CFA Level I Review
Study Session 16: Derivatives

USC/LASFA CFA Review Program

USC Campus

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SESSION OVERVIEW

I. Preliminary Material/Institutional Detail

- A. Introduction
- B. Futures Markets
- C. Options Markets
- D. Options Payoffs and Option Strategies
- E. The Swaps Markets: An Introduction

INTRODUCTION

Introduction

LOS 1A a) Definitions (Kolb pp. 1-3)

Key Definitions

Derivative Instrument - A financial contract or instrument whose value is derived from the value of another instrument

Arbitrage Opportunity - The opportunity to make a riskless (certain) profit with no investment (no money down)

Forward Contract - A contract to exchange one item for another at a future time with the terms of the exchange agreed to now.

Futures Contract - A special type of forward contract that is standardized, exchange traded, and requires collateralization.

Introduction

LOS 1A a) More Definitions (Kolb pp. 3-5)

Key Definitions - cont'd

Call Option - A contract that gives its owner the right but not the obligation to buy an item at any point over a pre-specified period of time at a pre-specified price.

Put Option - A contract that gives its owner the right but not the obligation to sell an item at any point over a pre-specified period of time at a pre-specified price.

Swap Contract - A contract between two or more parties to exchange sets of cash flows at pre-specified points in the future.

Introduction

LOS 1A b) No-Arbitrage Principle (Kolb p. 1)

The No-Arbitrage Principle

The No-Arbitrage Principle states that a financial instrument is selling at a "rational price" in a market if the market excludes any arbitrage (i.e., riskless profit) opportunities using that instrument.

Introduction

LOS 1A c) Forwards vs. Futures (Kolb pp. 2-3)

Contract Characteristic	Forwards	Futures
Contracts Traded on:	OTC	Exchange
Contract Design:	Flexible	Standardized
Performance Guaranteed By:	Counterparty	Clearinghouse
Parties Post Margin?	No	Yes
Government Regulated?	No	Yes
Marked to Market?	***No***	***Yes***
Need to Roll?	***No***	***Yes***
Liquidity?	***Thin***	***Good***

Introduction

LOS 1A d) Option Players (Kolb pp. 3-4)

Differences Between an Option Buyer vs. Writer

Option Buyer - An option buyer, either of a call or put, has the right to exercise the option contract's terms against the writer whenever those rights are available under the contract.

Option Writer (Seller) - An option writer, either of a call or a put, has the obligation to comply with the exercise of the option contract whenever they have been properly exercised by the buyer

Introduction

LOS 1A e) Market Completeness (Kolb pp. 5-6)

The Role of Derivatives in Market Completeness

Market Completeness - A market is considered "complete" if any possible pattern of payoffs can be formed using the instruments available to be traded in the market.

Impact of Derivatives - A market that includes derivatives is more complete than one that does not because derivatives offer the flexibility to achieve more different types of payoff patterns.

Example - Derivatives can generate a payoff pattern that is positive in a price range of $99 to $100 and negative everywhere else, while stock and bond trading could not.

Introduction

LOS 1A f) Derivative Applications (Kolb pp. 5-7)

Major Applications of Derivatives

Market Completeness - The presence of derivatives allows market participants to create payoff patterns that wouldn't otherwise exist.

Speculation - Derivatives offer market players avenues for speculating on market conditions and for taking more risk.

Risk Management - Derivatives allow market players to hedge against the adverse impact of market conditions on their current or anticipated securities holdings.

Trading Efficiency - Derivatives can be used as a substitute for market positions that might otherwise be more costly or inconvenient to establish.

FUTURES MARKETS

Futures Markets

LOS 1B a) Speculators vs. Hedgers (Kolb p. 14)

Differences Between a Speculator and a Hedger

Speculator - A speculator engages in futures trading in pursuit of profit and is willing to accept additional risk exposure in the process.

Hedger - A hedger engages in futures trading in order to reduce an existing risk exposure. A hedger may have an existing risk exposure due to existing holdings or due to anticipated holdings.

Futures Markets

LOS 1B b) Volume vs. Open Interest (Kolb pp. 13, *44-47*)

	Futures Trading and Open Interest	
	Buy to Open	**Buy to Close**
Sell to Open	Increase Open Interest	Unchanged Open Interest
Sell to Close	Unchanged Open Interest	Decrease Open Interest

NOTE: ALL Trading Increases Volume!!

Futures Markets

LOS 1B c) Benefits of Standardization (Kolb p. 15)

Contract Standarization Promotes Market Liquidity

Standardization - All futures contracts are standardized as to type, quality, quantity, delivery date, and delivery terms.

Market Liquidity - Standardization of futures contract terms promote market liquidity because all market participants know exactly what they are getting and under what circumstances and are therefore more willing to trade the instrument, all other things equal.

Futures Markets

LOS 1B d) The Futures Clearinghouse (Kolb pp. 16-17)

The Role of the Futures Clearinghouse

Guarantor - The clearinghouse is a well-capitalized and creditworthy institution that backs the performance of every futures contract position created on an associated futures exchange.

Counterparty - The Clearinghouse becomes the counterparty to every open futures position on an associated futures exchange.

Anonymity - The existence of the Clearinghouse as counterparty to every futures position allows traders to trade relatively anonymously.

Supervises Margins - The Clearinghouse insures that margin is properly posted and maintained for every futures position to which it is a counterparty by demanding it from the clearing members.

Futures Markets

LOS 1B e) Margin Mechanics (Kolb pp. 17-18)

Margin and Daily Settlement

Initial Margin - An amount of money posted as collateral by both the long and short traders in a futures transaction. The initial margin:

- Can be posted as cash, securities, or a letter of credit.
- Returned if the traders complete all their obligations.
- Typically around 5% of the future's notional value.

Daily Settlement (aka Marking to Market) - The act of debiting or crediting the margin account of a futures trader due to the daily change in value of the futures position by the Clearinghouse.

Variation Margin - The actual dollar amount by which the Clearinghouse debits or credits the margin account of a futures trader during the act of Daily Settlement.

Futures Markets

LOS 1B e) Margin Mechanics (Kolb pp. 18-19)

Margin and Daily Settlement - cont'd

Maintenance Margin - The dollar level at which, if a margin account falls below, the futures trader must add additional margin to bring the margin account up to the level of the initial margin. Generally maintenance margin is about 75% of the initial margin.

Margin Call - The request from the Clearinghouse, usually transmitted by the broker to the futures trader, indicating that the maintenance margin level has been violated and that additional margin must be delivered to bring the account back to the initial margin level.

Futures Markets

LOS 1B f) The Dreaded Margin Call (Kolb pp. 18-19)

Example: Price Trigger for a Margin Call

Question: A trader takes a short position in a futures contract at a price of 75. The exchange requires initial margin of $5,000. The maintenance margin level for one contract is $3,000. A one point change in the futures contract earns/loses $1,000. *(a) At what price would the futures have to move to trigger a margin call? (b) What will be the daily variation margin if the futures contract falls to 72?*

Answer: (a) If the futures contract price rose beyond 77 the trader would incur more than $2,000 in losses, which would bring the margin account below $3,000. (b) If the futures price falls to 72 the trader will receive $3,000 in daily variation margin, bringing the value of the margin account up to $8,000.

Futures Markets

LOS 1B g) Reversing a Futures Position (Kolb pp. 20-22)

Methods for Closing an Open Futures Position

1. Delivery (aka Settlement) - If you maintain a futures contract position through to the settlement date you will have to make or take delivery of a physical commodity or cash equivalent.

2. Offset (aka Reversing Trade) - If you enter an opposing position to one you already have (i.e., a short against a long or a long against a short) the futures contract disappears and you have no further obligation.

3. Exchange-for-Physicals (aka "EFP") - An off-pit trade in which a futures trader exchanges the futures position for a position in the underlying asset with someone else who takes the futures position.

Futures Markets

LOS 1B h) Types of Futures Contracts (Kolb pp. 23-25)

The Four Types of Futures Contracts

1. Agricultural/Metallurgical - Underlying deliverable asset is grain, livestock, forest product, textile, foodstuff, or petroleum

2. Interest Earning Asset - Underlying asset is financial bond, note, bill, or time deposit. May be cash settled or deliverable.

3. Foreign Currency - Underlying deliverable asset is a fixed amount of a foreign currency.

4. Indexes - Underlying asset is a defined index, usually a stock indexes like the S&P 500. Contracts are always cash-settled.

Futures Markets

LOS 1B i) Justification for Futures (Kolb pp. 25-28)

Purposes of the Futures Markets

Price Discovery - Market participants can use the prices that are determined in the futures markets to form estimates of what the broad market believes the price of the underlying commodity will be in the future. The futures market does not predict the future perfectly, however.

Hedging - Market participants can use futures contracts as a substitute for the underlying asset, and they can take partially or fully offsetting positions in the futures market. These offsetting positions can reduce the risk position of the hedger.

THE OPTIONS MARKETS

Options Markets

LOS 1C a) Rights vs. Obligations (Kolb p. 281, 3-4)

	Basic Option Mechanics	
	Buyer has the:	**Seller has the:**
Call Option	**RIGHT to Buy the Asset**	**OBLIGATION to Sell the Asset**
Put Option	**RIGHT to Sell the Asset**	**OBLIGATION to Buy the Asset**

NOTE: Futures only have Obligations, Options have Rights and Obligations!!

Options Markets

LOS 1C b) Definition of Option Terms (Kolb p. 282)

Important Features of Options

Exercise Price (X) - The price at which the option buyer can force the option seller to transact. aka the "strike" price

Option Premium (c or p) - The price the option buyer pays, and the option seller receives, for the option contract.

Time to Expiration (t) - The period of time over which the option buyer has the right to compel the option seller to transact.

Underlying Asset (S) - The asset that the option buyer and seller agree is the asset they will trade and/or track in value.

Options Markets

LOS 1C b) Moneyness (Kolb pp. 282-283)

"Moneyness" of Options

	Deep In The Money	In the Money	At the Money	Out of the Money	Deep Out of the Money
Call Option	S >> X	S > X	S = X	S < X	S << X
Put Option	S << X	S < X	S = X	S > X	S >> X

Options Markets

LOS 1C b) Calculate Moneyness (Kolb pp. 282-283)

Putting a Dollar Value on ITM and OTM

	If S > X	If X > S
Call Option	(S - X) ITM	(X - S) OTM
Put Option	(X - S) OTM	(S - X) ITM

ITM vs. OTM: An Example

The S&P 500 Index is currently at 1400. If both a call and a put have a strike price of 1500, how much ITM or OTM are they?

Answer: (based on S = 1400, X = 1500):

The call option is 100 points Out-of-The-Money (OTM)

The put option is 100 points In-The-Money (ITM)

Options Markets

LOS 1C c) American vs. European (Kolb p. 283)

Differences Between European and American Options

European Options - The owner of a European option can only exercise the option on the last day (expiration day) of the option contract. Similarly, the writer of a European option is only obligated to meet the terms of an option if it is exercised on expiration day.

American Options - The owner of an American option can exercise the option during trading hours on any day from the time he buys the option through the end of business on the expiration day. Similarly, the writer of an American option is obligated to meet the terms of the option at any point that the owner chooses to exercise it.

Options Markets

LOS 1C d) American vs. European (Kolb p. 283)

Issues to Remember about European vs. American

1. ***Geography*** **-** *The name "European" or "American" has nothing to do with where an option is traded or recorded.*

2. ***Popularity*** **-** *Most options traded on exchanges are American style.*

3. **Value -** All other things the same, an American option can never be worth less than a European option, although they can often be worth more. This is because you can do all the same things with an American option than you can with a European option, plus you have more rights.

