PLR4 PRINCIPLES OF CORPORATE FINANCE

Corporate Risk Management

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Topic Objectives:
1. To explain how various derivative instruments are used by the corporations for risk management *(examples based on exchange rate movements)*.
2. To understand working mechanism of various derivative instruments , and effects on investors, in the real life scenario.
3. To understand the role of financial intermediaries.

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Global FX market is the largest market in the world with over $5.3 trillion traded daily (BIS, 2013).

Table: Global foreign exchange market turnover						
Net-net basis, daily averages in April, in billions of US dollars						
Instrument	1998	2001	2004	2007	2010	**2013**
Foreign exchange instruments	1 527	1 239	1 934	3 324	3 971	**5 345**
Spot transactions	568	386	631	1 005	1 488	**2 046**
Outright forwards	128	130	209	362	475	**680**
Foreign exchange swaps	734	656	954	1 714	1 759	**2 228**
Currency swaps	10	7	21	31	43	**54**
Options and other products	87	60	119	212	207	**337**
Memo:						
Turnover at April 2013 exchange rates	*1 718*	*1 500*	*2 036*	*3 376*	*3 969*	***5 345***
Exchange-traded derivatives	*11*	*12*	*26*	*80*	*155*	***160***

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Corporate finance managers of MNCs experience cash flow risk arising due to currency fluctuations when:

-Companies earn revenues in one currency, but costs are paid in another;

-Time difference between the date when prices of international transactions are determined and when payments are actually made;

-European firm manufacturing in Europe and exporting to the USA;

- European firm selling in Europe but manufacturing in China;

- European firm manufacturing in China and exporting to the USA.

Arguments in Favor of Risk Management/Hedging:

•*Should shareholders mind hedging by themselves and let companies focus on the main business?*

•This argument is based on assumption that shareholders have same level of information of risks faced by firms as managements do have

•Due to transaction costs and commissions, it is less expensive for firms to hedge against fluctuating interest rates, exchange rates, and other market variables

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Arguments against Risk Management/Hedging :

•Shareholders are usually well diversified and can make their own hedging decisions

•It may increase risk to hedge when competitors do not

•Explaining a situation where there is a loss on the hedge and a gain on the underlying can be difficult

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RISK MANAGEMENT FOREIGN EXCHANGE TRANSACTIONS

A. Forward Contract:

A forward contract is an agreement between a corporation and a commercial bank to exchange a *specified amount* of a currency at a *specified exchange rate* (called the forward rate) on a *specified date* in the future.

Forward contract allows, for example, a US importer to convert an unknown dollar cost into a known dollar cost, by buying *currency* forward at a ***locked-in*** exchange rate.

Forward contract can be between a MNC and a bank or even between two banks.

-Forward contracts are high valued contracts ($1 million or more), and are not normally used by consumers or small firms.

-The forward market (usually big banks) facilitates the transactions of forward.

-Forward contracts are not traded in the secondary market.

-Settlement is by actual delivery.

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Example 1: A Finnish firm is purchasing products from a US MNC's subsidiary based in China in USD, and selling them in Finland in Euro. It is usually making monthly orders in amount of 25,000 USD and paying 45 days after placing the order.
1) What is the risk that this firm is exposed to?
2) What could the company do to hedge itself against this risk?

1) What is the risk that this firm is exposed to?
The firm is exposed to the risk that the USD appreciates against the Euro in the next 45 days after placing the order.
2) What could the company do to hedge itself against this risk?
Firm sign a forward contract with the bank to buy 25,000 USD after 45 days, at the time of import contract.

Example 2: The same Finnish firm (in example 1) has sold products to a firm in Mexico 50,000 USD and would receive payment after 45 days.

1) What is the risk that the Finnish firm is exposed to?

2) What could the company do to hedge itself against this risk?

1) What is the risk that this firm is exposed to?

The firm is exposed to the risk that the USD depreciates against the Euro in the next 45 days after placing the order.

2) What could the company do to hedge itself against this risk?

When the firm enters export contract, it could sign a forward contract with the bank to sell 50,000 USD after 45 days.

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Example 3: Consider a company that requires NZ$ 2,000,000 in 90 days to purchase imports from New Zealand. Assume it can buy NZ$ at the spot rate for NZ$1 = $0.80.

At that point the company would need (2,000,000×0.80) $1,600,000. But the firm may not have funds now to buy the NZ$ or it is uncertain as the price of NZ$ may change in 90 days time. If the *NZ$ appreciate ($ depreciate)* and at the time of payment is NZ$1=$0.90, then it would cost additional $200,000.

Had the firm known that NZ$ was going to appreciate it would have purchased NZ$ 90 days before, may be by borrowing $

(interest rate can be another consideration and firm would never know which direction NZ$ is going to move).

Forward contract can provide a better solution. Let's say the company can buy 90 days forward contract from the bank at NZ$1= $ 0.82. Therefore, company has contracted with a bank that it would be paying (2,000,000×0.82) $1,640,000 to the bank for the delivery of 2,000,000 NZ$, in 90 days.

