS FOR PRICE FLUCTUATIONS
- ◆ UNDERSTAND RISK MANAGEMENT

◆ WHAT IS CURRENCY EXPOSURE ?

Foreign exchange risk or currency exposure has a variety of forms and can be obvious or obscure. Foreign exchange risk may exist for a corporation without the company even being aware of it. One must be able to identify the existence of risk and its specific type before it can be effectively managed. Here are several situations in which various types of foreign exchange risk are more or less obvious:

- ◇ IMPORT USA is buying Wedgwood china from a supplier in England and is invoiced in GBP. Payment is due on a net 30-day basis. IMPORT USA must buy GBP sometime between the date the china is ordered and the payment due date.
- ◇ EXPORT USA is selling its tree trimming equipment to a company in Thailand. In order to be competitive, it must invoice its customer in THB. EXPORT USA will need to convert THB into USD upon receipt of the payment as it has no accounts payable in Thailand.
- ◇ NEWCO USA is exporting its products to Nigeria and is billing in USD. Payment is on a net 10-day basis.
- ◇ MEGA CORP USA has subsidiaries in several different countries around the world. At each quarter end, a consolidated balance sheet must be given to the board of directors. Each subsidiary maintains its own bank accounts and is responsible for remitting USD for dividend payments

In each of these situations, the companies involved have foreign exchange exposures, each in varying degrees and combinations. Currency exposure can be defined as a current position or a committed or forecast future asset or liability denominated in a foreign currency which will have to be converted or translated into another currency at a rate which is yet to be determined. Although translation risk and transaction risk are the major exposures that are quantified; there are three other types of risk that should be addressed.

◆ FOREIGN EXCHANGE EXPOSURE DEFINED

- ◇ **Sovereign Risk** This is another name for political risk. What are the chances that the government which is in power in the foreign country will remain intact and will continue to have favorable relations with the United States? What happens if the current government falls and a less than friendly governing body is installed.
- ◇ **Exchange Risk** Will the foreign currency be trading freely on the open market when the time comes to convert into or out of the currency. Further, are there any restrictions on the availability and transfer of “hard currency” out of the foreign country? What happens if exchange controls are instituted?
- ◇ **Translation Risk** This is an accounting based risk. When maintaining an overseas operation and a consolidated statement must be filed, changes may occur in the book value of the overseas operation without any true changes in its balance sheet. The foreign exchange rate applied to the assets and liabilities in the balance sheet will result in a reported gain or loss at each reporting period. There is a great deal of debate about whether translation really matters; some feel that it does not because its effect is on book values and not cash flows. Hedging such exposures may result in a real cash loss that is offset by a gain that only exists on paper. Those that believe that it does matter point to the effect that translation exposure can have on debt and reserves which may affect compliance on loan covenants.
- ◇ **Transaction Risk** This is the risk associated with the potential gains and losses on a given transaction which is susceptible to foreign exchange rate movements. This relates to any transaction resulting in a net receipt or payment which must be made in a foreign currency. Therefore items such as foreign currency payables or receivables, repatriation of revenues or dividends, or foreign currency loan payments or interest income are all subject to transaction risk. This exposure can be created when a foreign currency price list is issued, when a firm order from a customer is accepted, when an order to purchase goods is placed, or when the actual transaction is paid.
- ◇ **Economic Risk** This is an opportunity risk associated with conducting business only in USD. regardless of where the customers or suppliers are located. If a competing firm is located in the same country as the buyer and is pricing its product in local currency, with all

things being equal, the buyer may choose the competition simply because it doesn't want to experience the foreign exchange risk. This is direct economic exposure. An example of indirect economic exposure is when suppliers in different countries are competing for sales in a third country. For example if British and German motor manufacturers are competing in the French market, the British manufacturer will be exposed not only to the FRF/GBP exchange rate but also to the relative movements in the FRF/DEM exchange rate. The British manufacturer will gain a competitive advantage if GBP weakens against the FRF more than DEM does. It is doubtful whether a company could ever accurately assess its economic exposure because of the large range of factors. They should try to identify key elements of their economic exposure and to ascertain their tolerance to major exchange rate movements.