4. ***Analytical Tractability*** **-** *It is much easier to build models and do analysis on European options than on American options.*

Options Markets

LOS 1C e) Option Orders (Kolb p. 295)

	Options Trading and Open Interest	
	Buy to Open	**Buy to Close**
Sell to Open	Increase Open Interest	Unchanged Open Interest
Sell to Close	Unchanged Open Interest	Decrease Open Interest

An order that closes out an options position (either a Buy-to-Close or a Sell-to-Close) is called an Offsetting Order.

Options Markets

LOS 1C f) Options Clearinghouse (Kolb p. 295-296)

The Role of the Options Clearinghouse

Matching - The options clearinghouse checks to make sure that every pit purchase of an option coincides with a similar sale of an option.

Clearing - The options clearinghouse processes all receipts and payments of option premia amongst trading parties.

Assigning - In the event that an options owner wants to exercise an option, the clearinghouse randomly assigns the exercise obligation to someone who currently has a short position in the same option.

Guaranteeing - In the event that an option trader refuses to pay for an option or make delivery on an exercise, the options clearinghouse guarantees payment and/or delivery (i.e., they counterparty every trade).

Options Markets

LOS 1C g) Option Margin (Kolb p. 296-298)

Margin Rules for Options

1. For Long Positions - All option purchases must be paid in full at the time of purchase. No one can buy an option on credit (margin). Also, there is no further downside risk for an option buyer. As a result there is no margin requested or required on long option positions.

2. For Short Positions - The option seller faces substantial downside risk. The clearinghouse generally requires margin, although the rules vary widely. The clearinghouse is fully protected when:

(a) For Calls - the option writer maintains margin equal to the current market value of the underlying position, or allows the clearinghouse to hold the underlying security itself if the option trader owns it.

(b) For Puts - the option writer maintains margin equal to the strike value of the underlying position.

OPTION PAYOFFS AND OPTION STRATEGIES

Option Payoffs

LOS 1D a) Calculate Intrinsic Value (Kolb pp. 308-316)

Intrinsic Value

The gross value of an option (i.e., not considering its purchase price) if it were to be exercised immediately. An option has intrinsic value if it is in-the-money (ITM), and has no intrinsic value if it is out-of-the-money (OTM).

Intrinsic Value (Expiration Day Value) Formulas

CALL: $C_t = MAX\{0, S_t - X\}$

PUT: $P_t = MAX\{0, X - S_t\}$

Option Payoffs

LOS 1D b) Calculate Expiration Value (Kolb pp. 308-316)

Intrinsic (Expiration Day)Value Examples

1. A Call option has a strike price of $105 and the underlying asset is selling for $115. What is the call's intrinsic value?

$$C_T = MAX\{0, \$115 - \$105\} = MAX\{0, \$10\} = \$10$$

2. A Put option is selling for $7, has three months to maturity, has a strike price of $15, and the underlying asset is selling for $25. What is the put's intrinsic value?

$$P_T = MAX\{0, \$15 - \$25\} = MAX\{0, -\$10\} = \$0$$

Option Payoffs

LOS 1D c) Long vs Short Options (Kolb pp. 3-4, 310, 314)

<u>Differences Between an Option Buyer vs. Writer</u>

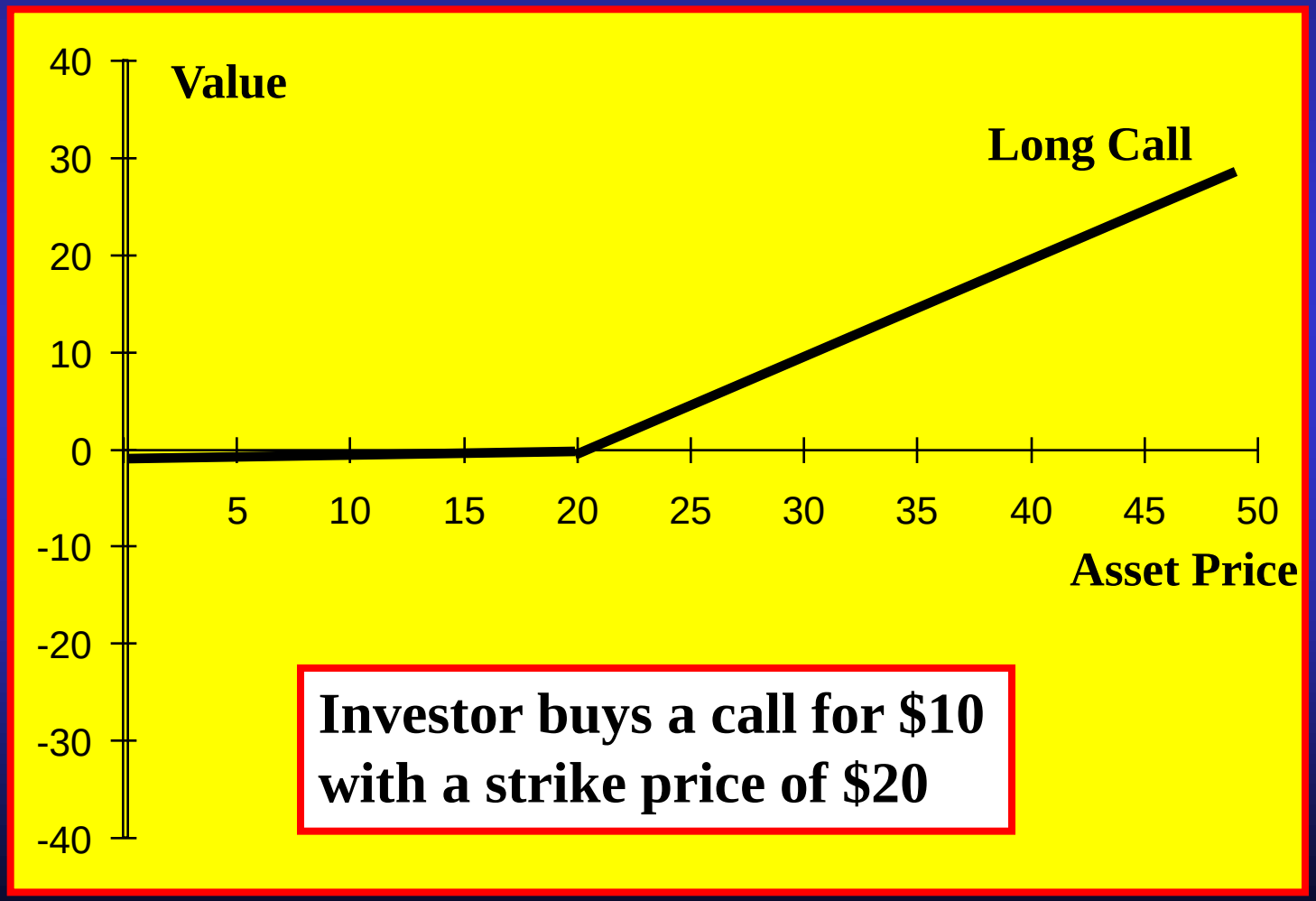
Option Buyer (Long Position) - An option buyer, either of a call or put, gets to exercise the option contract's terms against the writer whenever those rights are available under the contract.

Option Writer/Seller (Short Position) - An option writer, either of a call or put, has the obligation to comply with the exercise of the option contract whenever they have been exercised by the buyer

Note: This question has the same answer as Learning Outcome Statements 1A d) and 1C a).

Option Payoffs - Long Call

LOS 1D d) Long Call Expiry Graph (Kolb pp. 308-310)



Option Payoffs - Long Call

LOS 1D e) Long Call Expiry Value (Kolb pp. 308-310)

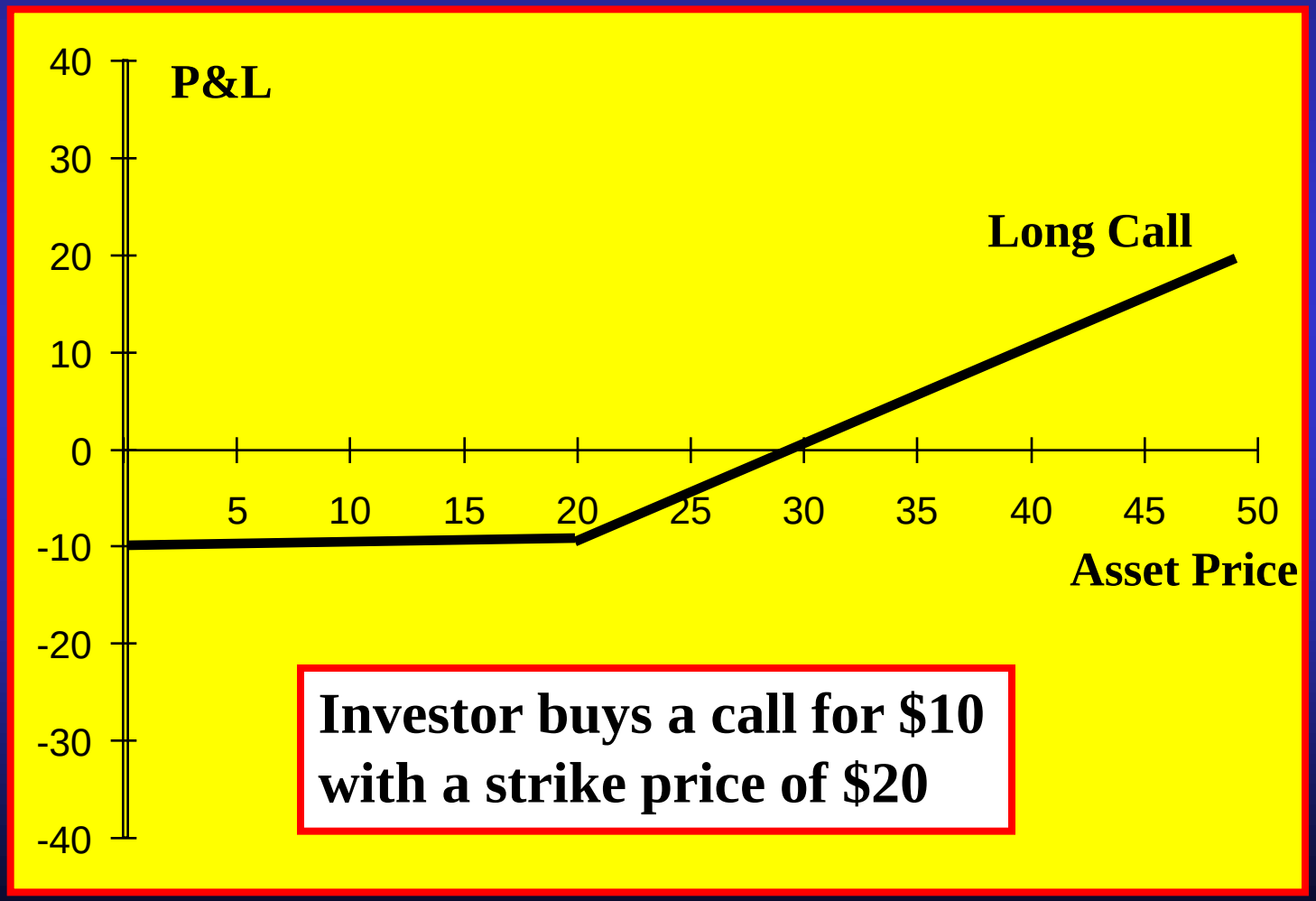
Expiration Value of a Long Call

Question: A stock currently trades at $32. You buy a call option for this stock that has 3 months to expiration, a strike price of $20, and costs $10. What will the expiration value of the call option be if the stock is selling at the following prices on expiration day?:

Stock	Strike		Call
$10	$20	C_T = Max{$0, $10 - $20} =	$0
$15	$20	C_T = Max{$0, $15 - $20} =	$0
$20	$20	C_T = Max{$0, $20 - $20} =	$0
$25	$20	C_T = Max{$0, $25 - $20} =	$5
$30	$20	C_T = Max{$0, $30 - $20} =	$10
$35	$20	C_T = Max{$0, $35 - $20} =	$15
$40	$20	C_T = Max{$0, $40 - $20} =	$20