Therefore, the company *locks in* with the bank at exchange rate of $1=0.82NZ$, therefore, can save itself from exchange rate fluctuations.

Forward contracts are generally available in 30, 60, 90,180,360 days but they can be **tailor-made** for the longer period.

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The forward rate of a given currency varies with the length of time.

Forward rates may also contain a premium or discount. If the forward rate exceeds the existing spot rate, it contains a premium. If the forward rate is less than the existing spot rate, it contains a discount.

Annualized forward premium/discount =

$$\frac{(\text{forward rate} - \text{spot rate}) \times 360}{\text{spot rate} \times n}$$

where n is the number of days to maturity

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Example 4:   Suppose £ spot rate = $1.681,

90-day £ forward rate = $1.677

$$\frac{(\$1.677 - \$1.681)}{\$1.681} \times \frac{360}{90} = -0.95\%$$

Forward discount rate on GBP = 0.95%. Therefore, in the absence of forward market company could have paid more by buying GBP in the spot market.

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What if the UK has higher rate of interest than in the USA?
If the forward and spot rates are same, and the interest rates of two countries differ, then there is a possibility of **arbitrage**.

The forward premium/discount reflects the difference between the home interest rate and the foreign interest rate, so as to prevent arbitrage. **(Interest Rate Parity (IRP))**

Forward Premium (p) $=$ $\dfrac{\textbf{(1 + home interest rate)}}{\textbf{(1 + foreign interest rate)}} - 1$

or p $\approx i_H - i_F$,

In last example, if the 90 day dollar forward rate is showing appreciation against pound sterling. Therefore, if an investor can borrow dollars, convert in pounds and invest in the UK due to higher rate of interest relative to the US, then for every pound that is earned due to higher interest is lost due when converting pounds back to US dollar due to appreciated dollar against pound **(IRP effect)**.

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B. Futures Contract:

"Currency futures, also called FX futures or foreign exchange futures, are exchange-traded futures contracts to buy or sell a specified amount of a particular currency at a set price and date in the future".

A **transferable** futures contract is the one that specifies a **standard volume** of a particular currency to be exchanged at a **specified future settlement date** when the currency can be bought or sold at a **specified price**.

Futures are traded in terms of contract months with standard maturity dates typically falling on the **third Wednesday of March, June, September and December**. The currency futures contracts are ***marked-to-market*** daily, hence, investors can exit their obligation to buy or sell the currency prior to the contract's delivery date.

Most participants in the futures markets usually *close-out* their positions before the date of settlement, so most contracts do not tend to last until the date of delivery.

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Futures Contract Specifications:

•Available on a wide range of underlying assets (commodities, currency, stocks, treasury bonds etc.)

•Exchange traded *(Chicago Mercantile Exchange, London International Financial Futures Exchange etc.)*

•**Clarity of:** What can be delivered, Where it can be delivered, When it can be delivered

•**Settled daily:** marked-to-market daily

•**Contract Size** (EUR/USD 125,000 euro, GBP/USD 62,500 British pounds, Corn 5000 bushels etc.)

•**Daily Price Movement Limits:** Each exchange puts daily price movement limits. Limit move can be limit up as well as limit down

•**Position Limit:** Exchange fixes how many contracts a speculator can take up.

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Contract Specifications:

Exchange Rate	Contract Size	Min. Price Increment	Tick Value
EUR/USD	125,000 euro	0.0001	$12.50
GBP/USD	62,500 British pounds	0.0001	$6.25
CHF/USD	125,000 Swiss francs	0.0001	$12.50
CAD/USD	100,000 Canadian dollars	0.0001	$10
AUD/USD	100,000 Australian dollars	0.0001	$10

The euro/U.S. dollar contract shows a minimum price increment of **0.0001**, and a tick value of **$12.50 (marked-to-market)**. This means each time there is a 0.0001 movement in price (+/-), the value of the contract will change (+/-) by $12.50. For instance, if a future contract is bought at €1 = $1.3958 and next day exchange rate moves to 1.3959, that .0001 (+) price move would be worth $12.50 to the trader (assuming one contract). If there are five contracts, a profit of $62.50 will be credited to the party's account, maintained with the broker.

Examples:
1. Mr. X takes future long contract of Euro/USD at €1 = $1.3958 from Bank Y, price moves to 1.3968, What would be the profit or loss to Mr. X and Bank Y, if 10 such contracts were traded?

2. Mr. X takes future short contract of CAD/USD at CAD 1= $0.9768 with Bank Y, price moves to 0.9799, What would be the profit or loss to Mr. X and Bank Y, if 10 such contracts were traded? http://online.wsj.com/mdc/public/page/2_3023-fut_currency-futures.html?mod=mdc_curr_pglnk

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Settlement:
Two primary methods of settling a currency futures contract. Mostly, parties will *offset* their original positions before the expiry of the contract by taking an **opposite position**.