◆ FOREIGN EXCHANGE RISK DEFINITIONS APPLIED

Now that the major foreign exchange exposure risks have been defined, the risks faced by the companies in the original examples can be determined.

- ◇ IMPORT USA has **transaction risk** associated with its purchase of china from England. the company runs the risk of the GBP increasing in value prior to the company buying the pounds to cover the invoice. This would result in an increased cost of the china which the company may or may not be able to pass on to its customers.
- ◇ EXPORT USA has **sovereign risk, exchange risk**, as well as **transaction risk**. Is the government of Thailand stable and free of sanctions? Is the THB a freely traded currency without conversion restrictions? Is there a forward market in THB so that EXPORT USA can sell the THB today for future delivery?
- ◇ NEWCO has **sovereign risk** and **exchange risk**. How stable is the Nigerian government? Is it on good terms with the U.S. government? Are there any trade sanctions covering the goods to be exported? Will the customer be able to purchase USD and transfer them out of the country? How reliable is the exchange market in Nigeria?

◇ MEGA CORP USA has **translation** and possibly **transaction risk**. The translation risk comes from converting the foreign currency value of the subsidiaries into USD. With everything else constant, the exchange rate alone could change the value of a subsidiary's assets significantly. If the subsidiary has local currency payables and remits profits or dividends to the U.S. parent, a transaction risk exists and must be managed effectively in order to protect their value.

◆ CREDIT OR COUNTERPARTY RISK

Any party to a foreign exchange contract faces two distinct types of credit risk. Examples:

Rate Risk

If a corporation were to become insolvent during the life of a foreign exchange contract held with a bank, the bank would face potential loss. For example, assume that Commercial Bank International (CBI) had purchased (from EXPORT USA) FRF 2,000,000 for delivery in six months at an exchange rate of 6.2500. Assume further that CBI sold the FRF 2,000,000 to another party at 6.2000.

Prior to the contract maturity date, CBI determines that EXPORT USA will be unable to meet its contract commitment. CBI may then have to purchase FRF 2,000,000 in the interbank market to cover the French francs sold at 7.20. If the French franc has gone up in value (e.g., 5.7500), CBI will incur a loss.

There are two primary elements in assessing this type of risk. First, the potential volatility of the currencies traded by the corporation. Second, the duration of the exposure determined by contract maturity dates.

Rate risk is generally no more than 5-25% of the face amount of outstanding contracts.

Delivery Risk

Due to time zone differentials, a commercial bank faces a risk when it delivers one currency several hours before it receives the corresponding currency. For example, CBI contracted with IMPORT USA to deliver DEM 1,000,000 spot. The DEM 1,000,000 are delivered to IMPORT USA's account in Germany the morning of the value date of the contract. When the U.S. markets open, CBI attempts to debit IMPORT USA's dollar account and determines that no dollars are available.

Unlike rate risk, the delivery risk is usually 100% of the contract value.

Summary

Because of these risks, a commercial bank will examine potential credit exposure before entering into spot or forward contracts with another bank, or a corporation.

It should be noted that a corporation faces the same credit risks, and therefore, should choose its foreign exchange banks with this in mind.

◆ WHY DO EXCHANGE RATES MOVE ?

Looking back to Module 1 and the history of attempts to manage exchange rate stability, recurring themes are evident: the effects over time of the balance of payments, capital flows, inflation and growth rates. These are the economic fundamentals that sooner or later assert themselves. When attempts have been made to fix rates at some historical parity, it is these factors that override the artificial means and bring rates into line with what the market considers to be economic reality. An understanding of how long term economic fundamentals interrelate with other short term factors is essential to understanding why exchange rates move and the rationale behind forecasting. The movements over time in the exchange rate of a freely floating currency should be viewed as having two key constituents. Economic performance can be considered to be the foundation of the trend of the currency in relation to other currencies. The

other short term political, psychological, and technical factors largely account for the volatility around the long-term trend line.