Option Payoffs - Long Call

LOS 1D f) Long Call P&L Graph (Kolb pp. 310-312)



Option Payoffs - Long Call

LOS 1D g) Long Call Expiry P&L (Kolb pp. 310-312)

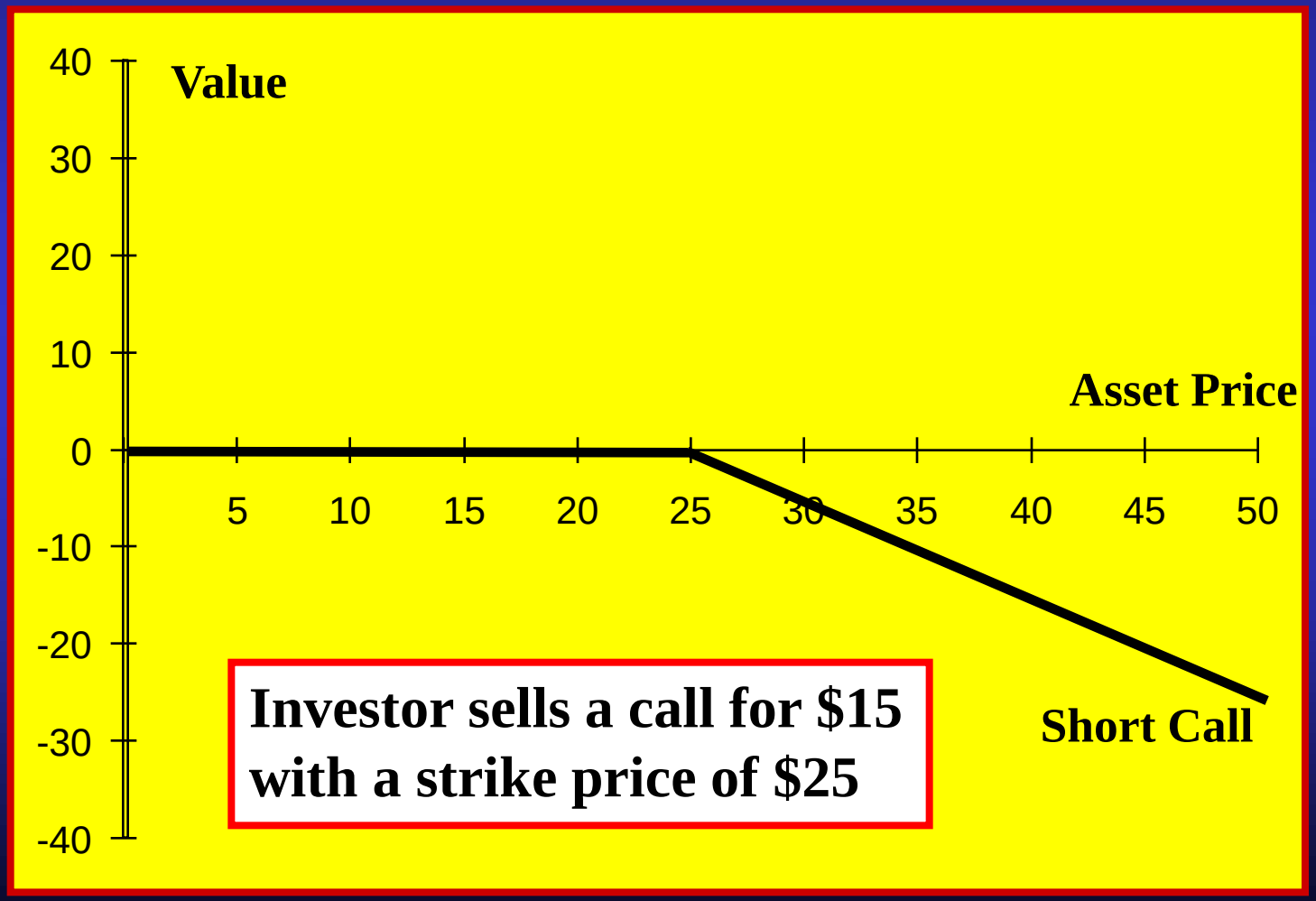
Expiration P&L of A Long Call

Question: A stock currently trades at $32. You buy a call option for this stock that has 3 months to expiration, a strike price of $20, and costs $10. What will the expiration P&L of the call option be if the stock is selling at the following prices on expiration day?:

Stock	Strike		P&L
$10	$20	$P\&L_T = Max\{\$0, \$10 - \$20\} - \$10 = -\$10$	
$15	$20	$P\&L_T = Max\{\$0, \$15 - \$20\} - \$10 = -\$10$	
$20	$20	$P\&L_T = Max\{\$0, \$20 - \$20\} - \$10 = -\$10$	
$25	$20	$P\&L_T = Max\{\$0, \$25 - \$20\} - \$10 = -\$5$	
$30	$20	$P\&L_T = Max\{\$0, \$30 - \$20\} - \$10 = \$0$	
$35	$20	$P\&L_T = Max\{\$0, \$35 - \$20\} - \$10 = \$5$	
$40	$20	$P\&L_T = Max\{\$0, \$40 - \$20\} - \$10 = \$10$	

Option Payoffs - Short Call

LOS 1D d) Short Call Expiry Graph (Kolb pp. 308-310)



Option Payoffs - Short Call

LOS 1D e) Short Call Expiry Value (Kolb pp. 308-310)

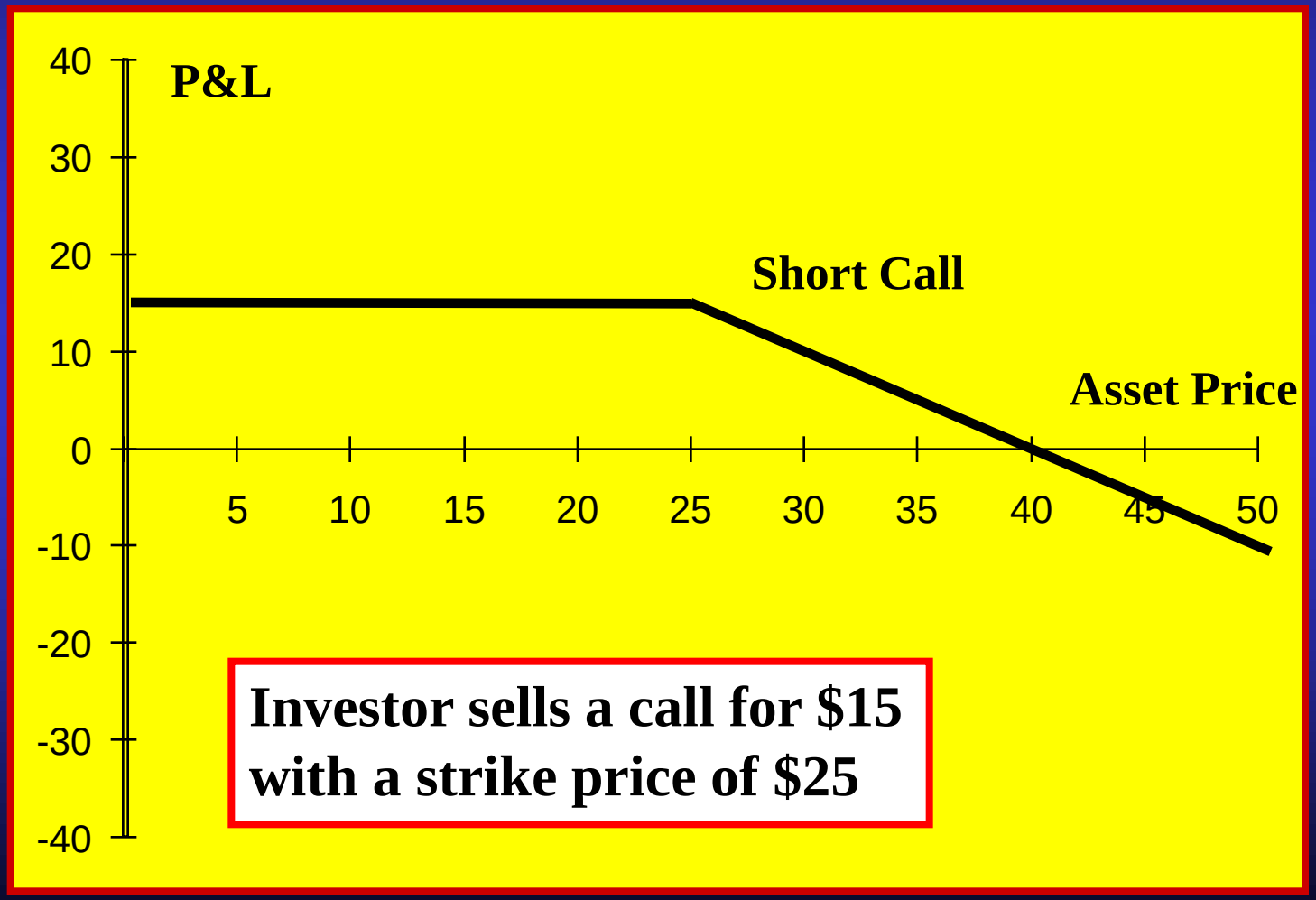
Expiration Value of A Short Call

Question: A stock currently trades at $32. You sell a call option for this stock that has 3 months to expiration, a strike price of $25, and costs $15. What will the expiration value of the call option be if the stock is selling at the following prices on expiration day?:

Stock	Strike		Call
$15	$25	$-C_T = -Max\{\$0, \$15 - \$25\} =$	$0
$20	$25	$-C_T = -Max\{\$0, \$20 - \$25\} =$	$0
$25	$25	$-C_T = -Max\{\$0, \$25 - \$25\} =$	$0
$30	$25	$-C_T = -Max\{\$0, \$30 - \$25\} =$	-$5
$35	$25	$-C_T = -Max\{\$0, \$35 - \$25\} =$	-$10
$40	$25	$-C_T = -Max\{\$0, \$40 - \$25\} =$	-$15
$50	$25	$-C_T = -Max\{\$0, \$50 - \$25\} =$	-$25

Option Payoffs - Short Call

LOS 1D f) Short Call P&L Graph (Kolb pp. 310-312)



Option Payoffs - Short Call

LOS 1D g) Short Call Expiry P&L (Kolb pp. 310-312)

