CFA LEVEL I:
DERIVATIVES AND ALTERNATIVES WORKSHOP

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What is a Derivative?

- A security that derives it's value from the value of another asset.

  ➢ Forwards

  ➢ Futures

  ➢ Options

  ➢ Swaps

  ➢ Credit Derivatives

How are Derivatives Traded?

- Exchange-traded, *standardized* contracts traded on *public* exchanges.

  - ➤ Heavily regulated
  - ➤ Low credit risk
  - ➤ Transparent pricing
  - ➤ High Liquidity

Futures & Options

- Over-the-counter (OTC), *customized* contracts traded *privately*.

  - ➤ Almost unregulated
  - ➤ Higher credit risk Default - Counterparty risk
  - ➤ Low transparency
  - ➤ Low Liquidity

Forwards, Swaps, Credit Derivatives & Some Options

Question ID#: 1206649

Over- The- Counter derivatives:

A) are backed by the OTC Clearinghouse.

B) are customized contracts.

C) have good liquidity in the over-the-counter (OTC) market.

Question ID#: 1206649

Over- The- Counter derivatives:

A) are backed by the OTC Clearinghouse.

No. There is NO such thing. Clearinghouses are for Exchanges.

B) are customized contracts.

Answer B is correct! Over-the-counter (OTC), *customized* contracts traded *privately*.

C) have good liquidity in the over-the-counter (OTC) market.

No. Remember! OTC is characterized by: Almost unregulated, High credit risk, Low transparency, Low Liquidity.

PRACTICE PROBLEMS

The following information relates to questions 1-5

Montau AG is a German capital goods producer that manufactures its products domestically and delivers its products to clients globally. Montau's global sales manager shares the following draft commercial contract with his Treasury team:

Montau AG Commercial Export Contract

Contract Date:	[Today]
Goods Seller:	Montau AG, Frankfurt, Germany
Goods Buyer:	Jeon Inc., Seoul, Korea
Description of Goods:	A-Series Laser Cutting Machine
Quantity:	One
Delivery Terms:	Freight on Board (FOB), Busan Korea with all shipping, tax and delivery costs payable by Goods Buyer
Delivery Date:	[75 Days from Contract Date]
Payment Terms:	100% of Contract Price payable by Goods Buyer to Good Seller on Delivery Date
Contract Price:	KRW650,000,000

Montau AG's Treasury manager is tasked with addressing the financial risk of this prospective transaction.

1. Which of the following statements best describes why Montau AG should consider a derivative rather than a spot market transaction to manage the financial risk of this commercial contract?

A. Montau AG is selling a machine at a contract price in KRW and incurs costs based in EUR.

B. Montau AG faces a 75-day timing difference between the commercial con-tract date and the delivery date when Montau AG is paid for the machine in KRW.

C. Montau AG is unable to sell KRW today in order to offset the contract price of machinery delivered to Jeon Inc.

2. Which of the following types of derivative and underlyings are best suited to hedge Montau's financial risk under the commercial transaction?

A. Montau AG should consider a firm commitment derivative with currency as an underlying, specifically the sale of KRW at a fixed EUR price.

B. Montau AG should consider a contingent claim derivative with the price of the machine as its underlying, specifically an A-series laser cutting machine.

C. Montau AG should consider a contingent claim derivative with currency as an underlying, specifically the sale of EUR at a fixed KRW price.

3. Identify A, B, and C in the correct order in the following diagram, as in Exhibit 1, for the derivative to hedge Montau's financial risk under the commercial transaction.
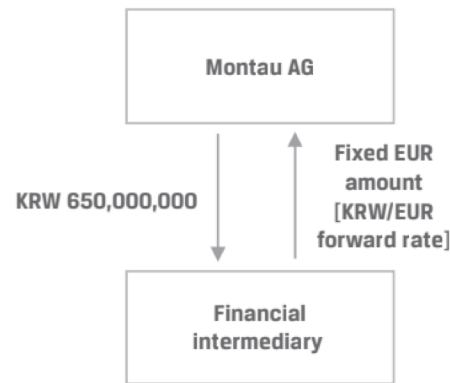

Exhibit 1
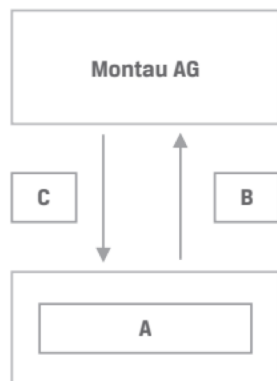
Montau AG

C

B

A

A. A: Financial intermediary, B: KRW650,000,000, C: Fixed EUR amount
B. A: Jeon Inc., B: KRW650,000,000, C: Fixed EUR amount
C. A: Financial intermediary, B: Fixed EUR amount, C: KRW650,000,000.

3. Identify A, B, and C in the correct order in the following diagram, as in Exhibit 1, for the derivative to hedge Montau's financial risk under the commercial transaction.

Exhibit 2

A. A: Financial intermediary, B: KRW650,000,000, C: Fixed EUR amount
B. A: Jeon Inc., B: KRW650,000,000, C: Fixed EUR amount
C. A: Financial intermediary, B: Fixed EUR amount, C: KRW650,000,000.

4. Which of the following statements about the most appropriate derivative market to hedge Montau AG's financial risk under the commercial contract is most accurate?

A. The OTC market is most appropriate for Montau, as it is able to customize the contract to match its desired risk exposure profile.

B. The ETD market is most appropriate for Montau, as it offers a standardized and transparent contract to match its desired risk exposure profile.

C. Both the ETD and OTC markets are appropriate for Montau AG to hedge its financial risk under the transaction, so it should choose the market with the best price.

5. If Montau enters into a centrally cleared derivative contract on the OTC market, which of the following statements about credit risk associated with the derivative is most likely correct?

A. Montau faces credit risk associated with the possibility that its counterparty

to the contract may not fulfill its contractual obligation.

B. Montau poses a credit risk to its counterparty because it may fail to fulfill its

contractual obligation.

C. Montau poses a credit risk to a derivative contract end user holding a con-

tract with the opposite features of Montau's.

- Forward commitment – is an agreement to buy or sell an asset at a specified time in the future.

- Contingent Claim – a derivative in which the payoff is dependent on the outcome or payoff of the underlying. ~ Options

Forward Contracts

- An agreement to enter into future transaction at a price specified at the contract's initiation.

    ➢ *Customized* to meet specific needs

    ➢ No money exchanges until contract expiration

    ➢ Credit risk that counterparty will default

    ➢ Early exit requires negotiation with counterparty

    ➢ Private transaction that provides little transparency

- Example: A cereal manufacturer enters into a forward agreement to buy 1,250 metric tons of wheat from a farmer next month, who agrees to sell it to the manufacturer for $140 per ton.

Forward Contracts

- Example: A cereal manufacturer enters into a forward agreement to <u>buy 1,250 metric tons of wheat</u> <u>from a farmer</u> <u>next month</u>, who agrees <u>to sell it</u> to the manufacturer <u>for $140 per ton</u>.

- A few crucial takeaways from this example.

    - **Buy / Hold / Long** position, wins when underlying Price ⬆, <u>Cereal Manufacturer</u>.

    - **Sell / Issue / Short** position, wins when underlying Price ⬇, <u>Farmer</u>.

    - Long position Profit / Loss = Contract size x (Market Price - Agreed Price)

    - Short position Profit / Loss = - Contract size x (Market Price - Agreed Price)

    - *If your P/L is positive, which means someone owes you a payment, you're exposed to a credit risk.*

Futures Contracts

- An agreement to enter into future transaction at a price specified at the contract's initiation.

  - ➤ *Exchange-traded:* contract size, underlying asset quality, term of expiration, and delivery method are all standardized

  - ➤ No cost to enter into contract

  - ➤ Both parties establish margin accounts with a clearinghouse, which are marked-to-market daily

  - ➤ Either party can exit contract with an offsetting position with a clearinghouse

  - ➤ Public transactions allow for price transparency

Futures Contracts

- Example: You decided today to take a long position in corn futures. You decided to buy 5 contracts, each contract covers 5000 ton of corn. Each contract is priced at $150 per contract and must maintain a maintenance margin of $100 per contract.

- The corn prices for 4 days is shown in the table below. For each day, what are your cash outflows and what are your Profit and Losses?

Day	Price
0	$2.00 / ton
1	$1.98 / ton
2	$1.99 / ton
3	$1.98 / ton

Day	Price	Price Change	Gain/Loss	Balance	Maintenance Margin	Required Deposit
0	$2	$0	$0	$750	5 x $100 = $500	5 x $150 = +$750
1	Price Day1	(Price Day0 – Price Day1)	Price Change X # of Contracts X Amount of corn per contract	Balance – Gain/Loss	Maintenance Margin	
1	$1.98	-$0.02	-$0.02 x 5 x 5000 = -$500	$750 + (-$500) = $250	5 x $100 = $500	+$500

Day	Price	Price Change	Gain/Loss	Balance	Maintenance Margin	Required Deposit
0	$2	$0	$0	$750	5 x $100 = $500	5 x $150 = +$750
1	$1.98	-$0.02	-$0.02 x 5 x 5000 = -$500	$750 + (-$500) = $250	5 x $100 = $500	+$500
2	$1.99	+$0.01	$0.01 x 5 x 5000 = $250	$750 +$250 =$1000	5 x $100 = $500	$0
3	$1.98	-$0.01	-$0.01 x 5 x 5000 = -$250	$1000 + (-$250) = $750	5 x $100 = $500	$0

Futures Contracts

- Great job! Now, let's illustrate a point on Maintenance Margin with a hypothetical price. Using the same example, let's do the calculation and analysis if Day 4 Price was $1.975 / ton.

Day	Price	Price Change	Gain/Loss	Balance	Maintenance Margin	Required Deposit
4	$1.975	-$0.005	-$0.005 x 5 x 5000 = -$125	$750 + (-$125) = $625	5 x $100 = $500	$0, Why?