When an opposite position closes the trade prior to the last day of trading, a profit or loss is credited to or debited from the trader's account.

Ex.5 Daily Settlement with a Future Contract

Time	Action	Cash Flows
Tuesday Morning	Investor buy SFr futures contract maturing in two days. Price is $0.75	None
Tuesday Close	Future price rises to $0.755. Position is marked to market.	Investor receives 125,000×(0.755-0.750)= $625 (+50 ticks)
Wednesday Close	Future price drops to $0.743. Position is marked to market.	Investor pays 125,000×(0.755-0.743)= $1500 (-120 ticks)
Thursday Close	Future price drops to $0.74. 1. Position is marked to market. 2. Investor take delivery of SFr125,000	1. Investor pays 125,000×(0.743-0.740)= $375 (-30 ticks) 2. Investor pays 125,000×0.74= $92,500 Net loss= $1,250 ($1500+$375-$625)= $1250

Observation:
1. This example is based on the actual delivery of Swiss Francs, whereas, most of the future positions are closed expire before the expiry date.

2. Future prices are **marked-to-market**, as **$0.75, $0.755, $0.743, $0.74** in above example. The effect of the price movements on the margin account of the trader is settled every day by debit/credit amount. Future has a new price every day.

3. Even though future prices are marked-to-market, you would still pay the same amount of money, as if were forwards.

Forwards: At the expiry of contract 125,000 $\times$ 0.75 = $ 93750
Futures: At the expiry of contract 125,000 $\times$ 0.74 = $ 92500 **PLUS** Net loss= $1,250. This makes sum equal to $ 93750

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Comparison between Currency Futures and Forwards:

Characteristics	Forward	Future
Size of Contract	Tailored	Standardized
Delivery date	Tailored	Standardized
Participants	Banks, brokers, MNCs	Banks, brokers, MNCs and authorized public speculators
Security deposit	Compensating bank balance required	Small security deposit (margin) required
Clearing operation	Handling contingent on individual banks and brokers. No separate clearinghouse function	Handled by exchange clearinghouse. Daily settlement marked-to-market price
Marketplace	Over the telephone worldwide	Central exchange with worldwide communications
Regulation	Self-regulating	Commodity Futures Trading Commission (CFTC) and the National Futures Association (NFA), stock exchanges
Liquidation	Settlement by actual delivery	Most by offset and few by delivery
Transaction costs	Spread between bank's buying and selling prices	Negotiated brokerage fees.

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C. Currency Options Market:
-Options are popular financial instrument to hedge against volatility of exchange rate**s**
-Options are flexible.
-Chicago Board Options Exchange (CBOE) in 1973.
-Amsterdam, Montreal and Philadelphia started currency options in the late 1982 and early 1983.

Purpose: Hedging and speculation.
Participants: Corporations, financial institutions, specialized trading firms, stock exchanges.

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Currency Options Market:

-The standard options that are traded on an **exchange** through brokers are guaranteed, but require margin maintenance.

-In U.S. option exchanges are regulated by the Securities and Exchange Commission.

Over-the-counter (OTC) market where commercial banks and brokerage firms offer customized *(number of units, strike price, expiration date)* currency options.

-There are no credit guarantees for OTC options, hence, collateral may be required.

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An investor/speculator is not signing a contract to buy or sell a currency at a particular future maturity date,

but buying the Right to Sell or Buy the specified currency at a specified price (Strike Price) at a specified maturity date (Expiration Date).

Expiration Date: The last date at which the option can be exercised.

Strike/Exercise Price: The exercise price of the option.

American options can be exercised at any time before the expiration date,

European options can be exercised only at maturity.

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Currency options are classified as either calls or puts.

I. Currency Call Options:
A *currency call option* grants the holder the <u>*right but not obligation*</u>, to buy a specific currency at a specific price (called the *exercise* or *strike* price) within a specific period of time.