◆ PURCHASING POWER PARITY

At the most basic level, foreign exchange rates are determined by supply and demand of one currency relative to another. The key question then becomes, “What factors determine supply and demand?” The “law of one price” is one of these governing factors. Identical products sold in different markets will sell for the same price, assuming no transportation costs or trade barriers. At an exchange rate of DKK /USD of 6.0000, if Levi jeans are selling for \$30 in Seattle, they should sell for DKK 180 in Copenhagen. If the price is actually DKK 300 in Copenhagen, one can earn arbitrage profits by buying jeans in Seattle and selling them in Copenhagen. Increased demand for jeans in Seattle will increase prices at the same time increased supply in Copenhagen causes prices there to drop, until eventually an equilibrium price is reached. If the “law of one price” were true for all goods and services, one could derive foreign exchange rates from the prices of comparable baskets of goods.

Exchange rates should change as relative prices change. The purchasing power parity theory holds that freely floating exchange rates are affected predominately by differences in inflation rates. Thus a currency with a high inflation rate can be expected to depreciate against one with a lower inflation rate, to maintain the purchasing power of the two currencies so that the price of goods in the two countries concerned is the same. In theory the appreciation or depreciation of one currency against another should be equal to the percent difference in the interest rates of the two countries. Purchasing power parity is useful for explaining long-term currency trends and has been shown to have some basis in fact.

There are, however other considerations that must be taken when using the theory. Price indices are not prepared on the same basis in each country and there are several to choose from. The only prices that should affect exchange rates are those that relate to goods and services that can be traded internationally. A rise in purely domestic costs may be reflected in a price index and not have a direct impact on exchange rates. Factors other than price can be as important to a

country's international competitiveness. High quality or unique products may not be as price sensitive.

◆ THE BALANCE OF PAYMENTS

THE U.S. BALANCE OF PAYMENTS

Group	Category Component	Popular Name
A	Merchandise trade, net other	Trade Balance
	current items = Current Account	Current Account Balance
B	Direct investment, net	Sum of A + B
	portfolio investment, net other long-term items = Long Term Capital	
C	Short Term Capital	
D	Errors and Omissions	
		Sum of A+B+C+D Overall Balance

Some economists consider a country's Current Account Balance to be a better guide to likely exchange rate trends in the shorter time horizon that most market participants are involved in. The Balance of Payments is an accounting system which measures economic transactions between a country and its trading partners. The Current Account Balance, comprising goods, services, investment incomes and transfers, is held to be a fair indicator of a country's international competitiveness. A current account surplus is a net inflow of overseas earnings. It creates demand for that country's currency and therefore strengthens it. A deficit is a net outflow of funds and will have the opposite effect.

The Balance of Payments is useful in forecasting short term market potential. A surplus indicates increased ability to purchase imports. A deficit may produce an excess supply of that

country's currency in the world markets which would decrease its value. Continuing deficits may signal future capital or exchange rate restrictions. Current Account Balance is a broader and more complex measure than Purchasing Power Parity and is influenced by several factors. High inflation weakens international competitiveness, which will eventually lead to a fall in exports and a rise in imports. A comparatively high growth rate also results in an increase of imports and a decrease in exports as other countries have less demand for goods and services. Both situations have negative impact on the Balance of Payments and in turn the value of the currency.

◆ OTHER MACROECONOMIC FUNDAMENTALS

- ◇ CAPITAL FLOWS In the past, flows of capital from one country to another were insignificant when compared to the flows described by the current account balance. That was because of a low level of liquid savings worldwide and restrictions on the freedom of movement on these assets. Since the 1970's and the emergence of the Eurocurrency market, coupled with high levels of liquid savings, capital flows can now have as much, or even more, effect on exchange rates than current account flows. In fact, the direction of the impact is the opposite as money tends to flow out of low interest rate currencies into high interest rate currencies. That is why a central bank will increase interest rates to protect its currency from depreciation. Capital flows can be the cause of major and sudden exchange rate movements as, in contrast to the flows that make up the trade balance, they can be reversed and may change direction on short notice. This is called the effect of "hot money".
- ◇ FOREIGN EXCHANGE RESERVES A government that is intervening in the foreign exchange markets will be using its foreign currency reserves to either push up or push down the value of its currency. efforts to support the domestic currency result in using reserve currencies to buy the domestic currency in the markets and result in a loss of reserves. Efforts to depreciate a domestic currency will result in the accumulation of foreign reserves.
- ◇ GDP GROWTH Economic growth is the largest single force affecting imports and exports. If the domestic economy is growing rapidly compared to major trading partners, the level of