- *__If you balance drops below the required Maintenance Margin, you must deposit to bring the balance back to the Initial Margin.__* As illustrated, you can have balance that's in between the Maintenance Margin and the Initial Margin. In this case, you will not get a Margin Call and will not need to make any deposit.

Question ID#: 1206669

If the margin balance in a futures account with a long position goes below the maintenance margin amount:

A) a deposit is required to return the account margin to the initial margin level.

B) a deposit is required which will bring the account to the maintenance margin level.

C) a margin deposit equal to the maintenance margin is required within two business days.

Question ID#: 1206669

If the margin balance in a futures account with a long position goes below the maintenance margin amount:

A) a deposit is required to return the account margin to the initial margin level.

Answer A is the correct answer. *If you balance drops below the required Maintenance Margin, you must deposit to bring the balance back to the Initial Margin.*

B) a deposit is required which will bring the account to the maintenance margin level.

No. Incorrect. Remember: *If you balance drops below the required Maintenance Margin, you must deposit to bring the balance back to the Initial Margin.*

C) a margin deposit equal to the maintenance margin is required within two business days.

No. There's no such thing as "within two business days."

Swaps

- An agreement to enter into a series of future transactions at specified times for a price specified at the contract's initiation.

    ➢ Usually involves one party making mixed payments, while counterparty makes variable payments.

    ➢ Swaps are OTC traded instruments

- Example: A bank enters a swap agreement with an insurance company to make fixed interest payments in exchange for receiving variable interest payments.

Fyleton Investments Swap

Fyleton Investments has entered a five-year, receive-fixed GBP200 million interest rate swap with a financial intermediary to increase the duration of its fixed-income portfolio. Under terms of the swap, Fyleton has agreed to receive a semiannual GBP fixed rate of 2.25% and pay six-month MRR.

Calculate the first swap cash flow exchange if six-month MRR is set at 1.95%.

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Calculate the first swap cash flow exchange if **six-month MRR** is set at 1.95%.
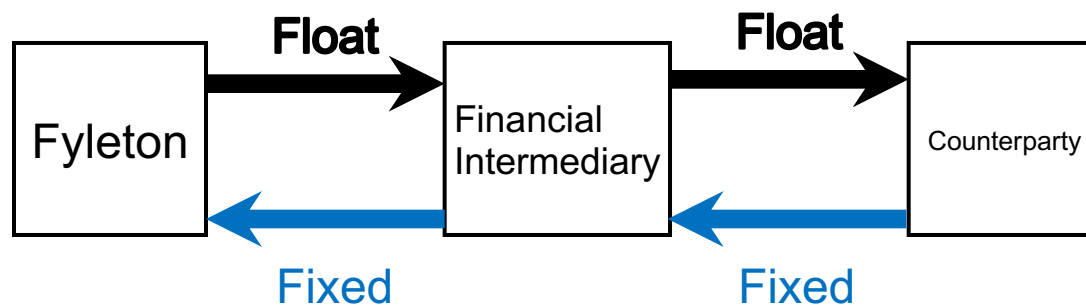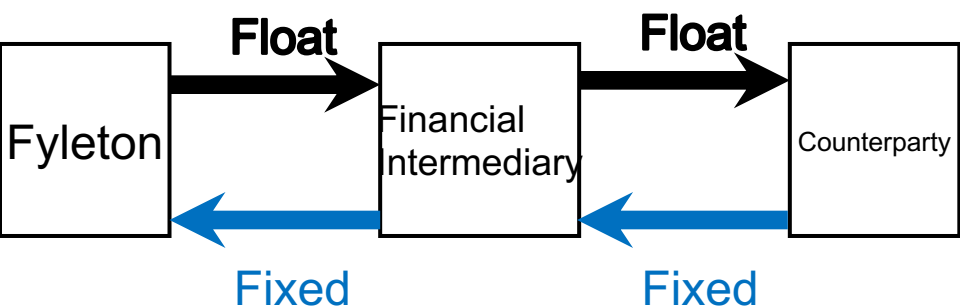
First step: Draw a swap diagram!
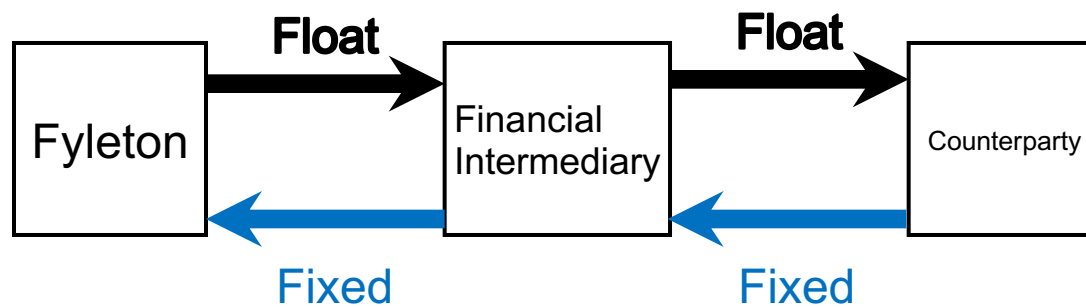
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Next step: Next, focus on the swap diagram of your subject (in this case, Fyleton company).

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Calculate the first swap cash flow exchange if **six-month MRR** is set at 1.95%.

Next step: Next, focus on the swap diagram of your subject (in this case, Fyleton company).
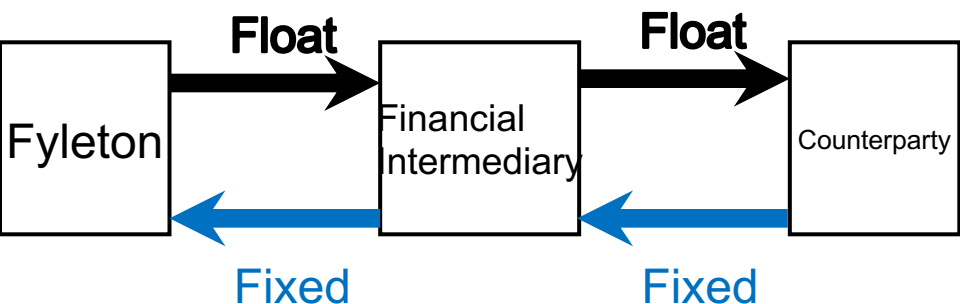

So, in **six-month** Fyleton will do the following:
1. Pay the float amount (based on **six-month MRR**).
2. Receive the fixed amount (based on agreed semiannual GBP fixed rate of 2.25%).
3. In a "plain-vanilla" swap, one will only pay / receive the net of the amounts.

Fyleton Investments Swap

Fyleton Investments has entered a five-year, receive-fixed GBP200 ~~million~~ interest rate swap with a financial intermediary to increase the duration of its fixed-income portfolio. Under terms of the swap, Fyleton has agreed to receive a semiannual GBP fixed rate of 2.25% and **pay six-month MRR**.

Calculate the first swap cash flow exchange if **six-month MRR** is set at 1.95%.


So, in **six-month** Fyleton will do the following:

1. Pay the float amount (based on **six-month MRR**) = 180 / 360 * 1.95% * GBP 200 M = GBP 1.95 M
2. Receive the fixed amount (based on agreed semiannual GBP fixed rate of 2.25%) = 180 / 360 * 2.25% * GBP 200 M = GBP 2.25 M
3. In a "plain-vanilla" swap, one will only pay / receive the net of the amounts.

3. Net amount: Fyleton Pays GBP 1.95 M and Receives GBP 2.25 M; Fyleton net Receives GBP 0.3 M (GBP 300,000).

Fyleton Investments Swap

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Calculate the first swap cash flow exchange if **six-month MRR** is set at 1.95%.
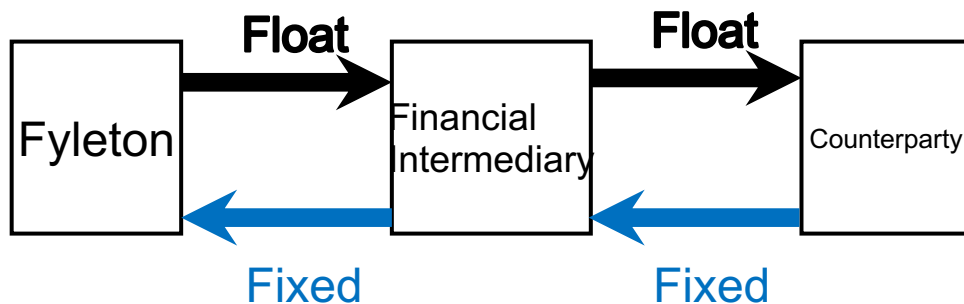
Let's do a deep dive. We know that MRR is currently at 1.95%. What if we have a rising interest rate structure. Let's use this (exaggerated) term structure below and Calculate the second swap cash flow exchange.
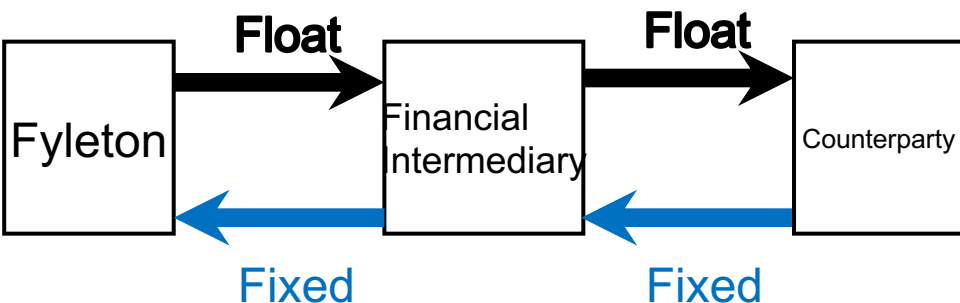
Day	0	180	360	540
MRR	1.95%	2.95%	3.95%	4.95%

Fyleton Investments Swap

Fyleton Investments has entered a five-year, receive-fixed GBP200 million interest rate swap with a financial intermediary to increase the duration of its fixed-income portfolio. Under terms of the swap, Fyleton has agreed to receive a semiannual GBP fixed rate of 2.25% and **pay six-month MRR**. Calculate the second swap cash flow exchange.