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Currency Call Options
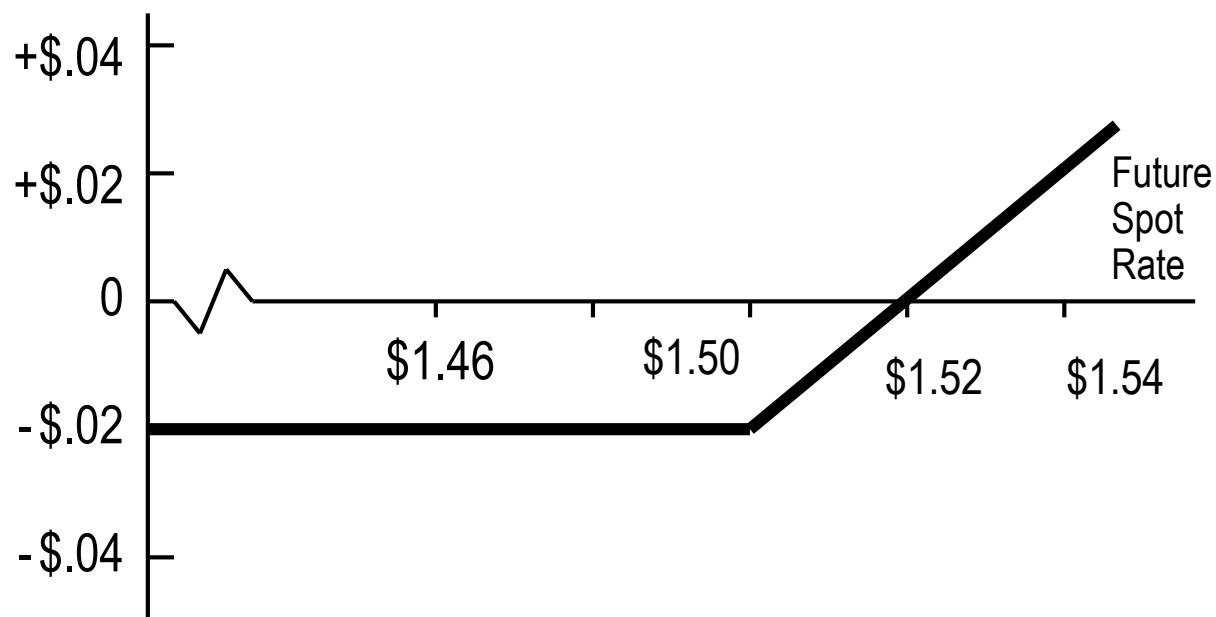
1. Pay-off For Buyer of £ Call Option

Strike price   = $1.50
Premium   = $0.02

Net Profit per Unit   Downside (limited) Upside (unlimited)
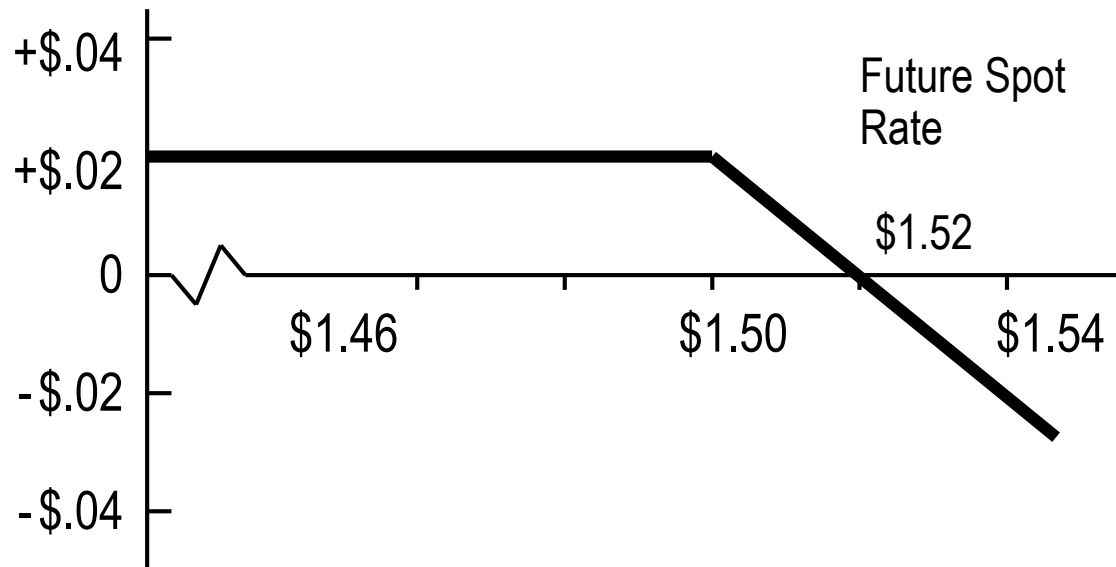
Currency Call Options

2. Pay-off For Seller of £ Call Option

Strike price = $1.50
Premium = $0.02

Net Profit per Unit Downside (unlimited) Upside (limited)

Future Spot Rate

+$.04

+$.02

0

-$.02

-$.04

$1.46 $1.50 $1.52 $1.54

A call option is

in the money if spot rate > strike price, (option exercised)
at the money if spot rate=strike price, (neutral)
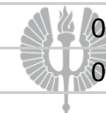*out of the money* if spot rate < strike price (option not exercised)
http://online.wsj.com/mdc/public/page/2_3024-futopt_currency.html?mod=topnav_2_3002_europe

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EURO (CME)
125,000 Euros, cents per Euro

