

BANKING FINANCIAL MANAGEMENT and FINANCIAL ECONOMICS

Introduction to Derivatives

Dave Coker

OBJECTIVES

- **Introduce Derivatives at a high level**
- **Describe the use of Forward Contracts**
- **Discuss Futures**
- **Outline Options**
- **Describe Swaps**

What is a *Derivative*

“A derivative is an instrument whose value depends on the values of other more basic underlying variables”

Who uses derivatives?

- Hedgers
- Speculators
- Arbitrageurs

Some of the largest trading losses in derivatives have occurred because individuals who had a mandate to be hedgers or arbitrageurs switched to being speculators

Examples of Derivatives

- **Forward Contracts**
- **Futures Contracts**
- **Options**
- **Swaps**

Ways Derivatives are Used

- Hedging
- Speculating
- Arbitrage

- To change the nature of a liability

- To change the nature of an investment
 - *without* incurring the costs of selling one portfolio and buying another

What are Forward Contracts

- **Forward contracts are agreements**
 - **To buy or sell**
 - **A specific commodity**
 - **At a specific price**
 - **And at a specific date in time**

Forward Contracts

- **A forward contract is an OTC agreement**
 - to buy or sell an asset at a certain time in the future for a certain price
- **There is no daily settlement**
 - (but collateral may have to be posted)
- **At contract maturity**
 - one party buys the asset for the agreed price from the other party