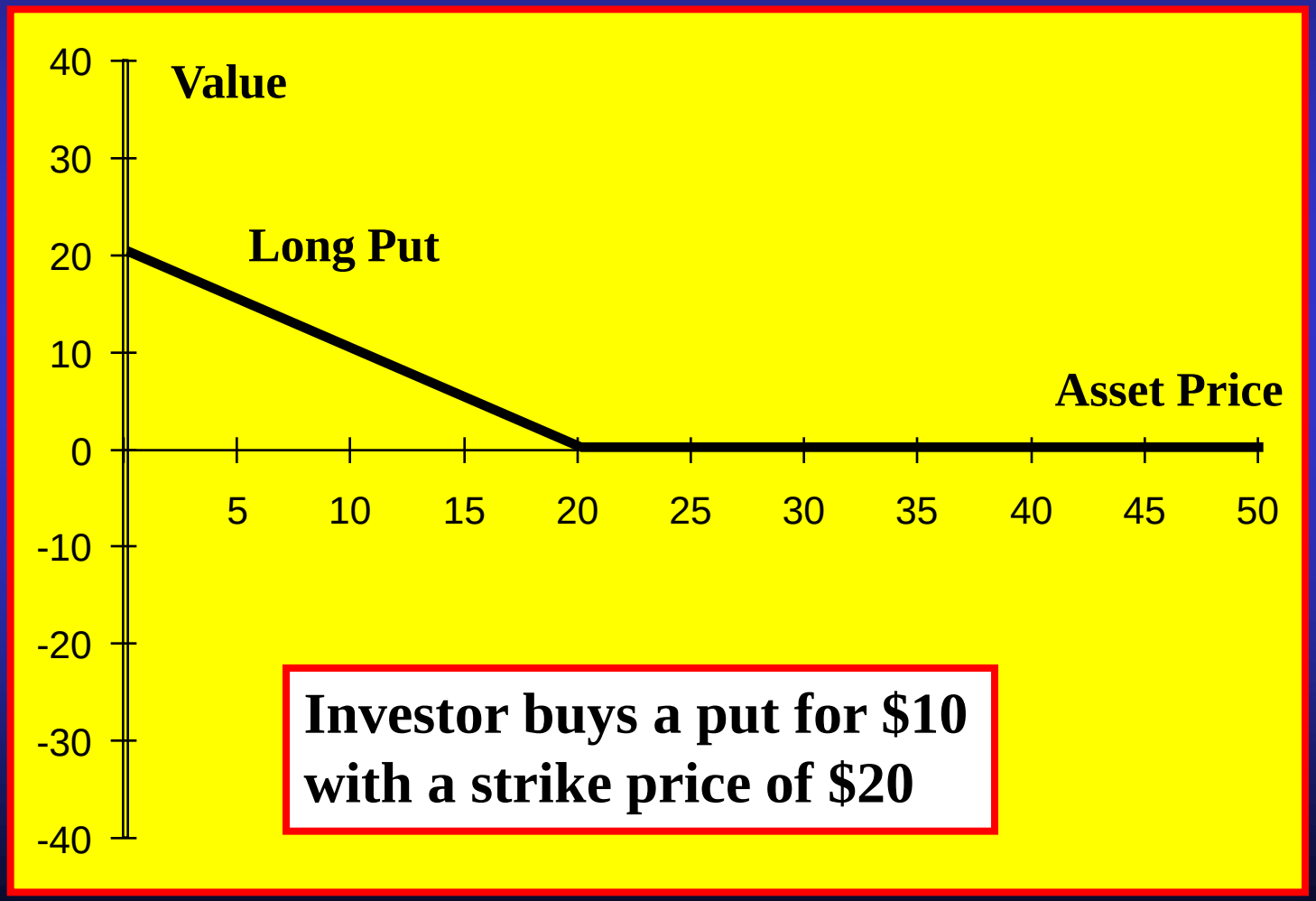
Expiration P&L of A Short Call

Question: A stock currently trades at $32. You sell a call option for this stock that has 3 months to expiration, a strike price of $25, and costs $15. What will the expiration P&L of the call option be if the stock is selling at the following prices on expiration day?:

Stock	Strike	P&L
$15	$25	$P\&L_T$ = -Max{$0, $15 - $25} + $15 = $15
$20	$25	$P\&L_T$ = -Max{$0, $20 - $25} + $15 = $15
$25	$25	$P\&L_T$ = -Max{$0, $25 - $25} + $15 = $15
$30	$25	$P\&L_T$ = -Max{$0, $30 - $25} + $15 = $10
$35	$25	$P\&L_T$ = -Max{$0, $35 - $25} + $15 = $5
$40	$25	$P\&L_T$ = -Max{$0, $40 - $25} + $15 = $0
$50	$25	$P\&L_T$ = -Max{$0, $50 - $25} + $15 = -$10

Option Payoffs - Long Put

LOS 1D d) Long Put Expiry Graph (Kolb pp. 313-314)



Option Payoffs - Long Put

LOS 1D e) Long Put Expiry Value (Kolb pp. 313-314)

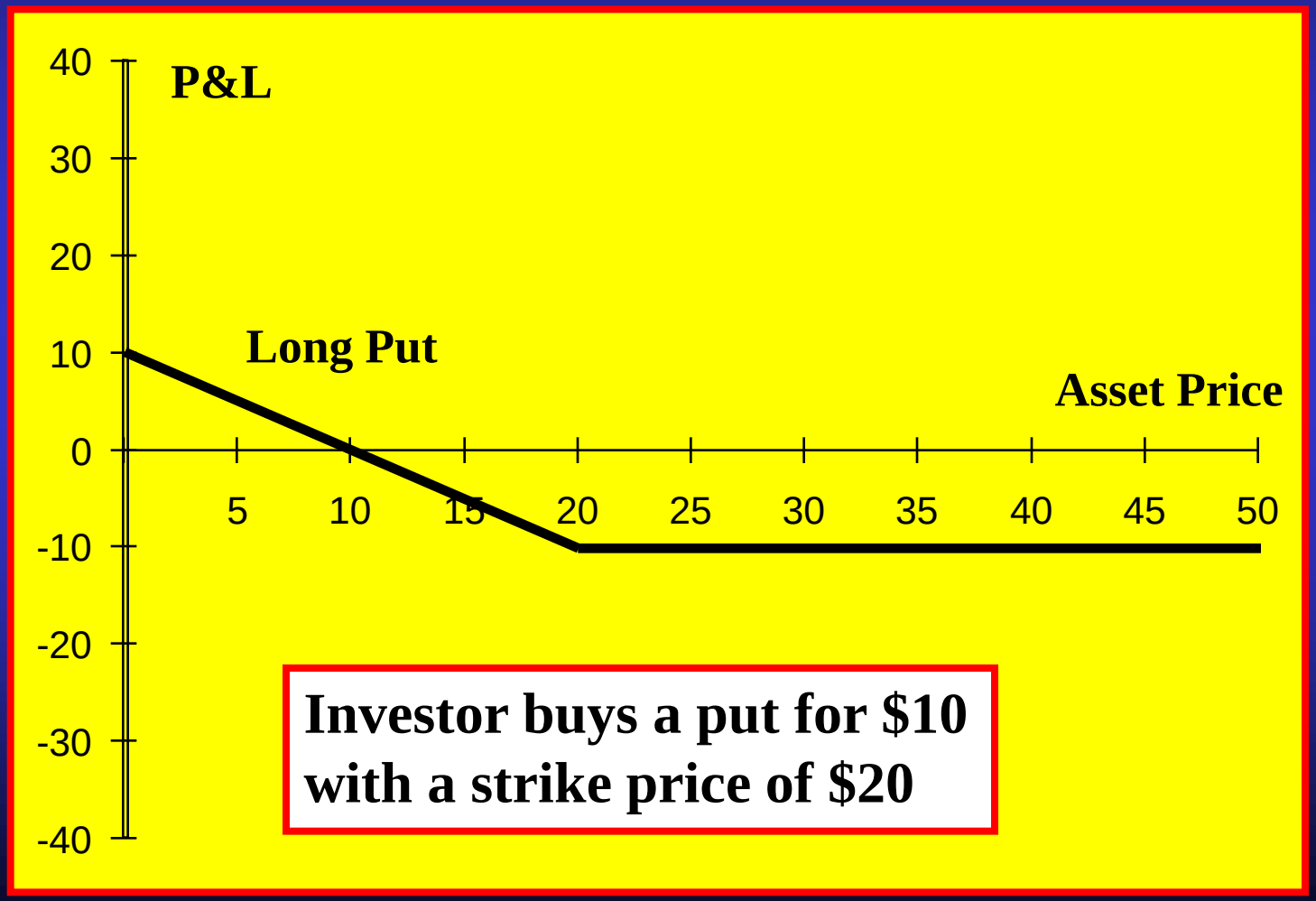
Expiration Value of A Long Put

Question: A stock currently trades at $12. You buy a put option for this stock that has 3 months to expiration, a strike price of $20, and costs $10. What will the expiration value of the call option be if the stock is selling at the following prices on expiration day?:

Stock	Strike		Put
$5	$20	P_T = Max{$0, $20 - $5} =	$15
$10	$20	P_T = Max{$0, $20 - $10} =	$10
$15	$20	P_T = Max{$0, $20 - $15} =	$5
$20	$20	P_T = Max{$0, $20 - $20} =	$0
$25	$20	P_T = Max{$0, $20 - $25} =	$0
$30	$20	P_T = Max{$0, $20 - $30} =	$0
$35	$20	P_T = Max{$0, $20 - $35} =	$0

Option Payoffs - Long Put

LOS 1D f) Long Put P&L Graph (Kolb pp. 314-316)



Option Payoffs - Long Put

LOS 1D g) Long Put Expiry P&L (Kolb pp. 314-316)

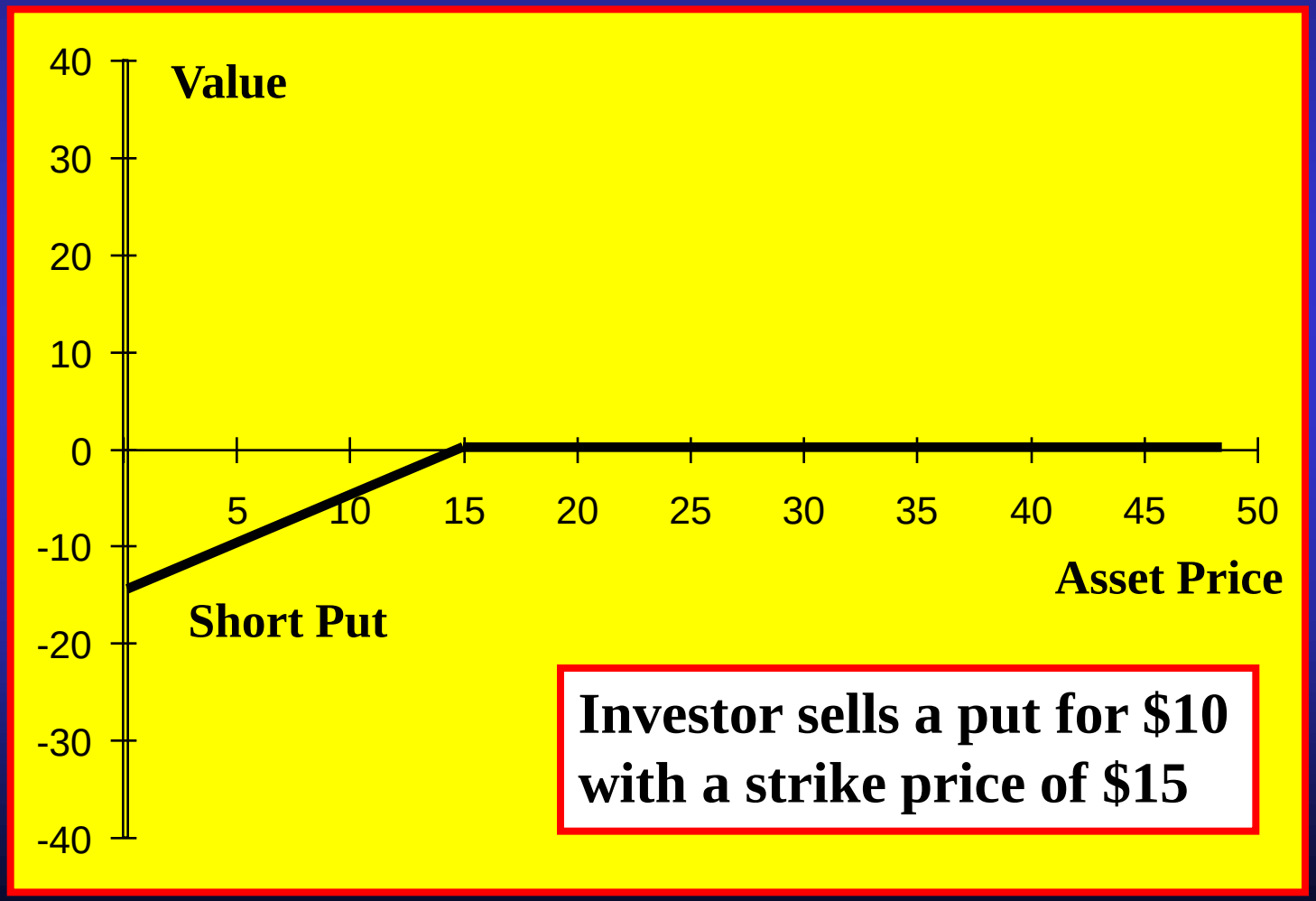
Expiration P&L of A Long Put

Question: A stock currently trades at $12. You buy a put option for this stock that has 3 months to expiration, a strike price of $20, and costs $10. What will the expiration P&L of the put option be if the stock is selling at the following prices on expiration day?:

Stock	Strike		P&L
$5	$20	$P\&L_T = Max\{\$0, \$20 - \$5\} - \$10 = \$5$	
$10	$20	$P\&L_T = Max\{\$0, \$20 - \$10\} - \$10 = \$0$	
$15	$20	$P\&L_T = Max\{\$0, \$20 - \$15\} - \$10 = -\$5$	
$20	$20	$P\&L_T = Max\{\$0, \$20 - \$20\} - \$10 = -\$10$	
$25	$20	$P\&L_T = Max\{\$0, \$20 - \$25\} - \$10 = -\$10$	
$30	$20	$P\&L_T = Max\{\$0, \$20 - \$30\} - \$10 = -\$10$	
$35	$20	$P\&L_T = Max\{\$0, \$20 - \$35\} - \$10 = -\$10$	

Option Payoffs - Short Put

LOS 1D d) Short Put Expiry Graph (Kolb pp. 313-314)



Option Payoffs - Short Put

LOS 1D e) Short Put Expiry Value (Kolb pp. 313-314)

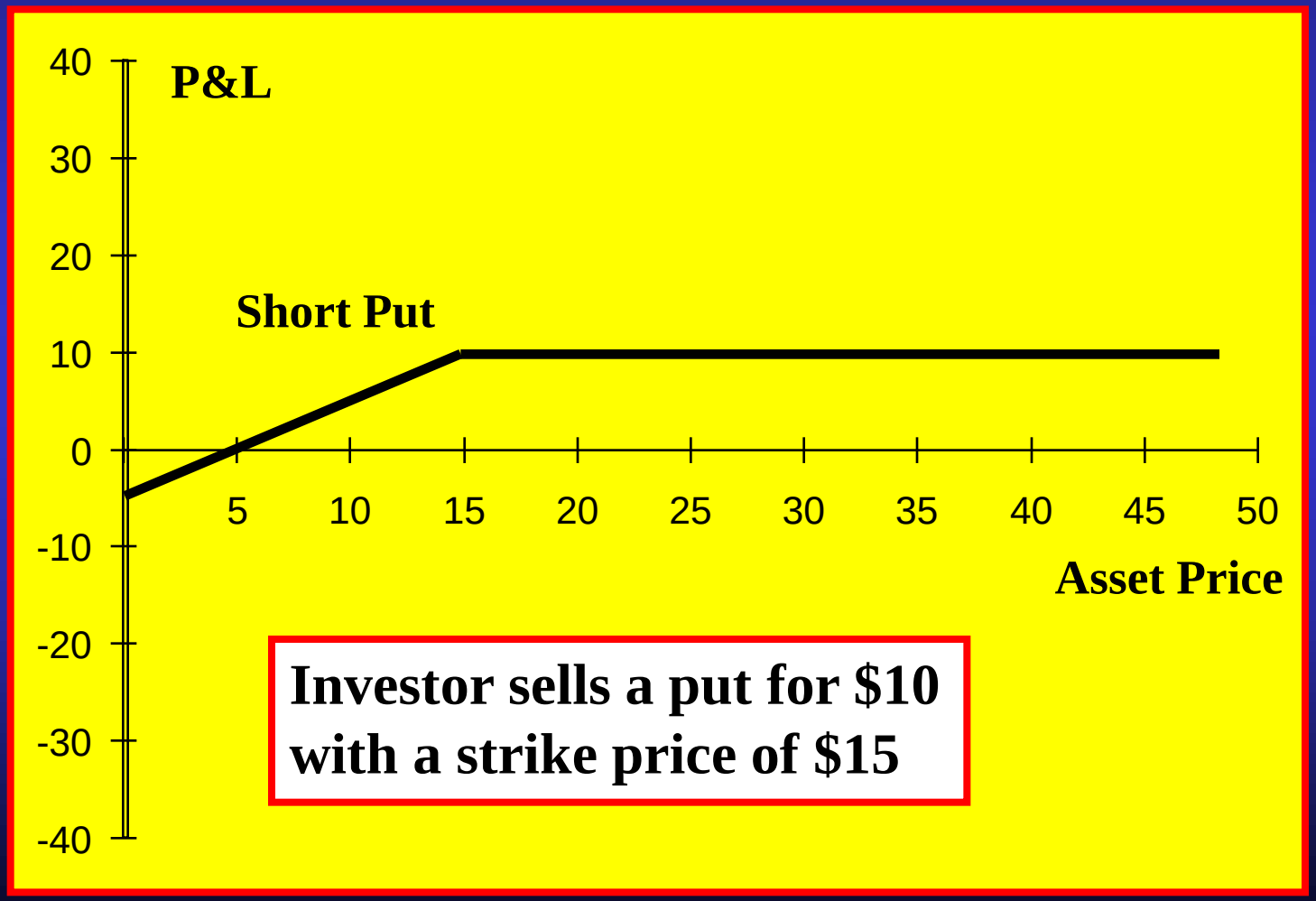
Expiration Value of A Short Put

Question: A stock currently trades at $6. You sell a put option for this stock that has 3 months to expiration, a strike price of $15, and costs $10. What will the expiration value of the put option be if the stock is selling at the following prices on expiration day?:

Stock	Strike		Put
$3	$15	$-P_T = -Max\{\$0, \$15 - \$3\} =$	-$12
$5	$15	$-P_T = -Max\{\$0, \$15 - \$5\} =$	-$10
$7	$15	$-P_T = -Max\{\$0, \$15 - \$7\} =$	-$8
$10	$15	$-P_T = -Max\{\$0, \$15 - \$10\} =$	-$5
$15	$15	$-P_T = -Max\{\$0, \$15 - \$15\} =$	$0
$20	$15	$-P_T = -Max\{\$0, \$15 - \$20\} =$	$0

Option Payoffs - Short Put

LOS 1D f) Short Put P&L Graph (Kolb pp. 314-316)



Option Payoffs - Short Put

LOS 1D g) Short Put Expiry P&L (Kolb pp. 314-316)

Expiration P&L of A Short Put

Question: A stock currently trades at $6. You sell a put option for this stock that has 3 months to expiration, a strike price of $15, and costs $10. What will the expiration P&L of the put option be if the stock is selling at the following prices on expiration day?:

Stock	Strike		P&L
$3	$15	$P\&L_T$ = -Max{$0, $15 - $3} + $10 =	-$2
$5	$15	$P\&L_T$ = -Max{$0, $15 - $5} + $10 =	$0
$7	$15	$P\&L_T$ = -Max{$0, $15 - $7} + $10 =	$2
$10	$15	$P\&L_T$ = -Max{$0, $15 - $10} + $10 =	$5
$15	$15	$P\&L_T$ = -Max{$0, $15 - $15} + $10 =	$10
$20	$15	$P\&L_T$ = -Max{$0, $15 - $20} + $10 =	$10

Option Payoffs

LOS 1D h) Zero-Sum Games (Kolb p. 312)

Options as a Zero-Sum Game

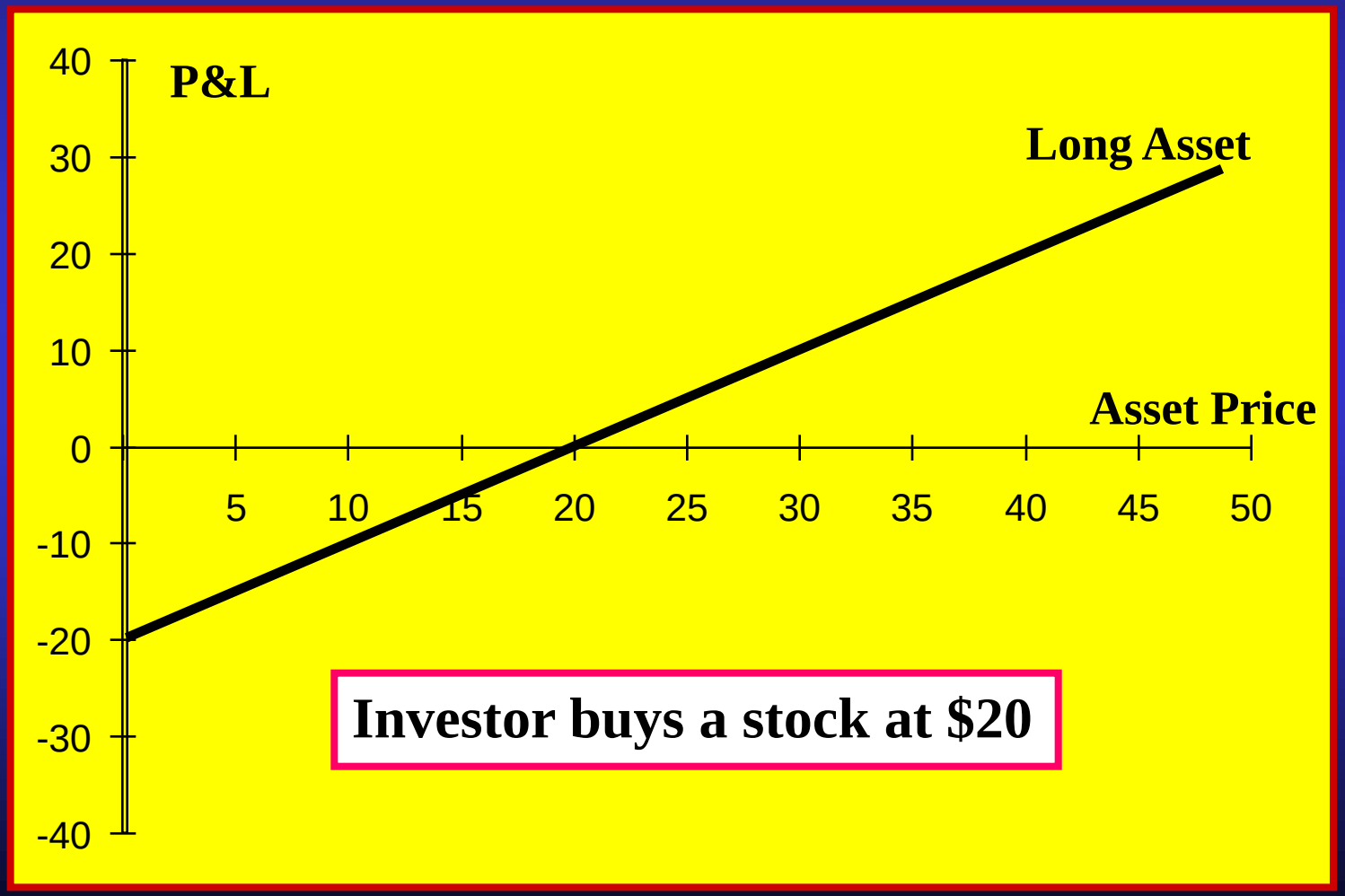
Zero Sum Game - A zero-sum game is a game in which in order for one player to win a given amount another player must lose that same amount.

Options are a zero-sum game, because all the profits that accrue to one party must come from the pocket of another party.

Example - if the price of an asset rises and the holder of a long call profits $1,000, the holder of a short call is the source of that $1,000 and must be the offsetting loser.