Day	0	180	360	540
MRR	1.95%	2.95%	3.95%	4.95%

So, in **360 days** Fyleton will do the following:
1. Pay the float amount (based on **six-month MRR**) = 180 / 360 * 2.95% * GBP 200 M = GBP 2.95 M
2. Receive the fixed amount (based on agreed semiannual GBP fixed rate of 2.25%) = 180 / 360 * 2.25% * GBP 200 M = GBP 2.25 M
3. In a "plain-vanilla" swap, one will only pay / receive the net of the amounts.

Fyleton → Float → Financial Intermediary → Float → Counterparty
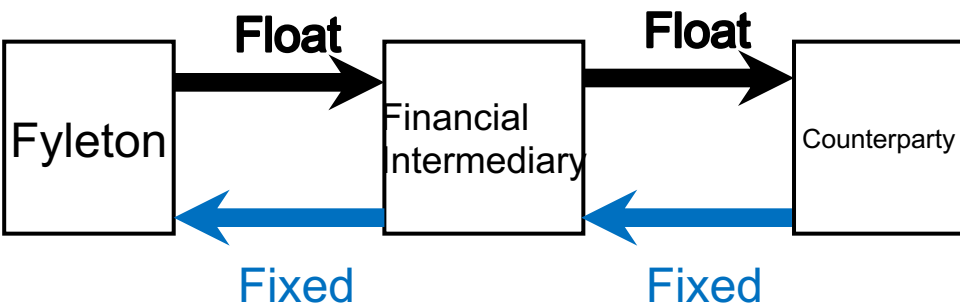Fyleton ← Fixed ← Financial Intermediary ← Fixed ← Counterparty

3. Net amount: Fyleton Pays GBP 2.95 M and Receives GBP 2.25 M; Fyleton net **Pays** GBP 0.7 M (GBP 700,000).

Fyleton Investments Swap

Fyleton Investments has entered a five-year, receive-fixed GBP200 ~~million~~ interest rate swap with a financial intermediary to increase the duration of its fixed-income portfolio. Under terms of the swap, Fyleton has agreed to receive a semiannual GBP fixed rate of 2.25% and **pay six-month MRR**.

Calculate the second swap cash flow exchange.

Day	0	180	360	540
MRR	1.95%	2.95%	3.95%	4.95%

Fyleton → Float → Financial Intermediary → Float → Counterparty
Counterparty → Fixed → Financial Intermediary → Fixed → Fyleton

Lets dig deeper, what happens in 540 days?

1. Pay the float amount (based on **six-month MRR**) = 180 / 360 * 3.95% * GBP 200 M = GBP 3.95 M

2. Receive the fixed amount (based on agreed semiannual GBP fixed rate of 2.25%) = 180 / 360 * 2.25% * GBP 200 M = GBP 2.25 M

3. In a "plain-vanilla" swap, one will only pay / receive the net of the amounts.

3. Net amount: Fyleton Pays GBP 3.95 M and Receives GBP 2.25 M; Fyleton net **Pays** GBP 1.7 M (GBP 1,700,000).

Fyleton Investments Swap

Fyleton Investments has entered a five-year, receive-fixed GBP200 ~~million~~ interest rate swap with a financial intermediary to increase the duration of its fixed-income portfolio. Under terms of the swap, Fyleton has agreed to receive a semiannual GBP fixed rate of 2.25% and **pay six-month MRR**.
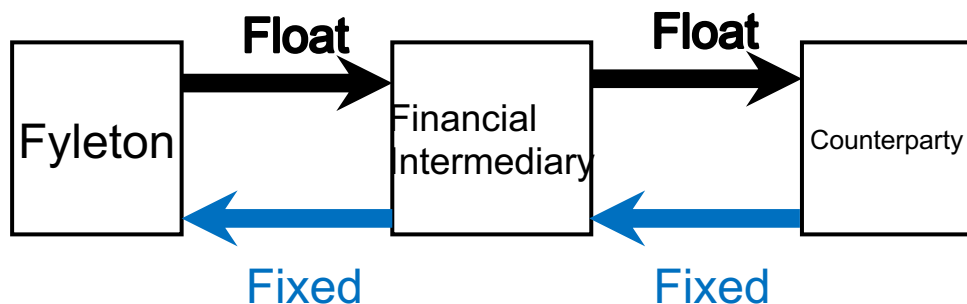
Here's a deep dive practice for you using a declining interest rate structure. Let's use another (exaggerated) term structure below:

Day	0	180	360	540
LIBOR	1.95%	1.45%	0.95%	0.45%

If you do the calculations right, you should observe that a declining future rate structure will produce a positive value for the float-rate payer / fixed-rate receiver.

- The price of a swap is the fixed rate of interest specified in the swap contract.

- The value depends on how expected future floating rates change over time.

- An increase in expected short-term future rates will produce a positive value for the fixed-rate payer.

- a decrease in expected future rates will produce a negative value for the fixed-rate payer.

- *We worked through the negative value for the the float-rate payer / fixed-rate receiver in the earlier example, please practice the case for positive value for the fixed rate payer [declining interest rate structure].*

Question ID#: 1206684

In a plain vanilla interest rate swap:

A) payments equal to the notional principal amount are exchanged at the initiation of the swap.

B) each party pays a fixed rate of interest on a notional amount.

C) one party pays a floating rate and the other pays a fixed rate, both based on the notional amount.

Question ID#: 1206684

In a plain vanilla interest rate swap:

A) payments equal to the notional principal amount are exchanged at the initiation of the swap.

No. Recall that the notional principal is the same amount for both parties. Also, the only type of swap that exchanges notional principle is the foreign currency swap and you are not responsible for that type of swap for Level I.

B) each party pays a fixed rate of interest on a notional amount.

No. For level I, you are responsible for one type of swap, the plain vanilla swap. In a plain vanilla swap, one party pays a fixed rate and the other party pays a floating rate, both based on the same notional amount.

C) one party pays a floating rate and the other pays a fixed rate, both based on the notional amount.

C is the correct answer.

Question ID#: 1206682

Which of the following regarding a plain vanilla interest rate swap is *most* accurate?

A) The notional principal is returned at the end of the swap.

B) The notional principal is swapped.

C) Only the net interest payments are made.

Which of the following regarding a plain vanilla interest rate swap
is *most* accurate?

A) The notional principal is returned at the end of the swap.

No. Recall that the notional principal is the same amount for both parties. The notional principal swapped is the same for both counterparties and in the same currency units, there is no need to actually exchange the cash. Again, the only type of swap that exchanges notional principle is the foreign currency swap and you are not responsible for that type of swap for Level I.

B) The notional principal is swapped.

No. Look above, the notional principal swapped is the same for both counterparties and in the same currency units.

C) Only the net interest payments are made.

C is correct. In interest rate swaps, only the *net* interest rate payments actually take place.

Options

- Agreements that gives the buyer the right, *but not the obligation*, to enter into a future transaction at a price specified at contract's initiation.

  - ➤ Either exchange-traded or OTC

  - ➤ A Call is the right to buy the underlying

  - ➤ A Put is the right to sell the underlying

  - ➤ American options can be exercised at ANY time BEFORE expiration

  - ➤ European options can ONLY be exercised AT expiration

- Example: An investor buys an American Call option on a stock with a $13 strike price that expires in three months.

Credit Derivatives

- A derivatives contract between a credit protection buyer and a credit protection seller, in which the credit protection seller provides protection to the former against a specific credit loss.

  ➢ Total Return Swap

  ➢ Credit Spread Option

  ➢ Credit-linked note

  ➢ Credit Default Swap (CDS)

- CDS: "Insurance". Buyer makes a series of payments to the seller and receives compensation for credit losses if the third party defaults.

- Please read the CFAI curriculum on Credit Derivatives.

Purpose of Derivatives Markets

- Derivatives enhance market efficiency:

  ➢ Provide price information

  ➢ Allow risk to be managed and shifted among market participants

  ➢ High Liquidity offers low transaction costs

Criticisms of Derivatives Markets

- Their complexity can wreak havoc with inexperienced investors

- They encourage speculation

- They promote excessive trading

Highly leveraged

Options Terminology

- *Call options* give the owner the right to buy the underlying at the stated strike price.

- *Put options* give the owner the right to sell the underlying at the stated strike price.

- *Option premium* is the amount paid by the owner to the writer (issuer/seller) for these rights

- *Intrinsic value* is the difference between the underlying's price and the strike or zero, whichever is greater.

- *"Moneyness"* refers to the price of the underlying relative to the strike.

  ➢ If option's intrinsic value is positive "In-The-Money."

  ➢ Otherwise it is "Out-The-Money."