	Calls			Puts		
Strike Price	Jul	Sep	Dec	Jul	Sep	Dec
9000	-	-	52.710	-	-	0.005
9900	44.120	44.120	-	-	0.005	-
10000	-	-	42.710	-	-	0.040
10500	-	-	37.730	-	-	0.100
11400	29.120	29.120	-	0.005	0.030	-
11500	28.120	28.130	27.930	0.005	0.015	0.310
11550	27.620	27.630	-	0.005	0.040	-
11600	27.120	27.130	26.970	0.005	0.045	0.350
11650	26.620	26.640	-	0.005	0.050	-
11700	26.120	26.150	26.010	0.005	0.060	0.390
11750	25.620	25.650	25.530	0.005	0.060	0.410
11800	25.120	25.160	25.050	0.005	0.070	0.430
11850	24.620	24.660	24.580	0.010	0.080	0.460
11900	24.120	24.170	24.120	0.005	0.090	0.490
11950	23.620	23.680	23.640	0.005	0.100	0.510
12000	23.120	23.190	23.160	0.010	0.110	0.530
12050	22.620	22.700	22.690	0.010	0.120	0.560
12100	22.120	22.210	22.220	0.015	0.130	0.590
12150	21.620	21.720	21.750	0.015	0.140	0.620
12200	21.120	21.230	21.280	0.020	0.150	0.650
12250	20.620	20.750	20.810	0.020	0.170	0.680
12300	20.120	20.260	20.350	0.005	0.180	0.720
12350	19.620	19.780	19.900	0.005	0.190	0.760

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http://online.wsj.com/mdc/public/page/2_3028.html?category=Other&subcategory=Currency&mod=mdc_curr_pglnk

Currency Call Options:

-Option owners can exercise/ sell / **bin** their options.

-Maximum loss will be the premiums paid for their options.

Call option premiums will be higher when:

1. **(spot price – strike price) is larger:** If today spot rate of euro in USD is 1.1650, then difference between this spot rate and strike prices, e.g. (1.1650-1.1400)> (1.1650-1.1500)>(1.1650-1.1550)………..> (1.1650-1.2350) is getting smaller and so is the option price, <u>for any month</u>.

    The logic is *"higher the exercise price, lesser is the transfer of my currency risk on other party, why should I pay more premium?"*

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Currency Call Options:

2. Time to expiration date is longer: Generally spot rate has a greater likelihood of rising above <u>a given strike price</u>, if the time horizon is longer.

3. Variability of the currency is greater: 'Hard currencies' *(less premium)* are less volatile than the 'exotic currencies' *(high premium)* in the world.

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Currency Call Options:
Hedging with Currency Call Options

1. A US firm bidding a contract in Canada requires C$200,000. US firm does not know until 3 months whether bid is accepted.

It can buy 2 option contracts (why?). If the exercise price of the Canadian dollar is $0.855 (direct or indirect quote?) and the option premium is then $0.1662, then option price the US firm has to pay is $2 \times 100{,}000 \times \$0.1662 = \$33240$.

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If the bid is successful then the US firm needs to pay and let's assume the spot rate is 1 C$= $1.275.

If unhedged the firm needs to but Canadian dollars in the spot market by paying 1.275\times$ C$200,000= $255,000. Whereas when hedged, the firm pays 0.855\times$ C$200,000= $171,000+$33240=$204,240.

Therefore, firm saves $255,000 - $204,240 = $50760

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Currency Call Options:
What if the spot rate at the time of expiration is
1 C$= $0.775?
What if the spot rate at the time of expiration is
1 C$= $0.995?
2. What if the bid of the US firm is rejected?
  The firm can still close its position: It can buy Canadian dollars by paying $204,240, using currency call option and then selling C$200,000@$1.275 (spot rate) and making profit of $255,000 - $204,240 = $50760. *Therefore, even if bid is lost, firm still earns.*

What if the spot rate is 1 C$= $0.775?
What if the spot rate is 1 C$= $0.995?

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Currency Call Options:

Why does the writer of the call write when he knows that it would be exercised?

If the likelihood of exercise increases the premium that call writer charge would increase, besides, it is only *likelihood* that option would be exercised.

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1. Which of the following factors affect the premium of a currency call option?
a. level of existing spot price relative to strike price
b. length of time before the expiration date
c. the currency of the call option
d. potential variability of currency
e. all of the above are factors

2. Suppose Darlene is a speculator who buys five British pound call options with a strike price of $1.50 and a March expiration date. The current spot price is $1.45. Darlene pays a premium of $0.01 per unit for the call option. Just before expiration, the spot price reaches $1.53, and Darlene exercises the option. Assume one option contract specifies 31,250 units. What is the profit or loss for Darlene?
a. $625
b. $3,125
c. $1,250
d. $6,250
e. none of the above

3. Peter has purchased a call option on Euros (€) with a strike price of $1.06 and a premium of $0.01. The current spot price of the euro is $1.04. Just before expiration, the euro's spot price is $1.09.What is the per unit profit or loss to the writer of this option?
a. $.02 loss
b. $.02 profit
c. $.03 loss
d. $.03 profit

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II. Currency Put Options:

-A *currency put option* grants the holder the right, not obligation, to sell a specific currency at a specific price (the *strike* price) within a specific period of time.