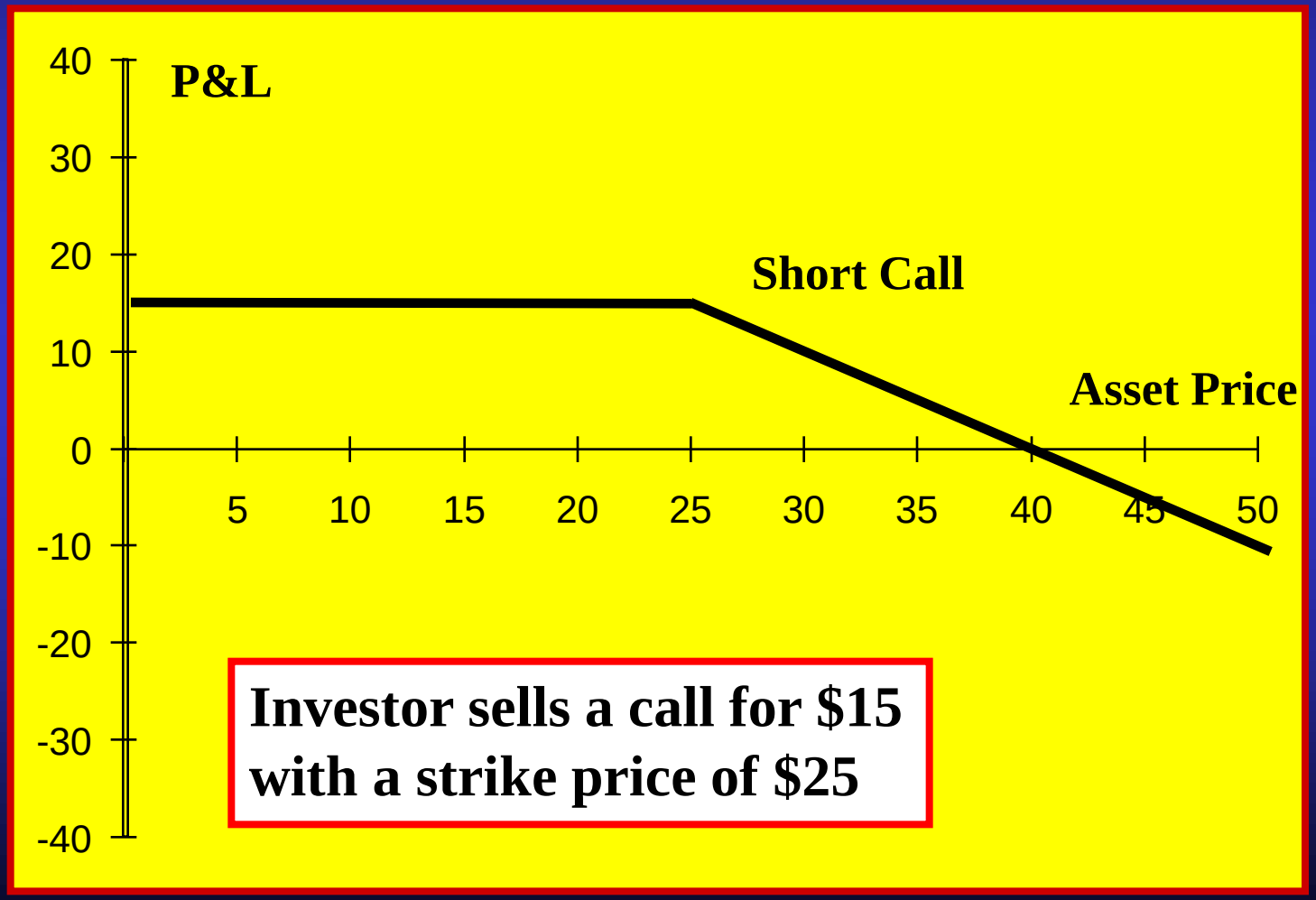
Option Strategies

LOS 1D i) Covered Calls (Kolb p. 336)



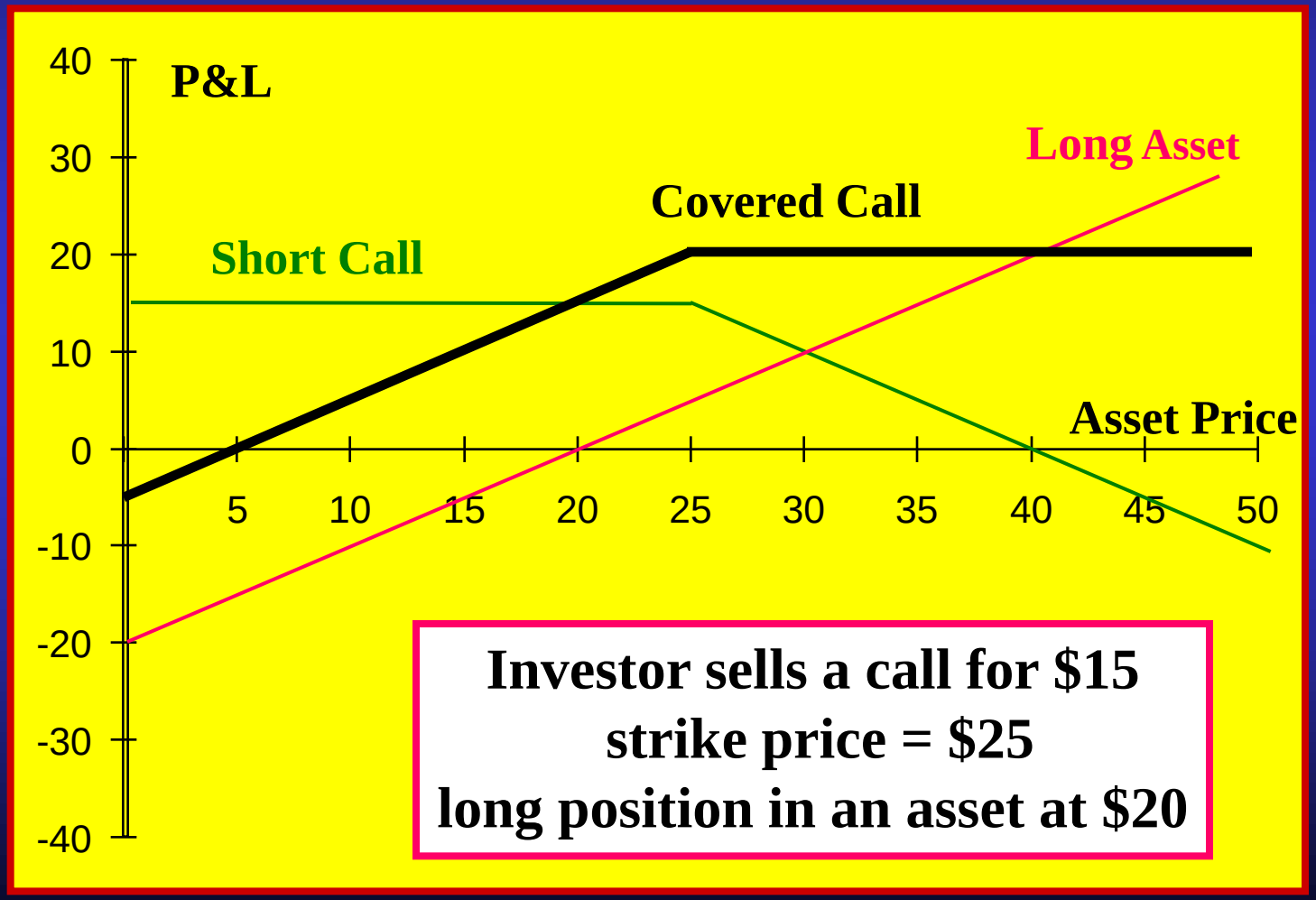
Option Strategies

LOS 1D i) Covered Calls (Kolb p. 336)



Option Strategies

LOS 1D i) Covered Calls (Kolb p. 336)



Option Strategies

LOS 1D i) Covered Calls (Kolb p. 336)

Covered Call Comments

Why is it used?

- To provide income enhancement
- To provide risk reduction

When does it work, when does it fail?

- Works when the asset does not rise to a level in excess of the sum of the strike price plus the call option premium
- Fails when the asset rises to a level in excess of the sum of the strike price plus the call option premium

Option Payoffs

LOS 1D j) Covered Call Example (Kolb p. 336)

Covered Call Example

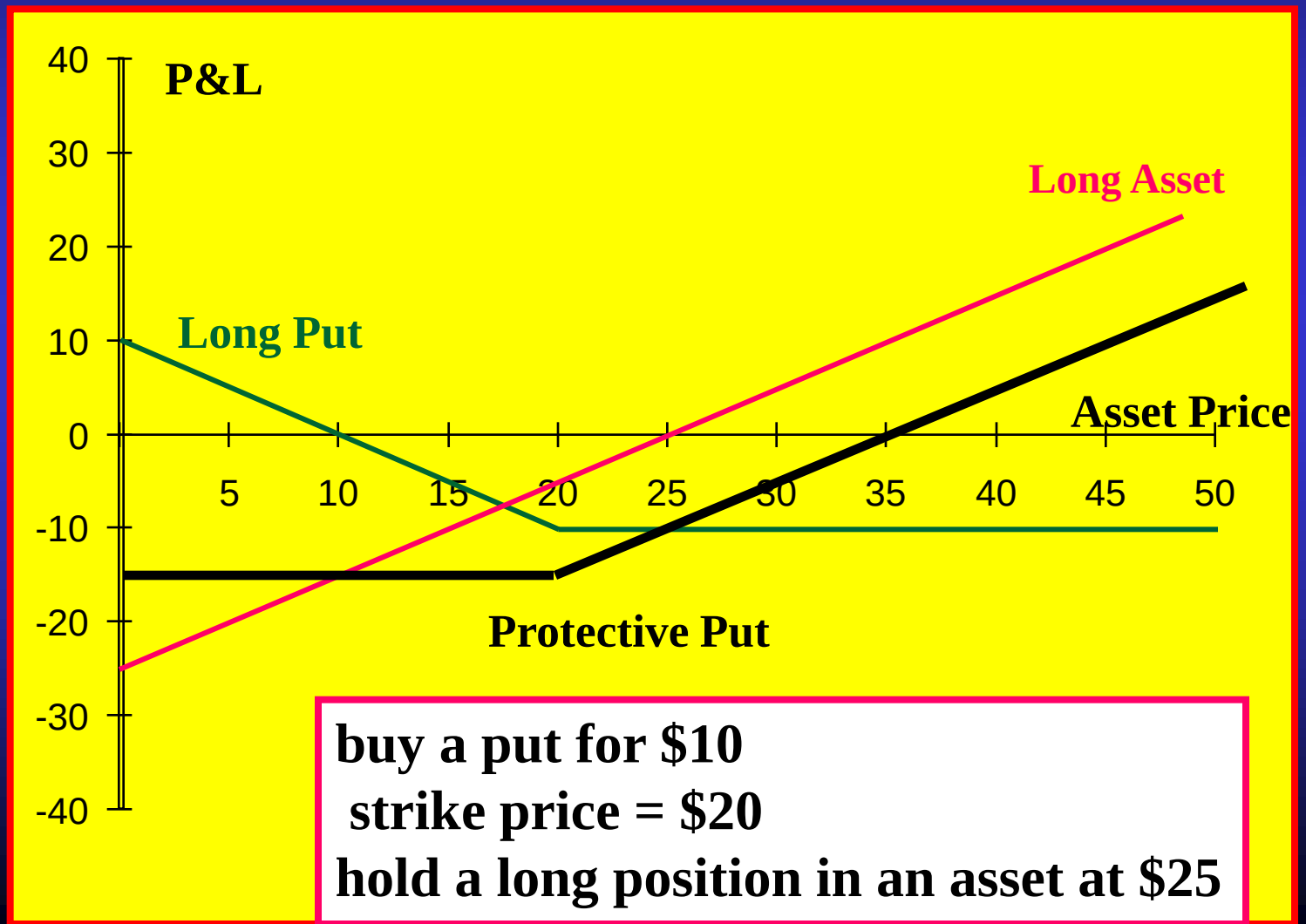
Question: You buy a stock at $125 and sell a 3 month call against it with a strike price of $150. You receive $20 in premium for the call. What is your profit or loss if you unwind the covered call in 3 months if the stock is trading at $75, $100, $125, $150, $175?