- Option premium = $5, strike price = $100, option life = 6 months
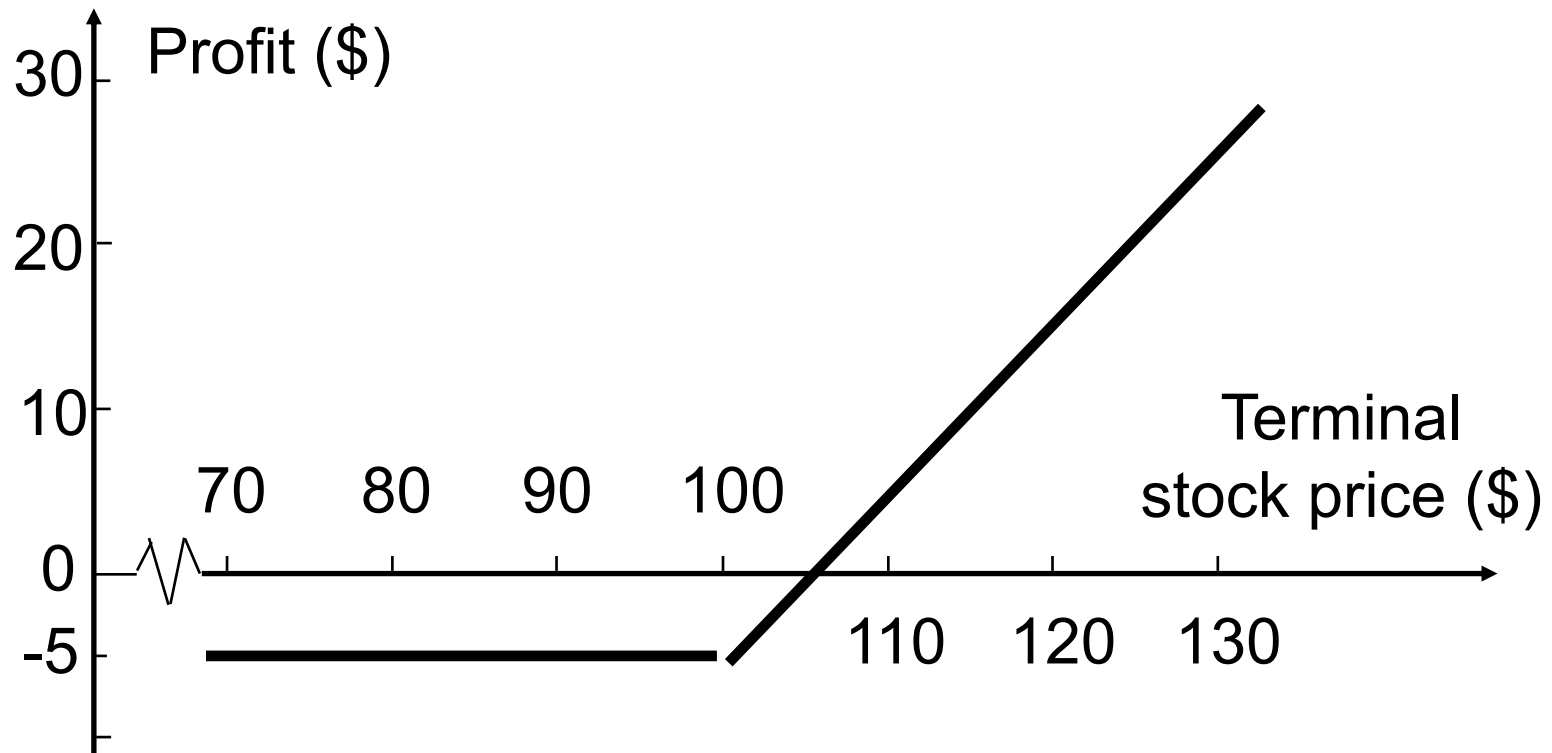
Long Call

- Call value; c = Max (St – X, 0) where St is the current stock price and X is the strike price

- Profit / Loss = Call Value – Call Premium = c – c0

- For our example.

  - When Stock Price is $110, Call Value is $10, P/L is +$5

  - When Stock Price is $130, Call Value is $30, P/L is +$25

  - When Stock Price is $100, Call Value is $0, P/L is -$5

  - When Stock Price is $90, Call Value is $0, P/L is -$5

  - When Stock Price is $80, Call Value is $0, P/L is -$5

- Long Call: Max Loss is bounded, Max Profit is infinity, Breakeven Price is Strike Price + Call Premium.

- Option premium = $5, strike price = $100, option life = 6 months
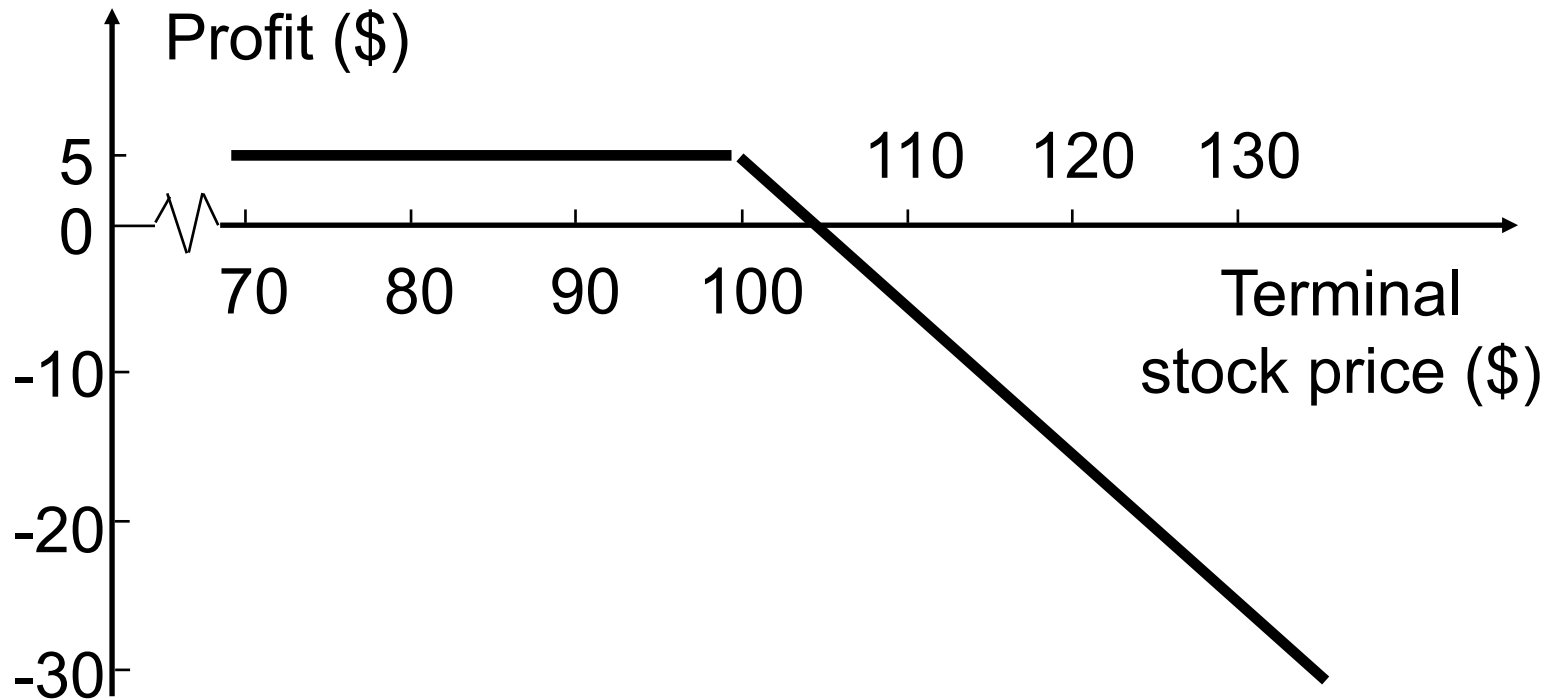
Short Call

- Call value; $c = Max (St – X, 0)$ where St is the current stock price and X is the strike price

- Profit / Loss = - (Call Value – Call Premium) = - (c – c0) = +c0 - c

- For our example.

  ➢ When Stock Price is $110, Call Value is $10, P/L is -$5

  ➢ When Stock Price is $130, Call Value is $30, P/L is -$25

  ➢ When Stock Price is $100, Call Value is $0, P/L is +$5

  ➢ When Stock Price is $90, Call Value is $0, P/L is +$5

  ➢ When Stock Price is $80, Call Value is $0, P/L is +$5

- Short Call: Max Loss is infinity, Max Profit is bounded, Breakeven Price is Strike Price + Call Premium.

- Put option premium = $7, strike price = $70, option life = 6 months
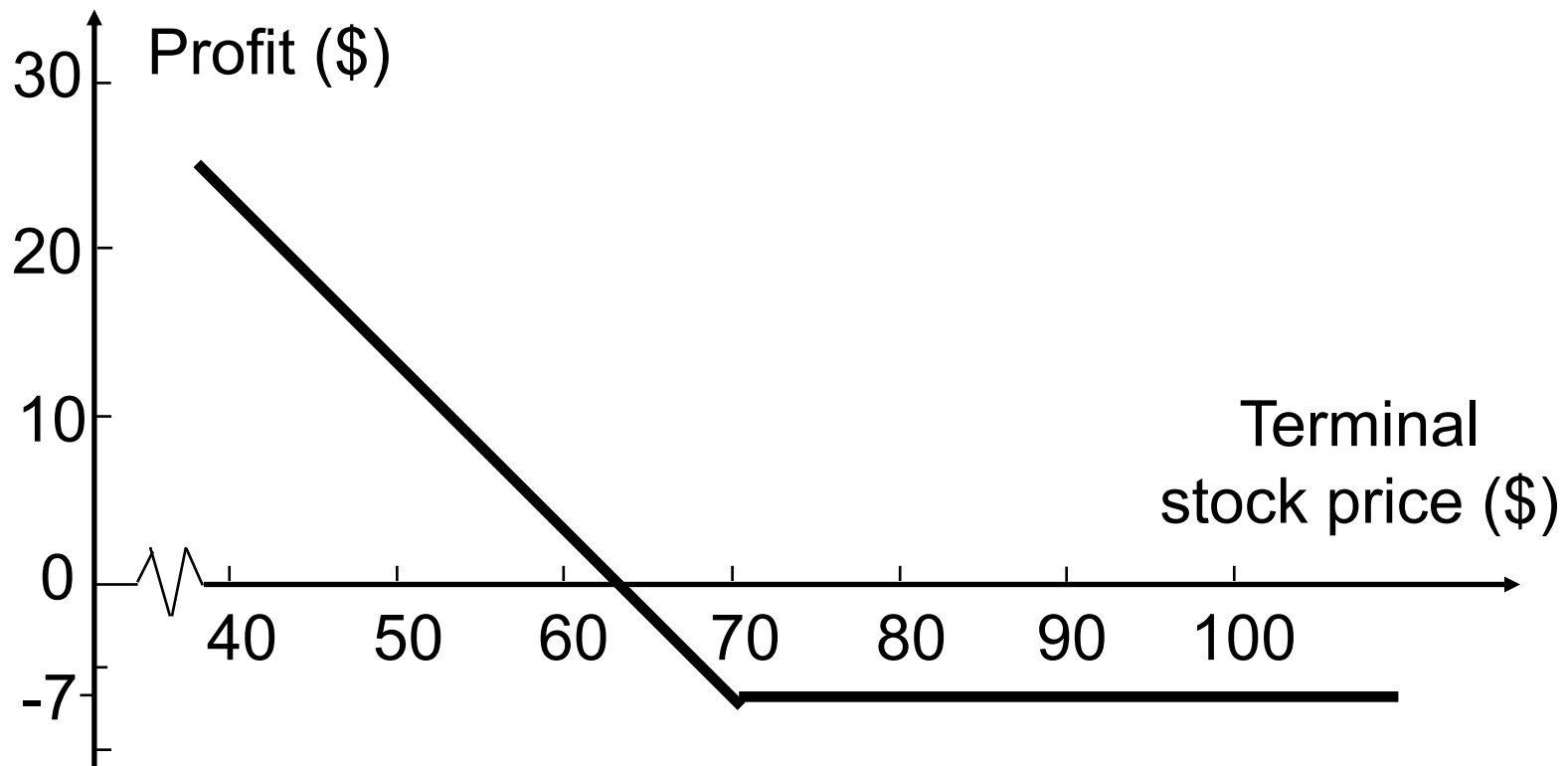
Long Put