Terminology

- **LONG**

- The party that has agreed to buy

- **SHORT**

- The party that has agreed to sell

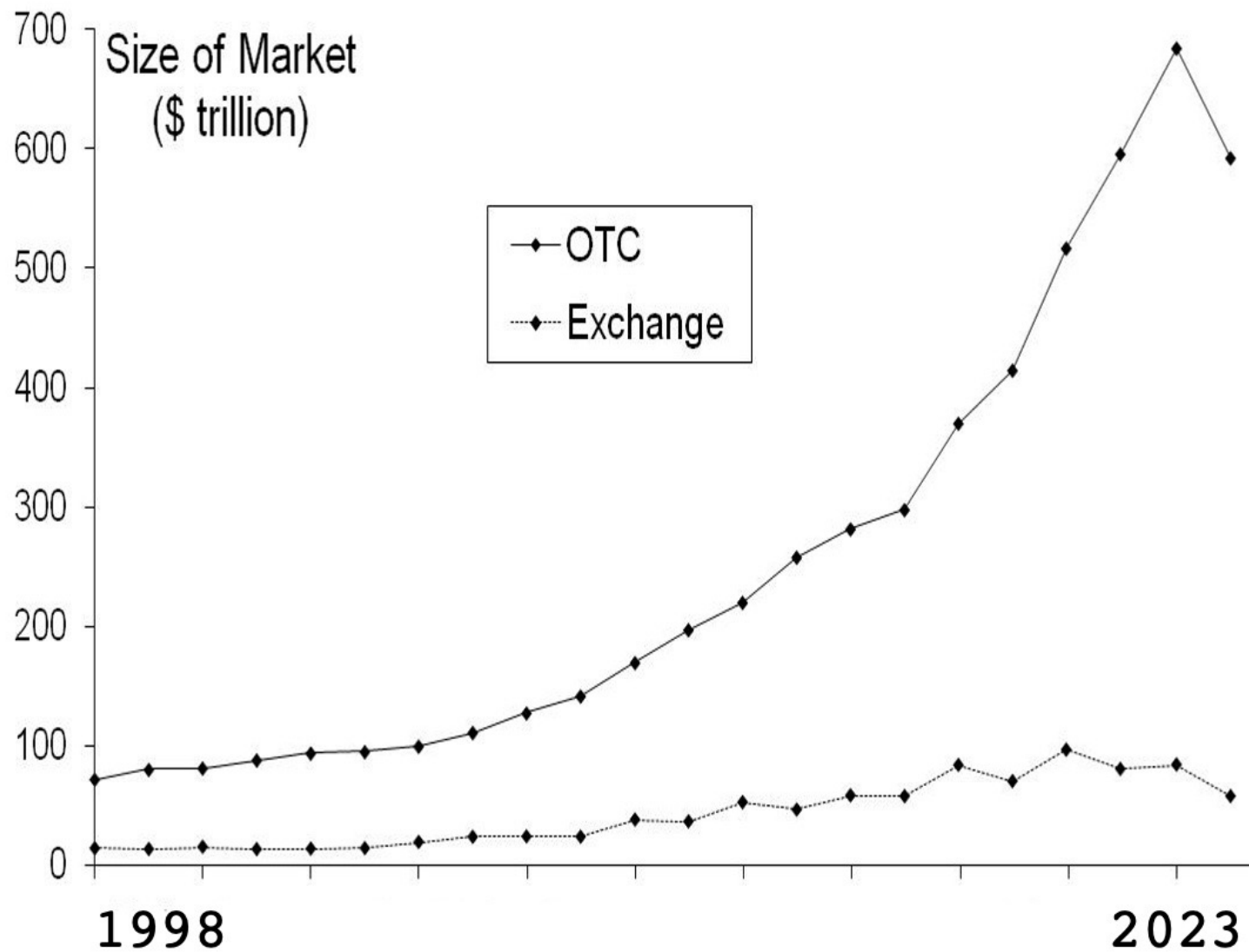
FORWARD CONTRACTS

- **Agreement to**
 - buy (*long*) or sell (*short*)
 - specific commodity
 - at a known price
 - and location
 - at a specific date in the future
- **Highly customisable contracts**
 - any parameters may be changed

Trading Forward Contracts

- **Takes place Over the Counter aka, OTC**
- **OTC an alternative to exchanges**
- **Telephone and computer-linked network of dealers**
 - **who do not physically meet**
- **Trades are usually between financial institutions, corporate treasurers, and fund managers**

Size of OTC and Exchange markets



Source: Bank for International Settlements. Chart shows total principal amounts for OTC market and value of underlying assets for exchange market