-Corporations with open foreign currency positions may use currency put options to cover their positions. For example, firms may purchase put options to hedge future receivables.

-A put option is:

in the money if spot rate < strike price,
at the money if spot rate = strike price,
out of the money if spot rate > strike price.

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Currency Put Options

For Buyer of £ Put Option

Strike price   = $1.50
Premium   = $ .03

Net Profit per Unit   Downside (limited) Upside (limited)

Future Spot Rate

+$.04
+$.02
0
-$.02
-$.04

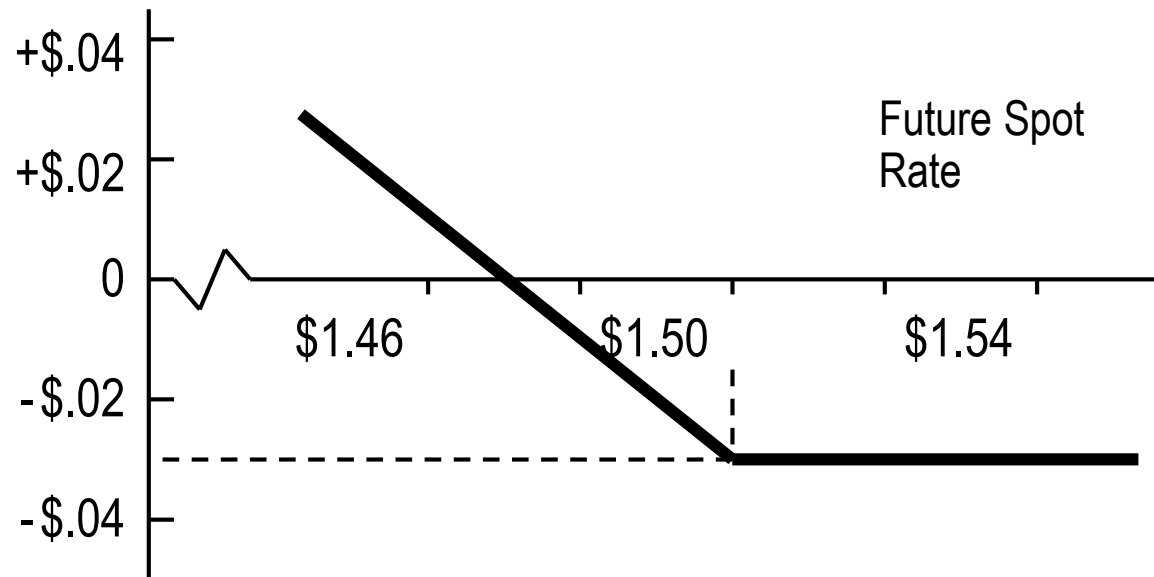$1.46 $1.50 $1.54
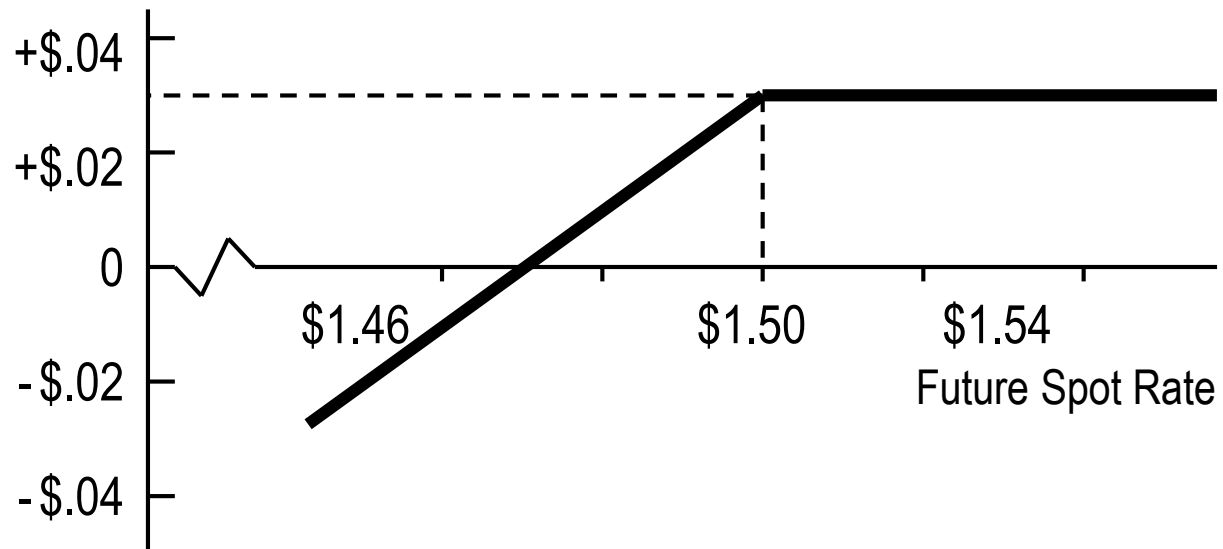
Currency Put Options