Answer:

Price	Stock	Premium	Call	P&L
$75	-$50	+$20	$0	-$30
$100	-$25	+$20	$0	-$5
$125	$0	+$20	$0	+$20
$150	+$25	+$20	$0	+$45
$175	+$50	+$20	-$25	+$45

Option Strategies

LOS 1D k) Portfolio Insurance (Kolb p. 337)



buy a put for $10
strike price = $20
hold a long position in an asset at $25

Option Strategies

LOS 1D k) Portfolio Insurance (Kolb p. 337)

Portfolio Insurance (Protective Put)

Why is it used?

- To provide a floor below which the asset value won't fall
- To provide risk reduction to an overall portfolio

When does it work, when does it fail?

- Works when the asset falls to a level lower than the strike price less the put option premium
- Fails when the asset price stays about the strike price less the put option premium

Option Payoffs

LOS 1D l) Portfolio Hedging Example (Kolb p. 337)

Portfolio Insurance Example

Question: You buy a stock at $50 and buy a 1 year put for it with a strike price of $47. The put cost you $4 in premium. What is your profit or loss if you unwind the whole position in 1 year if the stock is trading at $40, $45, $47, $50, $60?

Answer:

Price	Stock	Premium	Put	P&L
$40	-$10	-$4	+$7	-$7
$45	-$5	-$4	+$2	-$7
$47	-$3	-$4	$0	-$7
$50	$0	-$4	$0	-$4
$60	+$10	-$4	$0	+$6

Option Strategies

LOS 1D m) Determining Exercise Price (Kolb p. ????)

Backing out the Exercise Price for a Long Call

Question: Three months ago you paid $15 to buy a call option on a stock. It is now expiration day. The stock is selling for $125. You have calculated your P&L on your long call, and it is zero. What was the strike price of the option you bought?

Answer:

Using the formula $P\&L_T = Max\{\$0, S_T - X\} - C_t$ we can substitute in for the values given and solve for X, the exercise price:

$$\$0 = Max\{\$0, \$125 - X\} - \$15$$

which implies that X = $110

Option Strategies

LOS 1D n) Determining Exercise Price (Kolb p. ????)

Determine the Exercise Price for Either a Covered Call or Portfolio Insurance

The LOS wants you to be able to solve for the exercise price in either a covered call or a portfolio insurance problem where you are given the price of the stock currently and at expiration, as well as the original price of the option.

ANSWER:

There is no feasible solution to this type of problem. Unless I am mistaking the LOS, this LOS can't be solved, either for a covered call or for portfolio insurance. No example can be created where, at the breakeven point, there isn't otherwise an infinite number of strike prices for the associated options.

Option Strategies

LOS 1D o) Hedging & Risk/Return (Kolb pp. 338-341)

Impact of Portfolio Insurance on Return & Risk

Assume a stock (or portfolio) has a given return and risk profile when it is uninsured. Insuring that portfolio with protective puts has the following effects on return and risk:

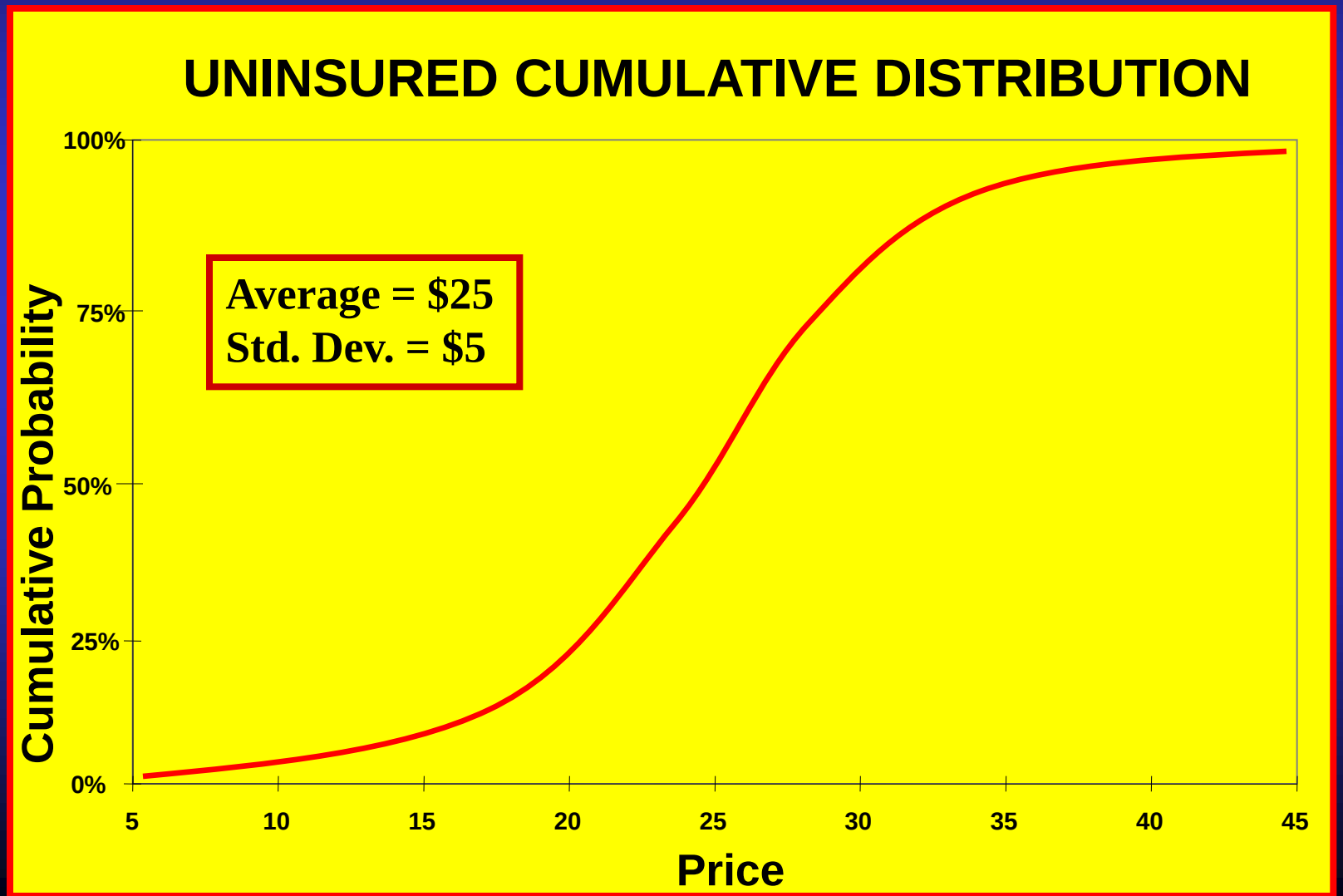
(1) Lower chance of large gains

(2) Zero chance of large losses

(3) Higher chance of returns ranging between medium loss and medium gain.

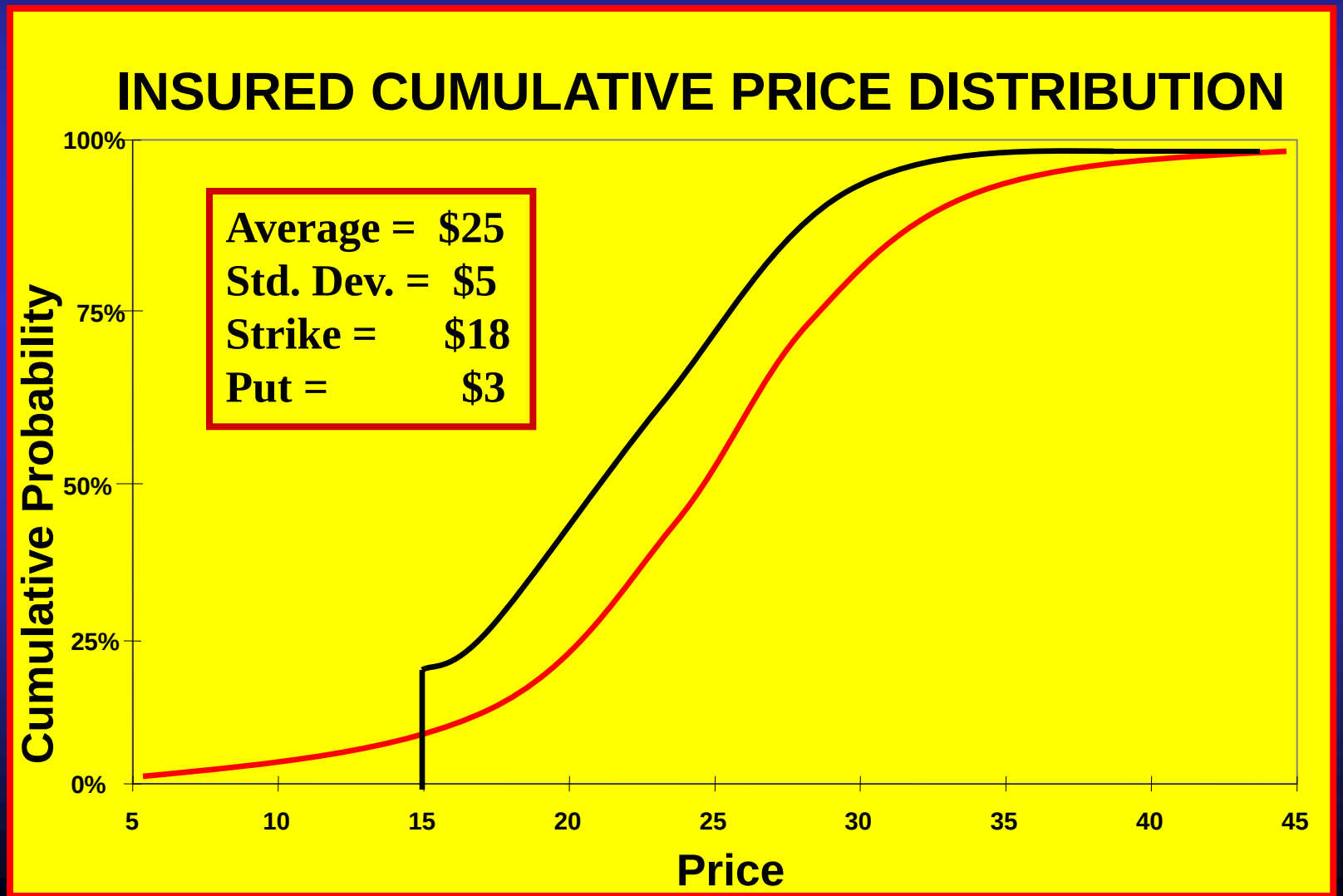
Option Strategies

LOS 1D p) Uninsured Distributions (Kolb pp. 338-341)



Option Strategies

LOS 1D p) Insured Distributions (Kolb pp. 338-341)



THE SWAPS MARKET: INTRODUCTION

The Swaps Market

LOS 1E a) Definitions (Kolb pp. 608-611)

Common Terms Used in Swap Contracts

1) Type of Contract *- Interest rate swap or currency swap*

2) Notional Principal - The reference amount that scales the swap. The amount to which all interest rates are applied.

3) Counterparties - The parties that agree to the terms of the swap.