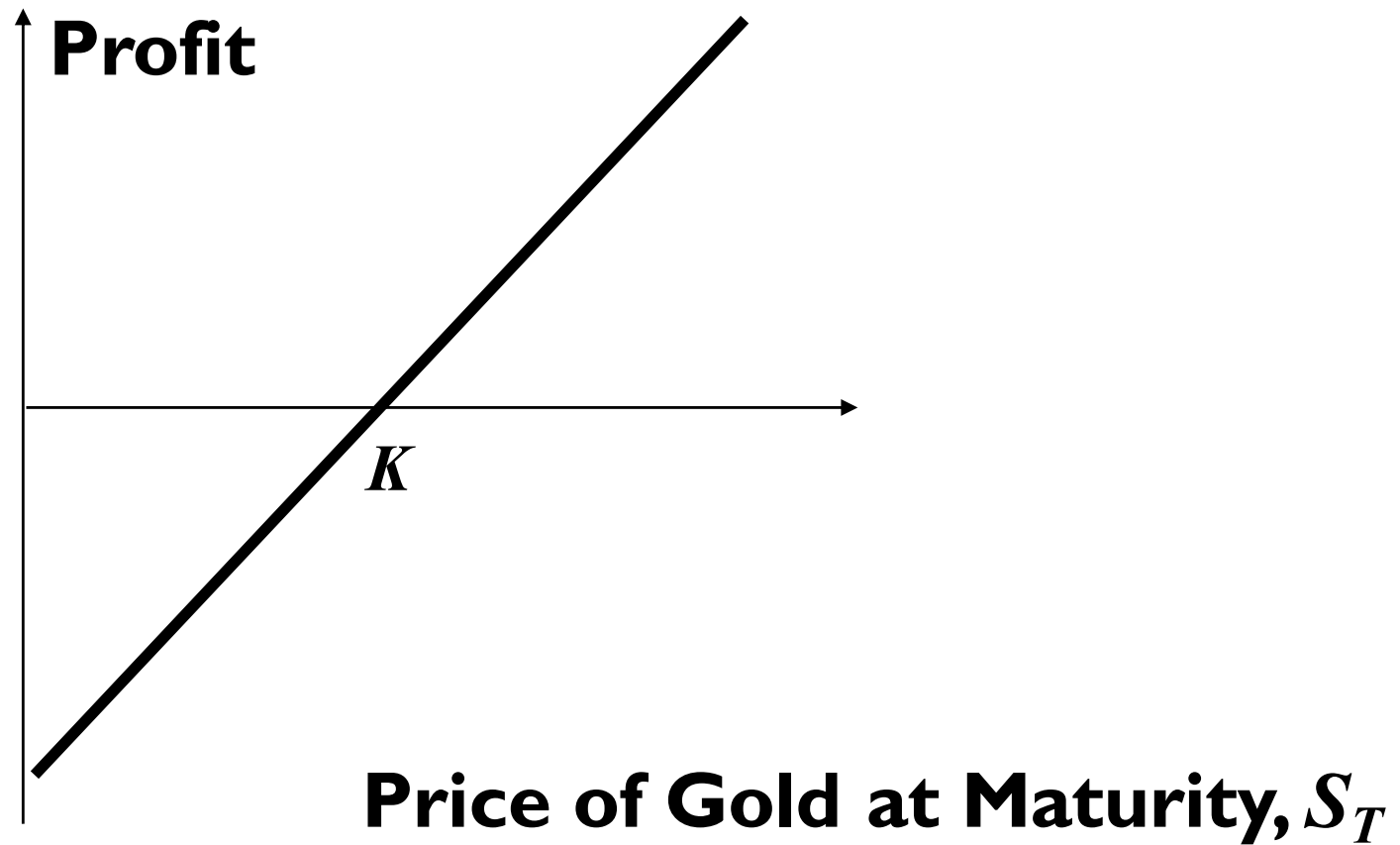
An example of forwards

- **On Jan 1st, 2021 a Jeweler**
 - enters into a long forward contract
 - to buy 1K ounces of gold
 - in six months
 - at a forward price of \$1,200
 - while current spot price of gold is \$1,096
 - **Jeweler (commodity consumer) is obliged**
 - to pay \$1,200,000
 - for 1K ounces of gold on June 1st, 2021
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- **What are the possible outcomes?**