- Put value; $p = \text{Max}(X - S_t, 0)$ where S_t is the current stock price and X is the strike price

- Profit / Loss = Put Value – Put Premium = $p - p_0$

- For our example.

  - When Stock Price is $90, Put Value is $0, P/L is -$7

  - When Stock Price is $80, Put Value is $0, P/L is -$7

  - When Stock Price is $70, Put Value is $0, P/L is -$7

  - When Stock Price is $60, Put Value is $10, P/L is +$3

  - When Stock Price is $50, Put Value is $20, P/L is +$13

- Long Put: Max Loss is bounded, Max Profit is bounded (occurs at $S_t=0$), Breakeven Price is Strike Price - Put Premium.

- Put option premium = $7, strike price = $70, option life = 6 months
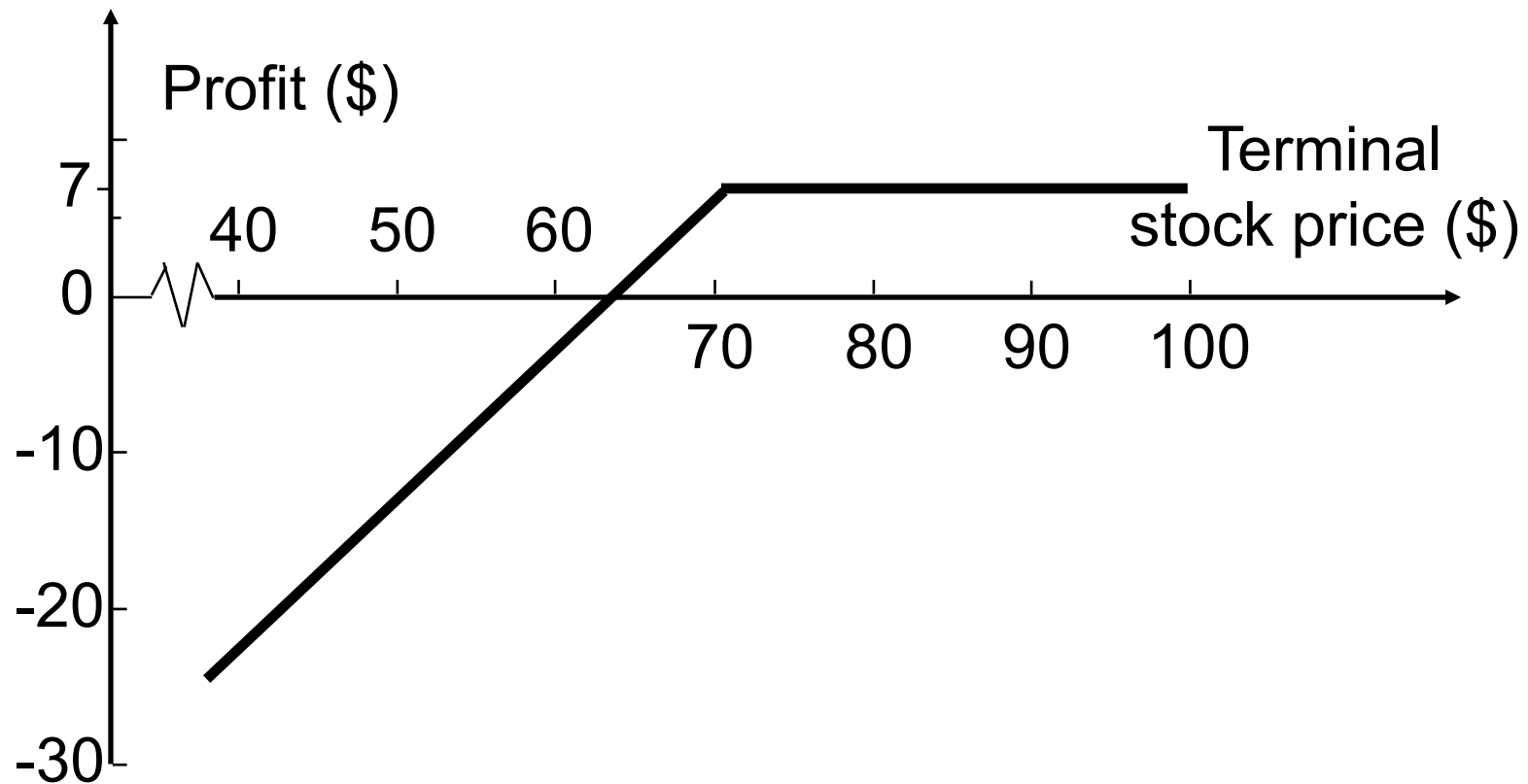
Short Put

- Put value; $p = \text{Max}(X - St, 0)$ where St is the current stock price and X is the strike price

- Profit / Loss = -(Put Value – Put Premium) = $-(p - p0) = +p0 - p$

- For our example.

  ➢ When Stock Price is $90, Put Value is $0, P/L is +$7

  ➢ When Stock Price is $80, Put Value is $0, P/L is +$7

  ➢ When Stock Price is $70, Put Value is $0, P/L is +$7

  ➢ When Stock Price is $60, Put Value is $10, P/L is -$3

  ➢ When Stock Price is $50, Put Value is $20, P/L is -$13

- Short Put: Max Loss is bounded (occurs at St=0), Max Profit is bounded, Breakeven Price is Strike Price - Put Premium.

Short Put

- Put value; $p = \text{Max}(X - St, 0)$ where St is the current stock price and X is the strike price

- Profit / Loss = -(Put Value – Put Premium) = $-(p - p0) = +p0 - p$

- For our example.

  - When Stock Price is $90, Put Value is $0, P/L is +$7

  - When Stock Price is $80, Put Value is $0, P/L is +$7

  - When Stock Price is $70, Put Value is $0, P/L is +$7

  - When Stock Price is $60, Put Value is $10, P/L is -$3

  - When Stock Price is $50, Put Value is $20, P/L is -$13

- Short Put: Max Loss is bounded (occurs at St=0), Max Profit is bounded, Breakeven Price is Strike Price - Put Premium.

L1V5_Derivatives_Module1-10_2024 page 40 EXAMPLE 5

Hightest Capital—Call Option Purchase

Hightest Capital purchases a call option on the S&P 500 Health Care Select

Sector Index (SIXV). This six-month exchange-traded option contract has a size of 100 index units and an exercise price of $1,240 per unit versus the initial SIXV spot price of $1,180.95. The option premium paid upfront is $24.85 per unit, or $2,485 (= $24.85 × 100).

1. Calculate the SIXV spot price at maturity from Example 5 at which Hightest

Capital will reach a breakeven point and earn zero profit.