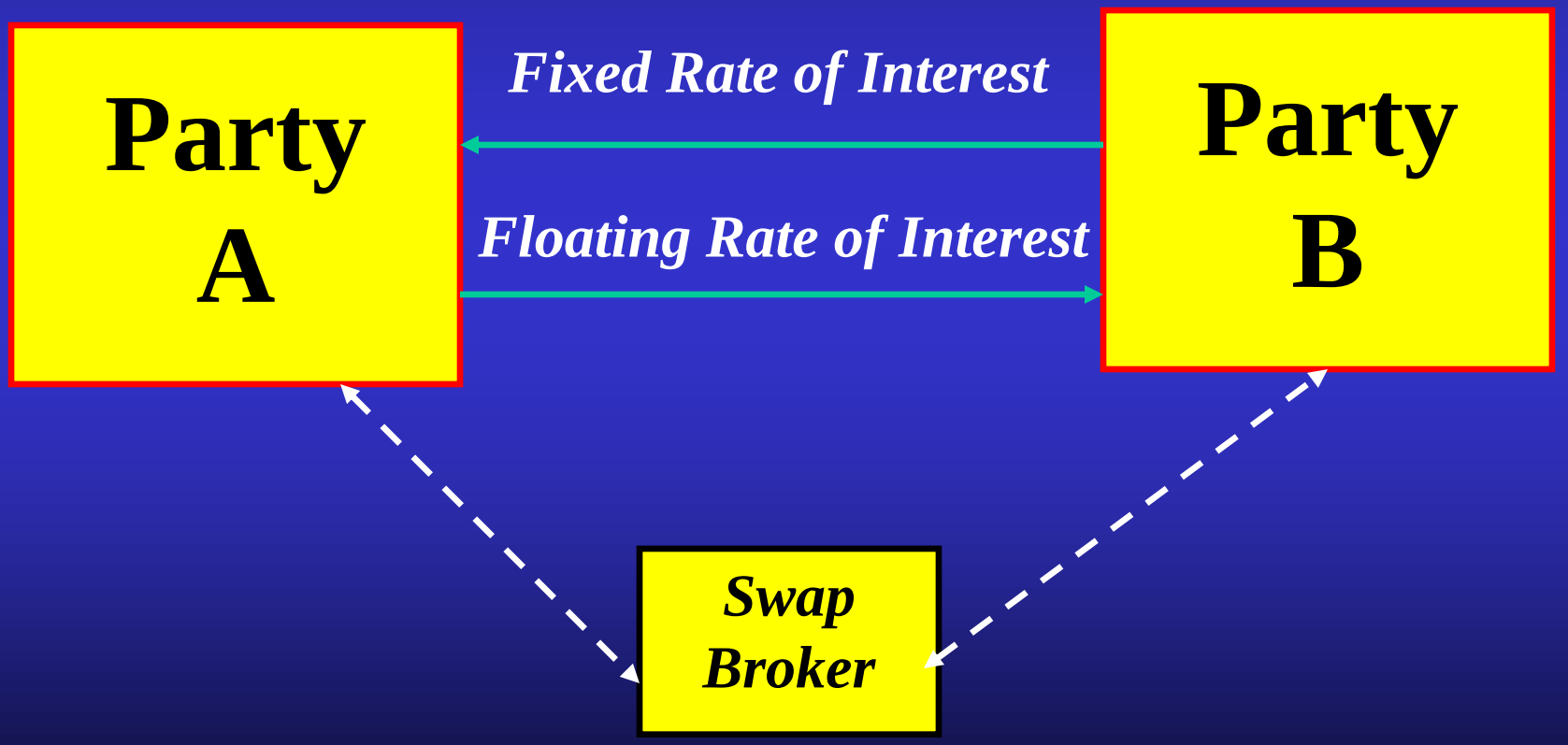
4) Pay Fixed - The obligation of one party to pay a fixed interest rate to the other party, and to receive a floating interest rate from the other party

5) Receive Fixed - The obligation of one party to receive a fixed interest rate from the other party, and to pay a floating interest rate to the other party.

4) Tenor *- The agreed-upon time period, or maturity, during which the swap takes place.*

The Swaps Market

LOS 1E b) Interest Rate Swap Diagram (Kolb p. 611-614)



The Swaps Market

LOS 1E c) Rate Swap Cash Flows (Kolb p. 611-614)

Plain Vanilla Rate Swap Cash Flows

Example: Party A wishes to pay Party B a 5% fixed rate, annually, for 4 years. Party B is willing to pay LIBOR to Party A annually for 4 years. Notional amount is $50,000,000

Yr	Fixed Rate	LIBOR Rate	Fixed Flow (from A)	Floating Flow (to A)	Net Flow to A
0	5.0%	5.2%	N/A	N/A	N/A
1	5.0%	5.4%	$2,500,000	$2,600,000	$100,000
2	5.0%	5.0%	$2,500,000	$2,700,000	$200,000
3	5.0%	4.5%	$2,500,000	$2,500,000	$ 0
4	5.0%	4.2%	$2,500,000	$2,250,000	($250,000)

The Swaps Market

LOS 1E d), f) Application of Swaps (Kolb pp. 618-619)

A Reason for Swaps: Comparative Advantage in Credit

FIRM	FIXED	FLOATING
AAA	7.50%	LIBOR + 25 BPs
BBB	9.00%	LIBOR + 75 BPs

The Swap:

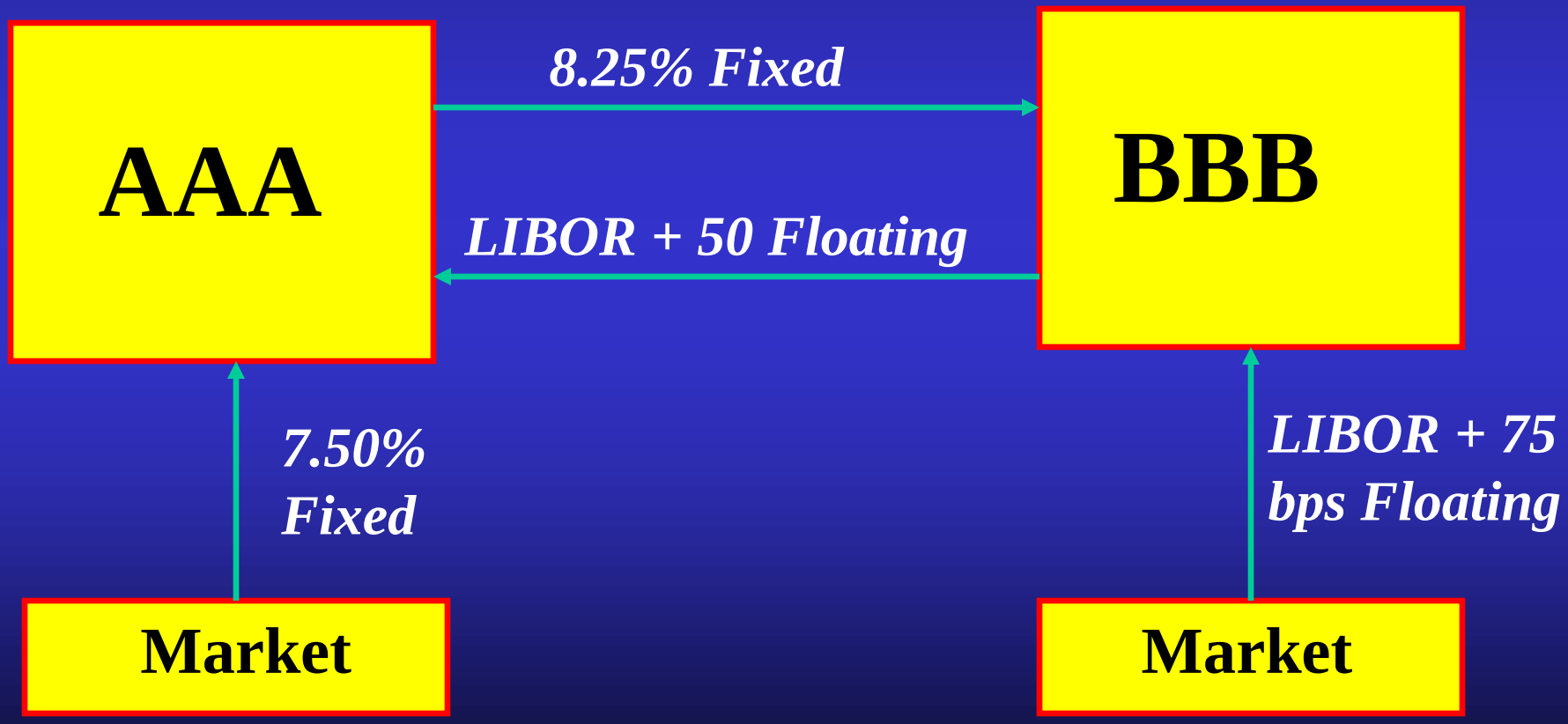
(1) Firm AAA borrows at 7.50% and receives fixed of 8.25% from BBB.
(2) Firm BBB borrows at L+75 bps and lends to AAA at LIBOR+50

The Advantages:

(1) AAA receives floating at 25 over market, but earns 75 bps on fixed loan, so they are 50 bps better off
(2) BBB receives fixed for 75 bps less than market, loses 25 bps in floating rate pass-through, so they are 50 bps better off.

The Swaps Market

LOS 1E d), f) Applications of Swaps (Kolb pp. 618-619)



The Swaps Market

LOS 1E b) Currency Swap Description (Kolb p. 614-616)

Basic Currency Swaps

1) Initiation at time 0 - Exchange principal by exchanging currencies at spot foreign exchange rates

2) Interest Payment Structure (payments are NOT netted)

(a) Pay fixed domestic, receive fixed foreign
(b) Pay floating domestic, receive fixed foreign ("plain vanilla")
(c) Pay fixed domestic, receive floating foreign
(d) Pay floating domestic, receive floating foreign

3) Conclusion at time T - Reverse the original exchange of principal at the original exchange rate, conclude final interest rate payments

The Swaps Market

LOS 1E e) Currency Swap Cash Flows (Kolb p. 614-616)

Fixed-for-Floating Currency Swap Cash Flows

Example: Party A wishes to pay Party B a floating rate in US dollars for 3 years, party B wishes to pay Party A in pounds at an 8% fixed rate. The notional principal is agreed to be 10 Mln pounds. The Pound/$ exchange rate is 1.60.

Year	USD Rate	GBP Rate	Party A Pays	Party A Receives
0	6.0%	8.0%	£10,000,000	$16,000,000
1	6.5%	8.0%	$ 960,000	£ 800,000
2	5.0%	8.0%	$ 1,040,000	£ 800,000
3	6.0%	8.0%	$16,800,000	£10,800,000

The Swaps Market

LOS 1E g), j) Applications of Swaps (Kolb p. 618-619)

A Motive for Currency Swaps: Informational Inefficiency

FIRM	$-Borrowing Rate	£-Borrowing Rate
US Based	7.50%	9.50%
British Based	9.50%	9.00%

The Swap:

(1) US firm borrows $ at 7.50% and lends to British firm at 7.50%.
(2) British firm borrows £ at 9.00% and lends to US firm at 9.00%

The Advantages:

(1) US firm saves 50 bps on £-based borrowings (9.50% - 9.00%)
(2) British firm saves 200 bps on $-based borrowings (9.50%-7.50%)

The Swaps Market

LOS 1E g), h), j) Applications of Swaps (Kolb p. 618-619)

The Swaps Market

LOS 1E i) Comparative Advantage (Kolb p. 618-619)

Understanding Comparative Advantage

FIRM	$-Borrowing Rate	£-Borrowing Rate
US Based	7.50%	9.50%
British Based	9.50%	9.00%

Comparative Advantage:

(1) US-based firm can borrow in dollars more cheaply than British firm
(2) British-based firm can borrow in pounds more cheaply than US firm.

Conclusion: There are gains from trade in an "exchange of borrowings" between the two firms