imports is likely to rise faster than exports, trade deficits ensue causing currency depreciation. A possible mixed signal is if the more rapid economic growth attracts large capital inflows, possibly offsetting the negative trade effects.

- ◇ **GOVERNMENT SPENDING** A rapid rise in government spending, particularly if financed through deficit spending, results in increased inflationary pressures on the economy. Inflation infers currency depreciation.
- ◇ **MONEY SUPPLY GROWTH** One of the primary causes of inflation is the rapid growth of the money supply. Many countries choose to stave off recession by increasing money supply growth to lower domestic interest rates. This usually results in higher inflation followed by currency depreciation.

An understanding of the effects of economic fundamentals on exchange rates can form the basis of a methodology for forecasting future exchange rates, however, the other short term factors must be accounted for.

◆ **OTHER SHORT TERM FACTORS**

Political and psychological factors influence short term exchange rate movements. Elections, national crises, even weather can cause a knee-jerk reaction of an exchange rate. Market psychology plays a big part in day to day currency movements. Sometimes the reaction to an economic announcement is the opposite of what the underlying data would indicate. For example if the trade deficit in a country is announced to have increased over the last month you would expect that the currency would weaken on the news. But if the actual number wasn't as bad as the market was anticipating, the currency may actually jump up in value at the announcement as short sellers scramble to cover their positions. When a currency is in an uptrend, the psychology is such that the market overreacts to good news and ignores bad tidings. However, when the opinion shifts, the correction may be violent like a rubber band that is stretched too far and is suddenly released to snap back. These are all psychological factors that effect currency rates in the short term.

Actual intervention in the currency markets by Central Banks to adjust exchange rates is an example of a short term factor that may not be expected. Another cause of short-term moves in exchange rates is the influence of technical analysis on the market. Closely tied to market psychology, short term forecasts using charts, momentum models, and moving averages are acted on by dealers and can be a dominant influence on the direction of the market.

◆ RISK MANAGEMENT

The previous sections defined the types of exposures inherent in doing business internationally and what factors influence foreign exchange markets, causing currencies to change value relative to each other. The risk that a corporate treasurer tries to manage is the effect of adverse currency movements on the exposures that the company has generated.

◆ WHERE SHOULD A CORPORATION BEGIN? DEFINING EXPOSURE

Decisions on managing foreign exchange exposure will probably involve accounting, tax, legal and economic questions. What follows is a brief summary of the first steps a corporation can take in assessing its foreign exchange exposure:

◇ Define the nature and extent of all foreign exchange exposure.

Ask:

Is the exposure transactional, translational or economic?

What are the potential accounting or tax implications?

Is this exposure related to (a.) one-time imports or exports, (b.) continuing trade, (c.) a loan in a foreign currency, or (d.) an investment in a foreign country that will be subject to foreign exchange fluctuations on an ongoing basis?

◇ Monitor the current and future position of your exposure. Do you have existing systems for reporting, evaluating and forecasting this information?

◇ Relate this foreign exposure to your total corporate activity and financial objectives . Specifically, what impact would currency movements have on the corporation's income statement, balance sheet, and cash flow?

◇ Determine to what extent economic or political factors may affect your exposure. For example, what is your risk if foreign governments install or modify policies such as foreign exchange controls or limits on remittances?

◆ PHILOSOPHY, POLICY, PROCEDURES

The process of managing risk effectively begins with determining a philosophy towards risk which can guide treasury personnel when policies have holes or gray areas, or parts of the policy become obsolete. A philosophy can be thought of as the general beliefs and attitude toward the business risks facing the corporation. Developing a corporate philosophy is much like developing a corporate personality. It can be thought of as “what you fundamentally believe you should do”. A corporate philosophy may range from total risk aversion to one of optimizing profits.