2. A put option seller receives a $5 premium for a put option sold on an underlying with an exercise price of $30. What is the option seller's maximum profit under the contract? What is the maximum loss under the contract?
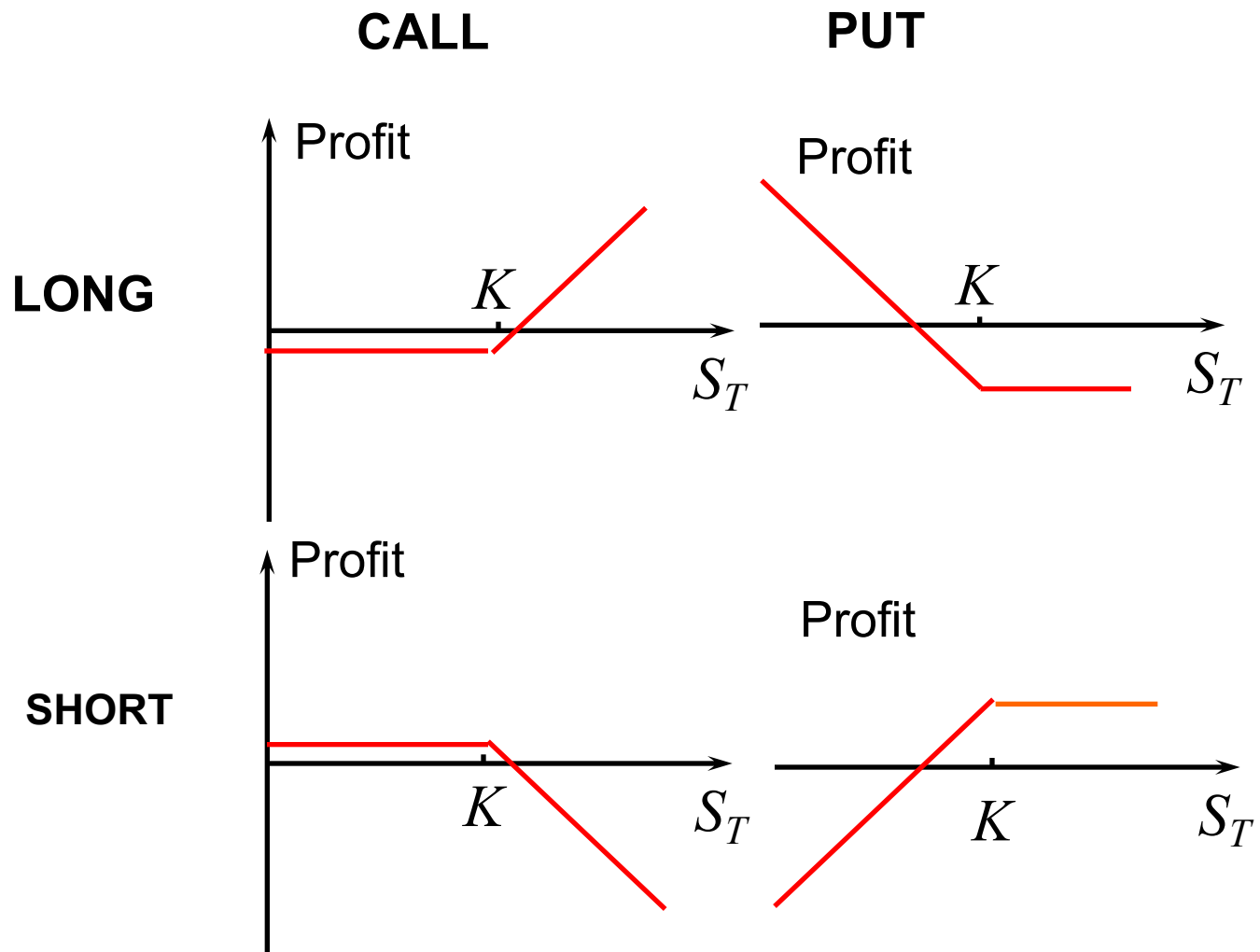
CALL   PUT

LONG

SHORT

Profit

K

S_T

Question ID#: 95531

Which of the following statements regarding Call options is most accurate? The:

A) Call holder will exercise (at expiration) whenever the strike price exceeds the stock price.

B) breakeven point for the seller is the strike price minus the option premium.

C) breakeven point for the buyer is the strike price plus the option premium.

Question ID#: 95531

Which of the following statements regarding Call options is <u>most accurate</u>? The:

A) Call holder will exercise (at expiration) whenever the strike price exceeds the stock price.

No. Not Accurate. Holder / Buyer / Long position: Call value; c = Max (St – X, 0). If strike (X) exceeds Stock price (St) then Call option has no value and Holder / Buyer / Long position will <u>NOT</u> exercise.

B) breakeven point for the seller is the strike price minus the option premium.

No. Not Accurate. We've learned earlier Breakeven Price is the same for buyer and seller. For a Call option, Breakeven Price is Strike Price + Call Premium.

C) breakeven point for the buyer is the strike price plus the option premium.

Yes. Breakeven Price is Strike Price + Call Premium. C is the correct answer.

Put Call Parity

- The value of Calls and Puts are related to each other through Put-Call parity!

- It's important because we will use this to explain Factors Affecting Option Value (page 187)

- Protective Put = Call + PV(X)

- So + po = co + PV(X) ; PV(X) = X / (1+r)^T

- This equation can be manipulated to create synthetic securities and identify arbitrage opportunities:

- Synthetic Stock; So = co + PV(X) – po

- Synthetic Put; po = co + PV(X) – So

- Synthetic Call; co = So + po - PV(X)

- Synthetic "Bond"; PV(X) = So + po – co

LOS 46.L;

Put Call Parity

- Let's look at an example question:

Question ID#: 1206760

An increase in the riskless rate of interest, other things equal, will:

A) decrease Call option values and increase Put option values.

B) decrease Call option values and decrease Put option values.

C) increase Call option values and decrease Put option values.

Put Call Parity

Question ID#: 1206760

An <u>increase</u> in the <u>riskless rate of interest</u>, other things equal, will:

A) decrease Call option values and increase Put option values.

B) decrease Call option values and decrease Put option values.

C) increase Call option values and decrease Put option values.

- PV(X) = X / (1+r)^T, so we have r ⬆ and that cause PV(X) ⬇

- Synthetic Call; co = So + po - PV(X) and PV(X) ⬇ so that cause co to ⬆

- Synthetic Put; po = co + PV(X) – So and PV(X) ⬇ so that cause po to ⬇

	Call	Put
(D)ividends; Cash Flow	↓	↑
(I)nterest Rate	↑	↓
(V)olatility	↑	↑
(U)nderlying Asset; Spot Price	↑	↓
(T)ime	↑	↑
(S)trike Price	↓	↑

Memorize this table.

Question ID#: 1206760

An increase in the riskless rate of interest, other things equal, will:

A) decrease Call option values and increase Put option values.

B) decrease Call option values and decrease Put option values.

C) increase Call option values and decrease Put option values.

	Call	Put
(D)ividends; Cash Flow	↓	↑
(I)nterest Rate	↑	↓
(V)olatility	↑	↑
(U)nderlying Asset; Spot Price	↑	↓
(T)ime	↑	↑
(S)trike Price	↓	↑

Question ID#: 95489

An increase in the riskless rate of interest, other things equal, will:

A) decrease Call option values and increase Put option values.

B) decrease Call option values and decrease Put option values.

C) increase Call option values and decrease Put option values. This is the Correct Answer.

	Call	Put
(D)ividends; Cash Flow	↓	↑
(I)nterest Rate	↑	↓
(V)olatility	↑	↑
(U)nderlying Asset; Spot Price	↑	↓
(T)ime	↑	↑
(S)trike Price	↓	↑

Question ID#: 95474

For stock options, which of the following will *least* likely increase Put option values and decrease Call option values?

A) A decrease in the riskless rate of interest.

B) An increase in the riskless rate of interest.

C) An increase in the exercise price.

Question ID#: 95474

For stock options, which of the following will *least* likely increase Put option values and decrease Call option values?

A) A decrease in the riskless rate of interest.

B) An increase in the riskless rate of interest.

C) An increase in the exercise price.

	Call	Put
(D)ividends; Cash Flow	↓	↑
(I)nterest Rate	↑	↓
(V)olatility	↑	↑
(U)nderlying Asset; Spot Price	↑	↓
(T)ime	↑	↑
(S)trike Price	↓	↑

Practice using the DIVUTS table effectively on exam like situations!

Question ID#: 95474

For stock options, which of the following will *least* likely increase Put option values and decrease Call option values?

A) A decrease in the riskless rate of interest.

B) An increase in the riskless rate of interest. This is the Correct Answer

C) An increase in the exercise price.

	Call	Put
(D)ividends; Cash Flow	↓	↑
(I)nterest Rate	↑	↓
(V)olatility	↑	↑
(U)nderlying Asset; Spot Price	↑	↓
(T)ime	↑	↑
(S)trike Price	↓	↑

Practice using the DIVUTS table effectively on exam like situations!

Factors That Affect Option Value (page 187)

1. Determine the correct answers to complete the following sentence: For a call option representing the right to buy the underlying, the exercise price represents a _____ bound on an option's exercise value at maturity, leading to a _____ option value for a lower exercise price.

Factors That Affect Option Value (page 187)

2. Match the following changes in factors affecting option value (holding other factors constant) with their corresponding option value change:

1. A lower exercise price (X) ~ ~~ A. Increases the value of both a call option and a put option

2. A lower underlying price (ST) ~ ~~ B. Increases the value of a call option

3. A rise in the volatility of the underlying price ~ ~~ C. Increases the value of a put option

Factors That Affect Option Value (page 187)

2. Match the following changes in factors affecting option value (holding other factors constant) with their corresponding option value change:

#1. A lower exercise price (X) ~ ~~ A. Increases the value of both a call option and a put option

#2. A lower underlying price (ST) ~ ~~ B. Increases the value of a call option

#3. A rise in the volatility of the underlying price ~ ~~ C. Increases the value of a put option

	Call	Put
(D)ividends; Cash Flow	↓	↑
(I)nterest Rate	↑	↓
(V)olatility	↑	↑
(U)nderlying Asset; Spot Price	↑	↓
(T)ime	↑	↑
(S)trike Price	↓	↑

Factors That Affect Option Value (page 187)

2. Match the following changes in factors affecting option value (holding other factors constant) with their corresponding option value change:

#1. A lower exercise price (X) ~ ~~ A. Increases the value of both a call option and a put option

#2. A lower underlying price (ST) ~ ~~ B. Increases the value of a call option

#3. A rise in the volatility of the underlying price ~ ~~ C. Increases the value of a put option

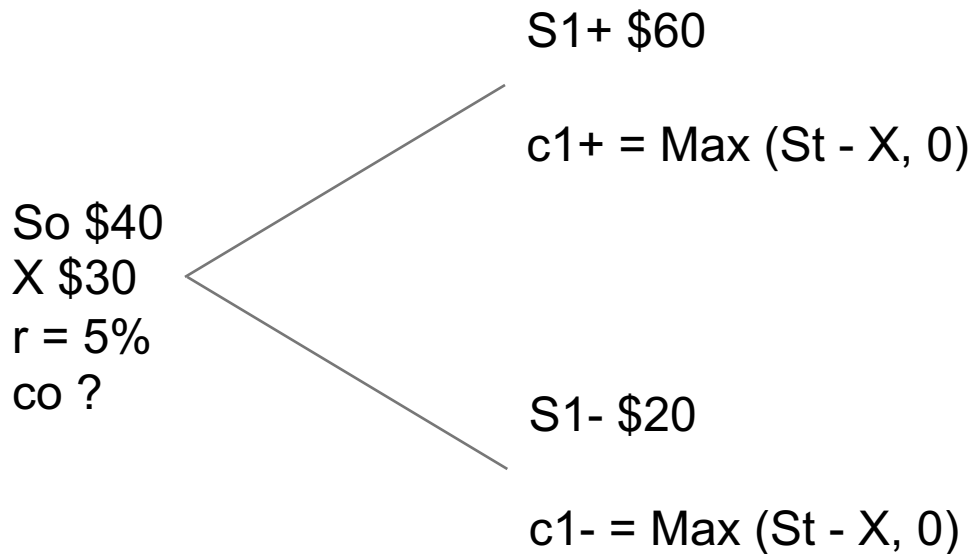|	Call	Put
(D)ividends; Cash Flow	↓	↑
(I)nterest Rate	↑	↓
(V)olatility	↑	↑
(U)nderlying Asset; Spot Price ⬇	↑⬇	↓⬆
(T)ime	↑	↑
(S)trike Price ⬇	↓⬆	↑⬇

LOS 46.M;

Put Call Forward Parity

- Recall that in the simplest form. Forward discounted by the risk free rate is the Spot.