For Seller of £ Put Option

Strike price   = $1.50
Premium   = $ .03

Net Profit per Unit   Downside (limited) Upside (limited)

EURO (CME) EURO (CME)   **Source: Chicago Mercantile Exchange**

125,000 Euros, cents per Euro

Strike Price	Calls			Puts		
	Jul	Sep	Dec	Jul	Sep	Dec
9000	-	-	52.710	-	-	0.005
9900	44.120	44.120	-	-	0.005	-
10000	-	-	42.710	-	-	0.040
10500	-	-	37.730	-	-	0.100
11400	29.120	29.120	-	0.005	0.030	-
11500	28.120	28.130	27.930	0.005	0.015	0.310
11550	27.620	27.630	-	0.005	0.040	-
11600	27.120	27.130	26.970	0.005	0.045	0.350
11650	26.620	26.640	-	0.005	0.050	-
11700	26.120	26.150	26.010	0.005	0.060	0.390
11750	25.620	25.650	25.530	0.005	0.060	0.410
11800	25.120	25.160	25.050	0.005	0.070	0.430
11850	24.620	24.660	24.580	0.010	0.080	0.460
11900	24.120	24.170	24.120	0.005	0.090	0.490
11950	23.620	23.680	23.640	0.005	0.100	0.510
12000	23.120	23.190	23.160	0.010	0.110	0.530
12050	22.620	22.700	22.690	0.010	0.120	0.560
12100	22.120	22.210	22.220	0.015	0.130	0.590
12150	21.620	21.720	21.750	0.015	0.140	0.620
12200	21.120	21.230	21.280	0.020	0.150	0.650
12250	20.620	20.750	20.810	0.020	0.170	0.680
12300	20.120	20.260	20.350	0.005	0.180	0.720
12350	19.620	19.780	19.900	0.005	0.190	0.760

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Currency Put Options:

Put option premiums will be higher when:
    1.(strike price – spot rate) is larger:
    If today spot rate of euro in USD is 1.1650, then difference between this spot rate and strike prices, e.g. (1.1400-1.1650)<…(1.1700-1.1650)<…..(1.1950-1.1650)……….. < (1.2350-1.1650) is getting larger and so is the option price, <u>for any month</u>.

    The logic is *"higher the exercise price (guaranteed price), more is the transfer of my currency risk on other party, so I should pay more premium?"*

Currency Put Options:

2. Time to expiration date is longer: A longer time until expiration means higher probability for the currency to move in the exercise zone so higher would be the option price/premium.

3. variability of the currency is greater: 'Hard currencies' are less volatile than the 'exotic currencies' in the world.

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Currency Put Options:
Hedging with Currency Put Options

1. A US firm receives a bid from a Canadian contracting firm. If the bid is accepted the latter would require to pay C$200,000. US firm will decide not before 3 months if the bid is accepted. If the US firm leaves this contract unhedged then if the bid is accepted it has to bear the risk of exchange rate fluctuations. Alternatively, it can buy 2 put option contracts. If the exercise price of the Canadian dollar is $0.895 (direct or indirect quote?) and the option premium is then $0.0006, then option price the US firm has to pay is **2×100,000×$0.0006= $120**.

What if the bid is successful and then the spot rate is1 C$= $0.850 ?

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Currency Put Options:

The US firm would receive **$0.850× C$200,000= $170,000 (when unhedged)** and

($0.895× C$200,000 - $120) = $178,880(when hedged). Therefore, the US firm would gain $178,880 - $170,000 = $8,880

What if the spot rate at the time of expiration is 1 C$= $0.894?
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2. What if the US firm rejects the bid of Canadian contractor?

The US firm can still close its position: It can sell Canadian dollars for $178,880, using currency put option and then buy C$200,000@$0.850(spot rate) and making profit of $178,880 - $170,000 = $8,880. Therefore, even if business deal is unsuccessful, the US firm still makes financial gain.

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1. Suppose Darlene is a speculator who buys ten British pound put options with a strike price of $1.50 and a March expiration date. The current spot price is $1.55. Darlene pays a premium of $0.02 per unit for the call option. Just before expiration, the spot price reaches $1.48 and Darlene exercises the option. Assume one option contract specifies 31,250 units. What is the profit or loss for Darlene?
a. $0
b. $6,250
c. $3,125
d. $625
e. none of the above

2. A company expects to receive a foreign currency from the sale of merchandise. Because it is nervous about possible exchange rate movements in this currency, it wants to hedge its position with an option in the currency. The appropriate action for them to hedge is to buy a call option.
 a. True
b. False

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3. A European-style currency option may only be exercised on the expiration date.
   a. True
   b. False

4. The only difference between European and American options is that European options are traded only in Europe while American options are traded only in the US.
a. True
b. False

5. The buyer of an option has an obligation to purchase in the case of a call, or sell in the case of a put, while the seller of an option has the right to deliver in the case of a call, or take delivery in the case of a put.
a. True
b. False

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6. A put offers the holder of an asset protection from depreciation in the value of foreign currency, while a call provides a potential purchaser protection from an appreciation in the value of the same.
a. True
b. False

7. If a call's strike price exceeds the spot rate, the call is in the money.

a. True
b. False

D. Swaps:

•An exchange of future cash flow obligations between two parties.