Once the foreign exchange risks have been identified and the philosophy established it is time to develop a policy that is consistent with the company’s philosophy of accepting and managing risk.

The policy should address the following issues:

- ◇ How much risk is the company prepared to accept?(Exposure Limits)
 - Which countries are acceptable?(Country Limits)
 - What currencies are acceptable?
 - What size of transaction is acceptable?(Value Limits)
 - What time periods are acceptable? (Gap Limits)
- ◇ How will that risk be managed?
 - Determine which transactions will be hedged and which will be left unhedged.
 - Look at which foreign exchange product gives the best protection for the cost.
 - Identify authorized hedging tools.
 - Establish policies regarding when transactions will be hedged and by what process.
- ◇ Identify who will be responsible for doing the hedging transactions and who is responsible for the audit controls. These two functions should not be performed by the same person.
- ◇ Have stated controls for the following functions:
 - Risk measurement. What should be measured and by what determination.
 - Audit trails should be identified and mandated.

Independent verification should be established.

Procedures are merely an extension of policies. They are the specific steps to take to meet what a policy requires. The approved procedures must be created and then documented. they must spell out who is responsible for carrying out policy and in what method. In general, philosophy states what you believe you should do; policy states what you are allowed to do; and procedures state how to do the actions defined by the other two.

◆ **ALTERNATIVES: TO HEDGE OR NOT TO HEDGE?**

You may decide to leave your corporation's foreign exchange exposure open or protect your position by "hedging"--that is, covering an exposure to avoid a future loss resulting from movements in foreign exchange rates. Whether or not to hedge depends upon the particulars of each exposure.

Before any decision is made, you will want to discuss your options with a variety of sources including accountants (for both income tax and FASB 52 impact), economists, bankers, foreign exchange dealers and other corporate treasurers.

1. **Not hedging** - This alternative may or may not be the conservative approach. Carefully estimate the cost/benefit of not hedging before deciding to leave your exposure open.

2. **Hedging** - There are several methods of covering an exposure through hedging, so you will need to decide how the hedge will be made. All hedging alternatives should be explored through cost/benefit analysis with careful consideration given to accounting and tax implications. Your alternatives include:

- Hedging through adjusting balance sheet structure:
 - Leading or lagging payables/receivables
 - Borrowing or investing in a foreign currency
- Hedging through various foreign exchange products

- Eliminating the exposure
 - Change the credit terms or currency of billing
 - Change the source of products

When making a decision about hedging, it is important to realize that not every situation can be hedged. For example, forward markets may not exist prior to a currency devaluation. Even if they do exist, the costs of hedging may be prohibitively high. In addition, always be aware of potential foreign exchange exposures. Any corporation considering investments in a foreign country should analyze the historical and projected ability to obtain U.S. dollars from that country, as well as the historical and projected value of that country's currency relative to the U.S. dollar.

CASE STUDY

IDENTIFYING EXPOSURES

YOU ARE THE FOREIGN EXCHANGE COMMITTEE FOR A MULTINATIONAL CORPORATION INVOLVED IN THE FOLLOWING INTERNATIONAL ACTIVITIES :

- ◆ MANUFACTURING AND SALES SUBSIDIARIES IN CANADA, GERMANY, AND JAPAN**
- ◆ IMPORT MOTORS FROM JAPAN IN JPY**
- ◆ IMPORT COMPONENTS FROM GREAT BRITAIN IN GBP**
- ◆ EXPORT TO MEXICO IN MXP**
- ◆ EXPORT TO BOTSWANA IN USD**
- ◆ EXPORT TO JAPAN IN JPY**
- ◆ EXPORT TO CANADA IN CAD**
- ◆ EXPORT TO GERMANY IN DEM**

DETERMINE WHAT TYPE OF EXPOSURE IS INVOLVED IN EACH SITUATION. INDICATE WHICH EXPOSURES YOU WOULD HEDGE AND WITH WHAT INSTRUMENT.

TRADING GAME

WHAT MAKES EXCHANGE RATES MOVE?