- So + po = co + PV(X) ; PV(X) = X / (1+r)^T

- Also, Forward = Fo = So x (1+r)^T

- So we can rearrange it as: So = Fo / (1+r)^T

- And combine it with above to get: Fo / (1+r)^T + po = co + PV(X)

- That also means that PV(Fo) + po = co + PV(X)

LOS 46.N;

One-period binomial model

S1+ $60

c1+ = Max (St - X, 0)

So $40
X $30
r = 5%
co ?

S1- $20

c1- = Max (St - X, 0)

LOS 46.N;

One-period binomial model

S1+ $60
u = $60 / $40 = 1.5

c1+ = Max (St - X, 0)

So $40
X $30
r = 5%
co ?

π

$1 - \pi$

S1- $20
d = $20 / $40 = 0.5

c1- = Max (St - X, 0)
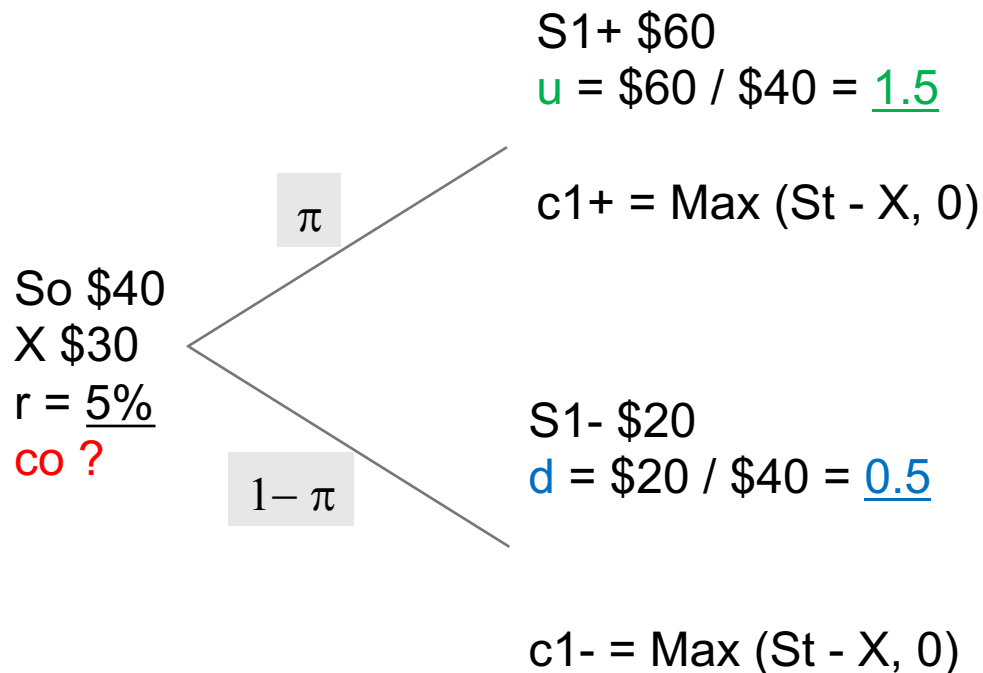
Step 1: $\pi = (1 + r - d) / (u - d)$

$\pi = (1 + r - d) / (u - d)$
$\pi = (1 + 5\% - 0.5) / (1.5 - 0.5)$
$\pi = 0.55$

LOS 46.N;
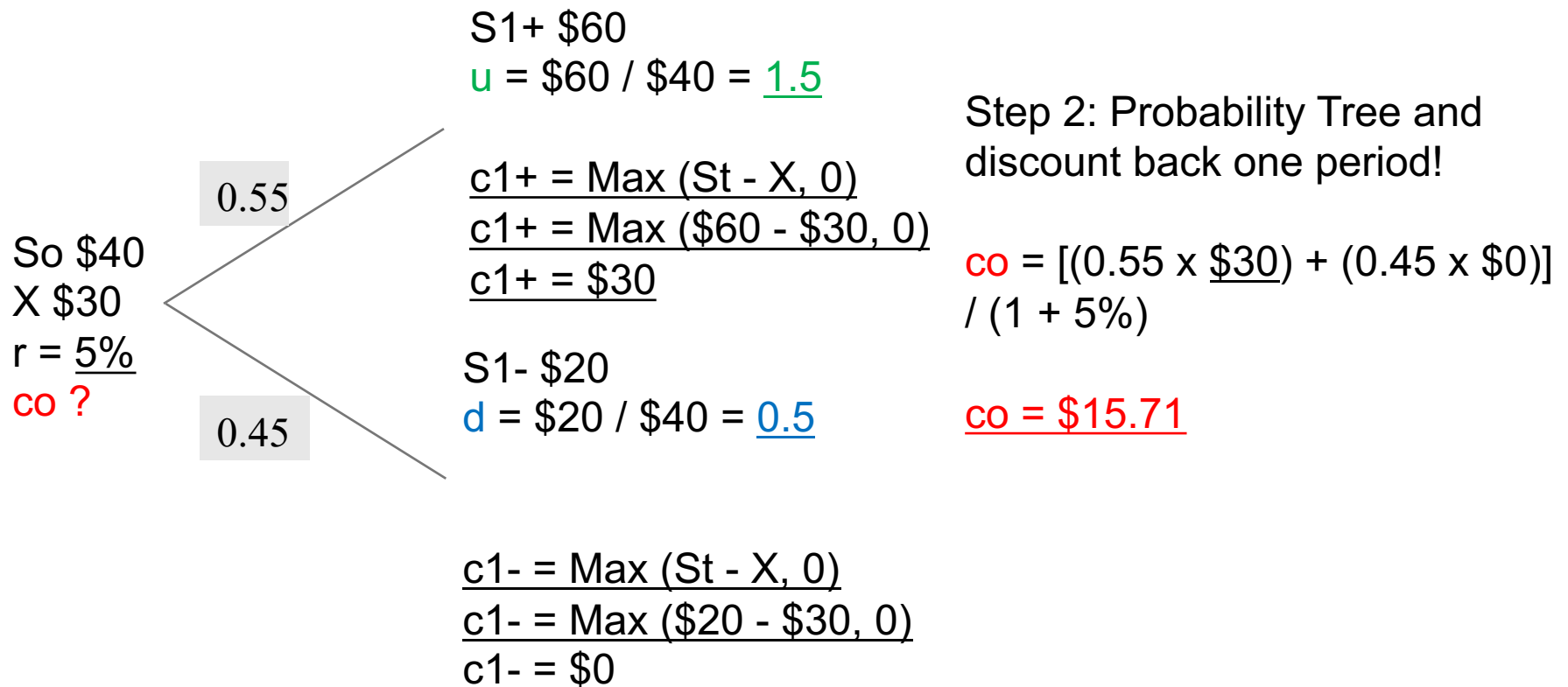
One-period binomial model

S1+ $60
u = $60 / $40 = <u>1.5</u>

0.55

c1+ = Max (St - X, 0)
c1+ = Max ($60 - $30, 0)
c1+ = $30

So $40
X $30
r = <u>5%</u>
co ?

0.45

S1- $20
d = $20 / $40 = <u>0.5</u>

c1- = Max (St - X, 0)
c1- = Max ($20 - $30, 0)
c1- = $0

Step 2: Probability Tree and discount back one period!

co = [(0.55 x $30) + (0.45 x $0)] / (1 + 5%)

co = $15.71

LOS 46.N;

One-period binomial model

S1+ $60
u = $60 / $40 = <u>1.5</u>

p1+ = Max (X - St, 0)

π

So $40
X $30
r = <u>5%</u>
po ?