• Swaps are the OTC financial instruments which are used to hedge against <u>interest rate risks, foreign currency exposure</u> etc.

• Swap market emerged in the late 1970s as currency traders used swaps to evade British control on the movement of foreign currency.

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Most Popular Types of Swaps:
1) Interest rate swaps
2) Currency swaps

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1) Interest Rate Swaps:

Exchange of _interest payments (not principal amounts)_ for two different types of loans in the _same currency_
-fixed interest rate vs. floating interest rate.

"An agreement between two parties (known as counterparties) where one stream of future interest payments is exchanged for another, based on a specified _notional (reference)_ amount, a theoretical principal amount against which all interest payments/receipts are calculated for a specified period of time".

Note: Exchange of interest payments only, underlying notional principal is _never exchanged_. Generally used to hedge long term borrowings.

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Swaps are OTC Traded: contracts set up between two or more parties, and can be customized.

•Firms and financial institutions are the main players in the swap market.

• Financial institutions act as intermediaries.

• Some risk of a counterparty defaulting is always present.

• Interest payments may be made annually, quarterly, monthly, or at any other interval determined by the parties.

• Negotiated terms include starting and ending dates, settlement frequency, *notional amount* on which swap payments are based, and published reference rates on which swap payments are determined.

• The maturity period can be between one to fifteen years.

Coupon Swap/ Plain Vanilla Interest Rate Swap:
"Plain vanilla" swaps are the most common type of interest rate swaps. Payments made by one counterparty are based on a floating rate of interest, such as the London Inter Bank Offered Rate (LIBOR), while payments made by the other counterparty are based on a fixed rate of interest.

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Example 6: Assume that counterparties A and B require $100 million each for a five year period. A is a BBB rated company and wants to borrow at a fixed rate. B is AAA company and it wants to borrow at floating rate.

How would they use interest rate swap contract to hedge their cash flow risks and at the same time reducing cost of borrowing?

Borrower	Fixed Rate	Floating Rate
Counterparty A: BBB-rated	8.5%	6-month LIBOR + 0.5%
Counterparty B: AAA-rated	7.0%	6-month LIBOR
Quality Spread	1.5%	0.5%

Does Principle of comparative cost advantage come in picture?

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Solution:

In the fixed rate interest market the difference between the credit quality of AAA-rated company and BBB-rated company is 1.5% (150 basis points), whereas, the same is 0.5% (50 basis points) in the floating rate interest market. Hence there is an _anomaly_ of 1% (100 basis points) that can be shared by the counterparties and the financial intermediary.

- **Above cited differences 1.5% and 0.5% are also called quality spreads.**
- **Difference of Differences:1.5% and 0.5%= 1% (100 basis points)** is called **effective swap spread** which is the basis of gain to the counterparties and bank.
- Spread is the risk premium, and it is based on the credit rating of the customer. The spread is higher when the credit rating is lower.

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Swap Mechanism for A:

Phase 1: A should borrow $100 million five year floating rate Eurodollar loan from a syndicate of banks at an interest rate 6-month LIBOR + 0.50% (50 basis points).

Phase 2: A enters into swap contract through financial intermediary (generally a global bank), that it would pay **7.35% (?)** rate of interest to the financial intermediary on the notional amount of $100 million and

Phase 3: Financial intermediary would pay to A, a 6 month LIBOR (LIBOR6).

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Net cost to A is

7.35%+ LIBOR + 0.50%-LIBOR= 7.85%,

Therefore, A has swapped floating-rate loan for a fixed-rate loan paying 7.85%.

-This is lesser than 8.5% that it would have paid in the absence of swap contract. Therefore, out of 1% anomaly, A has taken advantage of 0.65% (65 basis points).

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Swap Mechanism for B:
Phase 1: B issues $100 million, five year Eurobond carrying 7% fixed rate. **Phase 2:** B agrees to pay LIBOR to the financial intermediary,
Phase 3: who in turn would pay 7.25% to B.
Hence, B has swapped a fixed-rate loan for a floating-rate loan by effectively paying LIBOR minus 0.25% (25 basis points).

Net cost to B is
7%+LIBOR-7.25%= LIBOR-0.25% (25 basis points).

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How much would bank gain?

Counterparty	Bank Receives	Bank Pays	Bank's Gain
A	7.35%	LIBOR6	7.35% minus LIBOR6
B	LIBOR6	7.25%	LIBOR6 minus 7.25%
Net Gain			0.10% (10 basis points)

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