HAVE GROUP SIT IN A CIRCLE. ONE PERSON STARTS BY STATING A NEWS HEADLINE ABOUT A CURRENCY TO THE PERSON ON THEIR LEFT. THAT PERSON WILL STAND UP IF THE CURRENCY SHOULD REACT POSITIVELY TO THE NEWS OR SIT DOWN IF THE REACTION IS NEGATIVE. THEN THAT PLAYER STATES A HEADLINE TO THE PERSON ON THEIR LEFT AND SO ON AROUND THE ROOM. THE NEWS COULD BE POLITICAL, OR AN ECONOMIC RELEASE, OR JUST A RUMORED EVENT.

MODULE 9

CASE STUDY MEGA CORP USA

MODULE OBJECTIVES

- ◆ IDENTIFY CURRENCY AND INTEREST RATE EXPOSURE
- ◆ COMPILE RELEVANT MARKET DATA
- ◆ ANALYZE RISK AND APPLY STRATEGIES

CASE STUDY

Mega Corp USA is a U.S. based company that imports cows' lips from Canada and exports them to Japan. They have a processing plant in Canada and lease a sales office in Tokyo.

The corporation has CAD 14.6 MM in payables and JPY 1.5 B receivables annually. There is a 90 day lag period between when they have to pay the Canadian supplier and when they are paid by the customer in Japan. They have to borrow funds to cover this period of time each quarter.

While the Canadian economy has been quite robust, there has been a long term recession in Japan, hurting the demand for their product. Their main competition is a company in Argentina that has been marketing aggressively in Japan. There is grave concern over the economic outlook in Japan and that efforts to spur the economy have been inadequate. Japanese authorities have made it clear that they oppose any further weakening of the JPY and the threat of intervention looms. The CAD has weakened to record lows in recent months. The Bank of Canada has responded to currency weakness by raising interest rates. However the rates are still lower than those in the U.S. which is causing capital outflows. Commodity prices have also been very low in recent months.

	SPOT CAD 1.4600 - 05	SPOT JPY 136.20 - 25
1 MONTH	12 - 10	63 - 61
2 MONTHS	20 - 18	120 - 117
3 MONTHS	27 - 25	183 - 180
6 MONTHS	48 - 45	360 - 355
12 MONTHS	82 - 77	700 - 690

	EURODOLLARS	EURO CAD	EURO JPY
1 MONTH	5.25 - 5.50 %	4.50 - 4.75 %	.25 - .50 %
2 MONTHS	5.50 - 5.75 %	5.00 - 5.25 %	.25 - .50 %
3 MONTHS	5.50 - 5.75 %	5.00 - 5.25 %	.25 - .50 %
6 MONTHS	5.75 - 6.00 %	5.25 - 5.50 %	.50 - .75 %
12 MONTHS	5.75 - 6.00 %	5.50 - 5.75 %	.50 - .75 %

	ATM CAD OPTIONS	ATM JPY OPTIONS
1 MONTH	1 % OF USD	2 % OF USD
2 MONTHS	1.5 %	3 %
3 MONTHS	2 %	4 %
6 MONTHS	4 %	8 %
12 MONTHS	6 %	12 %

1. IDENTIFY THE FOREIGN EXCHANGE AND INTEREST RATE EXPOSURES.
2. WRITE A SHORT FOREIGN EXCHANGE POLICY ADDRESSING THESE EXPOSURES AND WHO HAS RESPONSIBILITY FOR THE EXPOSURES.
3. COMPARE SEVERAL DIFFERENT STRATEGIES FOR EACH CURRENCY EXPOSURE. BE SURE TO INCLUDE MARKET ASSUMPTIONS, OBJECTIVES, COSTS, ADVANTAGES, AND DISADVANTAGES OF EACH STRATEGY.
4. DEVELOP DIFFERENT FINANCING POSSIBILITIES FOR THE WORKING CAPITAL.

***** IF YOU NEED MORE INFORMATION, RATES, ECONOMIC DATA, ETC. CHECK WITH THE FACILITATOR !!!!**