$1-\pi$

S1- $20
d = $20 / $40 = <u>0.5</u>

p1- = Max (X - St, 0)

Step 1: $\pi = (1 + r - d) / (u - d)$

$\pi = (1 + r - d) / (u - d)$
$\pi = (1 + 5\% - 0.5) / (1.5 - 0.5)$
$\pi = 0.55$

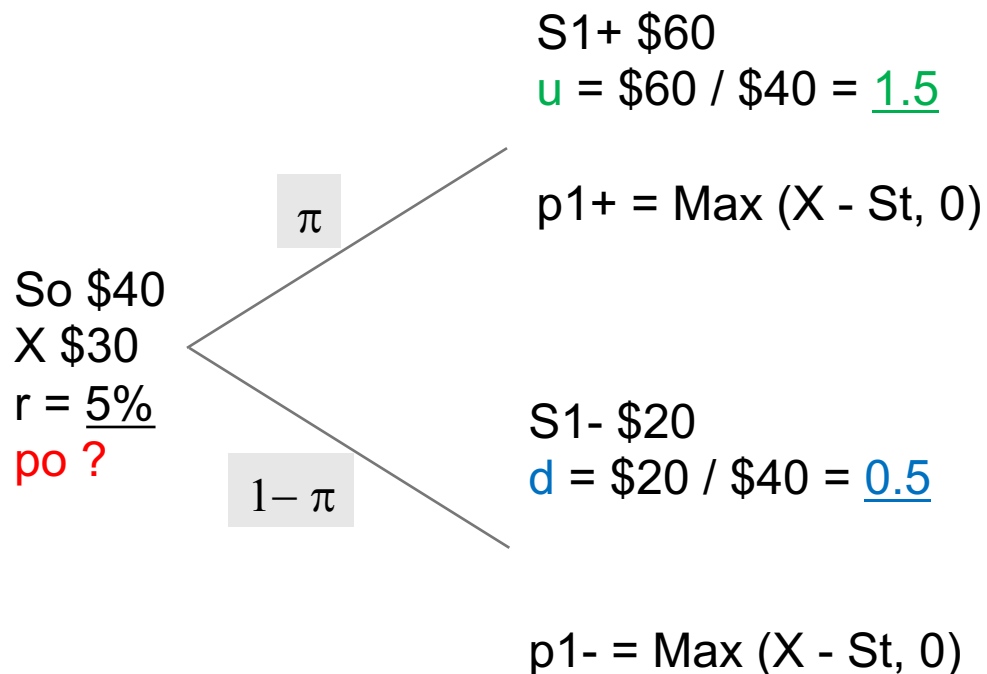Step 2: Probability Tree and discount back one period!

po = [(0.55 x p1+) + (0.45 x p1-)] / (1 + 5%)

- The prices of European and American options will be equal unless the right to exercise prior to expiration has positive value.

- For a Call option on an asset that has no cash flows during the life of the option, there is no advantage to early exercise so identical American and European Call options will have the same value. If the asset pays cash flows during the life of a Call option, early exercise can be valuable and an American Call option will be priced higher than an otherwise identical European Call option.

- For Put options, early exercise can be valuable when the options are deep in the money and an American Put option will be priced higher than an otherwise identical European Put option.

1. Compensation structures for alternative investments most likely are:

A. less complex than those of traditional investments.

B. equally complex as those of traditional investments.

C. more complex than those of traditional investments.

2. Identify the following statement as true or false: Limited partners (LPs) are involved in the management of the alternative investment fund in which they invest; they assist the general partner (GP) in the operations and decisions of the fund.

A. True

B. False

3. Calculate the general partner's performance fee earned based on the following terms:

Single-period fund rate of return 20%

Hard hurdle rate 10%

GP performance fee 18%

Catch-up clause none

A. 1.6%

B. 1.8%

C. 2.0%

L1V5_AI_Module1-5_2024 (page 270)

1. In which part of the investment life cycle of a private equity investment should investors generally expect a positive cash flow?

A. Capital commitment
B. Capital deployment
C. Capital distribution

1. In which part of the investment life cycle of a private equity investment should investors generally expect a positive cash flow?

A. Capital commitment

B. Capital deployment

C. Capital distribution

2. Why is IRR preferred for performance measurement for alternative investments?

A. IRR is commonly used for other asset classes.

B. IRR is easy and intuitive to calculate.

C. IRR takes into account the timing of cash flows in long-lived alternative investments.

3. Which of the following statements regarding hedge fund fee structure is correct?

A. The periodic returns of all investors in the same fund must be identical.

B. Hedge funds usually charge a performance fee based on a percentage of periodic return above a certain threshold.

C. The management and performance fee rates are always the same for all investors in the same fund.

4. A $100 million hedge fund charges all its investors a 2% management fee and a 20% performance fee if the periodic return, net of management fee, exceeds a 5% hard hurdle rate. All fees are deducted based on the end-of-year value.

If the fund makes a gross return (before fees) of 8% for the year, what is the investor's return, net of fees, closest to (ignoring any high-water mark provisions)?

A. 4.67%

B. 5.67%

C. 5.84%

5. A €100 million private equity fund has a preferred return of 5% per annum,

20% carried interest with full catch-up, and standard clawback clauses. The fund realizes a gross gain of 50% in two years before it distributes all its capital back to its LPs. Ignoring management fees, the total carried interest to the GP for the two years is closest to:

A. €8 million.

B. €10 million.

C. €16 million.

1. Which of the following is most likely to participate in early-stage financing?

A. Founders

B. Angel investors

C. Strategic investors

2. Private equity funds are most likely to use:

A. leveraged buyouts.

B. option-based strategies.

C. merger arbitrage strategies.

3. A shared advantage of IPO and SPAC exit strategies for a private equity fund is their:

A. fast and simple execution.

B. ability to win market attention.

C. transaction structure flexibility.

4. Which of the following combinations of financial characteristics most likely would be associated with a venture debt transaction?

A. Positive revenues and cash flow

B. Declining revenues and cash flow

C. Low revenues and negative cash flow

5. In contrast to direct lending and distressed debt, mezzanine debt most likely requires higher interest rates for its investors due to its:

A. reliance on leverage.

B. overall ranking and status in company debt structure.

C. need for management involvement over an extended time.

6. A feature that private debt and public debt share in the setting of their investment returns is their:

A. relationship to benchmark interest rates.

B. need for specialized investment knowledge.

C. opportunity for illiquidity premiums in market crises.

L1V5_AI_Module1-5_2024 (page 322)

7. The most likely effect on a portfolio's diversification when exposure to direct lending commences is that it:

A. decreases.

B. remains the same.

C. increases.

8. Private equity funds whose vintage year occurs in the expanding phase of the business cycle tend to earn excess returns by investing in companies that are:

A. mature.

B. distressed.

C. early stage.

9. The private capital category most likely to offer the highest diversification benefit for portfolios holding public stock and bonds is:

A. private debt.

B. private equity.

C. venture capital.

L1V5_AI_Module1-5_2024 (page 351)

1. A REIT is considered to be "hybrid" if it invests in both:

A. equity REITs and mortgage REITs.

B. sole ownership and joint ventures.

C. direct and indirect property ownership.

2. A direct private real estate investor can reduce taxable income using:

A. double taxation.

B. cash depreciation expenses.

C. tax-deductible interest expenses.

3. The main appeal of the REIT structure is the elimination of:

A. dividend distributions.

B. double corporate taxation.

C. the requirement to report earnings per share.

3. Hedge funds versus mutual funds: Choose the false statement.

A. Mutual funds are open to any investor and are generally more liquid instruments with minimal constraints on redemptions.

B. Hedge fund fees are typically negotiable by an investor, while mutual funds operate with the same fees for all investors.

C. Hedge funds are more restricted in what they can trade compared to mutual funds.

3. Hedge funds versus mutual funds: Choose the false statement.

A. Mutual funds are open to any investor and are generally more liquid instruments with minimal constraints on redemptions.

B. Hedge fund fees are typically negotiable by an investor, while mutual funds operate with the same fees for all investors.

C. Hedge funds are more restricted in what they can trade compared to mutual funds.

4. How many of the following statements comparing hedge funds and ETFs are true?

1. ETFs are exchange-traded public securities, while hedge funds are private partnership funds.

2. Any investor can invest in an ETF, while specific restrictions apply to who can invest in a hedge fund.

3. ETFs have very low fees and expense ratios compared to hedge funds.

4. ETFs are highly regulated, with specific reporting requirements, while hedge funds are lightly regulated.

A. One of the statements is true.

B. Two of the statements are true.

C. Three of the statements are true.

D. Four of the statements are true.

1. Choose the false statement about hedge funds:

A. While traditional fund managers charge mainly a management fee, hedge fund managers charge both a management fee and a performance-based incentive fee.

B. Redemption of funds from a hedge fund prior to its liquidation is very hard, due to the initial lockup period and specific terms of redemption.

C. Individual retail investors cannot invest in hedge funds, and only institutional investors can.

2. A fundamental long/short hedge fund manager is evaluating specific securities to build a portfolio's positions. Which of the following is the strategy the manager would least likely adopt?

A. Long securities that have an upside potential relative to current price

B. Short sectors with macro trends negatively impacting the company

C. Long securities that trade at a significant discount, expecting an increased valuation in case of a bankruptcy

13. Which of the following fund structures is most likely to be suitable for an institutional hedge fund investor that seeks a highly customizable offering with negotiable fees?

A. Separately managed hedge funds

B. Commingled hedge funds (master feeder funds)

C. Mutual funds

D. Funds of funds

4. Which of the following parties is responsible for the portfolio management of a fund of hedge funds?

A. Accredited investor

B. General partner

C. Limited partner

5. Which of the following best explains why it is unlikely a poor-performing hedge fund would be added to an index?

A. Survivorship bias

B. Backfill bias

C. Selection bias

6. The strategy that identifies opportunities for future merger, bankruptcy, or spin-offs and seeks profit from pricing inefficiencies is known as:

A. event driven.

B. relative value.

C. opportunistic.

7. A money manager was reviewing the automobile sector and identified that the stock of General Motors (GM) is relatively overvalued compared to Ford. A money manager purchases 100 shares of Ford and shorts 150 shares of GM. It turned out that the manager's perception was right. At the end of the quarter, she unwinds both positions, making a profit on both positions. What is this strategy called?

7. A money manager was reviewing the automobile sector and identified that the stock of General Motors (GM) is relatively overvalued compared to Ford. A money manager purchases 100 shares of Ford and shorts 150 shares of GM. It turned out that the manager's perception was right. At the end of the quarter, she unwinds both positions, making a profit on both positions. What is this strategy called?

A. Equity long/short

B. Event driven

C. Relative value

Quick Exam Taking Discussion and Tips

Thank you!