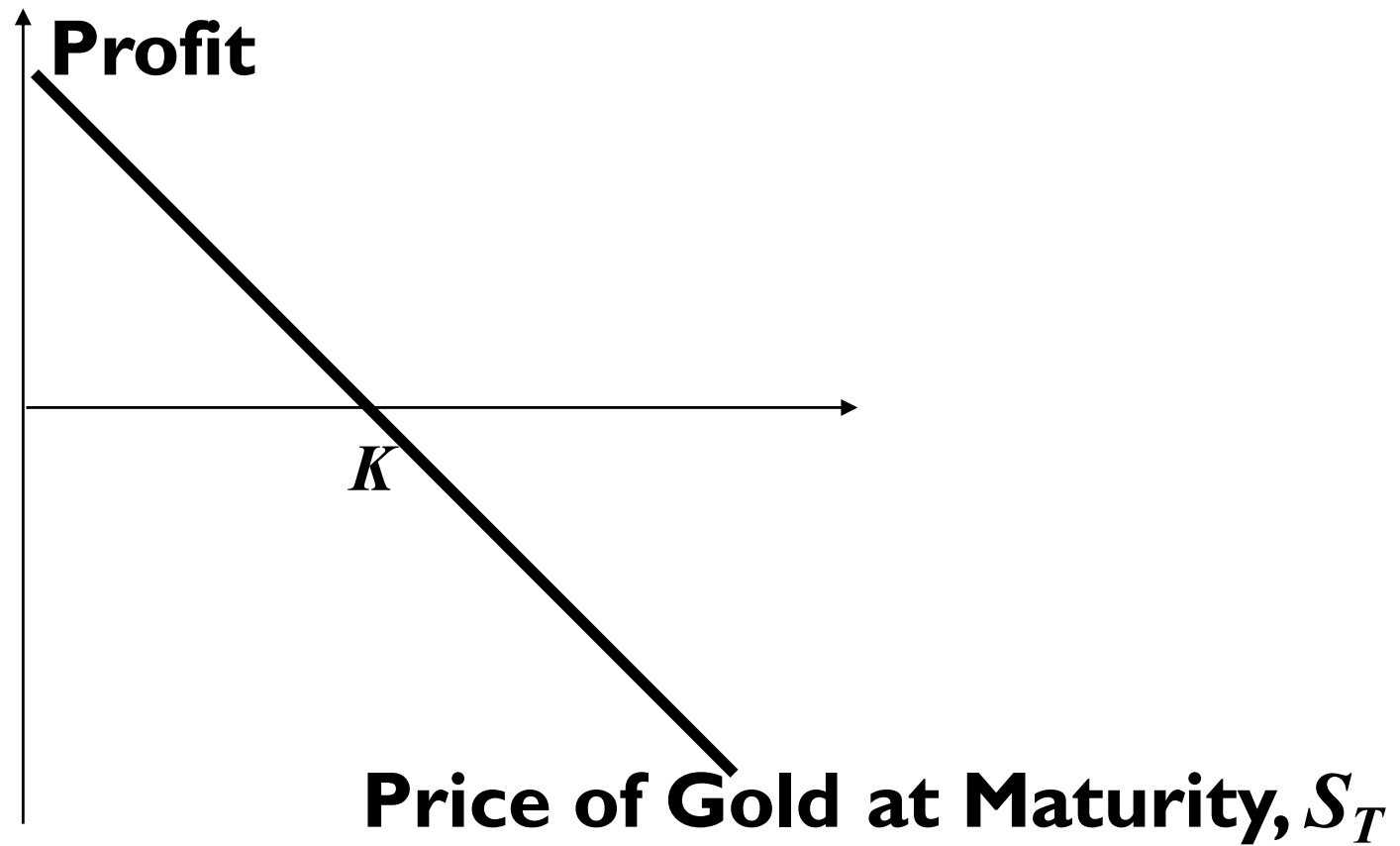
An example of forwards

- **If spot price > \$1,200**
 - **Jeweler purchases at below market prices**
 - **while current spot price of gold is \$1,096**
 - **BUT**
 - **cost of the forward must be considered**
 - **as well as other factors**
- **If spot price < \$1,200**
 - **Jeweler is obliged**
 - **to pay \$1,200,000 for 1K ounces of gold**

Long Forward Position



Short Forward Position



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20 MINUTE BREAK

Futures Contracts

- **Available on a wide range of underlyings**
- **Exchange traded**
- **Highly standardised**
 - **The underlying asset**
 - **Delivery date and location**
 - **Prices**
 - **Settled daily**

Margin

- **Cash or marketable securities**
 - deposited by an investor with his or her broker
 - Collateral
- **Balance is adjusted to reflect daily settlement**
- **Margins minimize possibility of a loss through a default**

Other Key Points About Futures

- **They are settled daily**
- **Closing out a futures contract**
 - Enter into an offsetting trade
- **Most contracts are closed out before maturity**

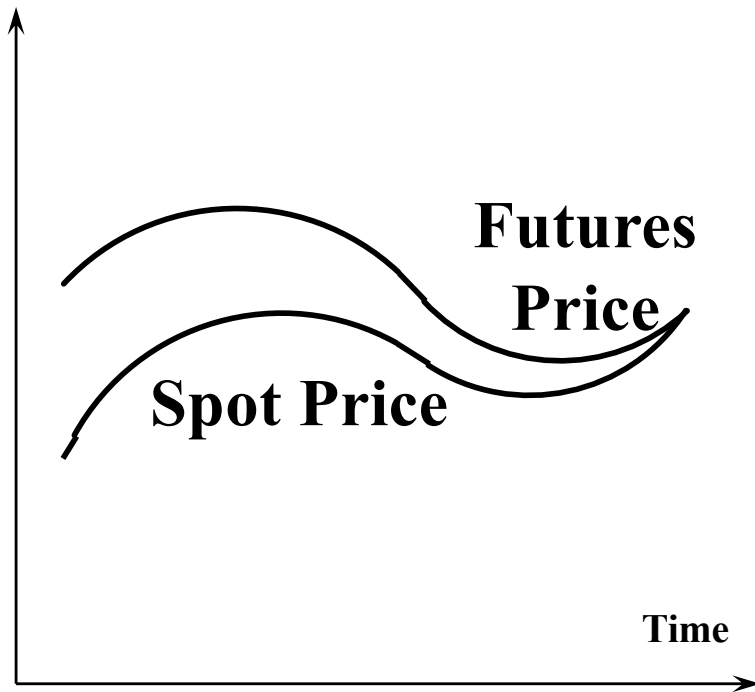
Delivery

- **Contracts that mature are delivered**
 - Seller must deliver assets underlying the contract
 - Buyer must take delivery of assets
 - Some contracts allows substitutions of deliverable
 - In which case short side chooses
- **But some contracts are cash settled**
- **IF cash settled THEN payments made / received are considered delivery**

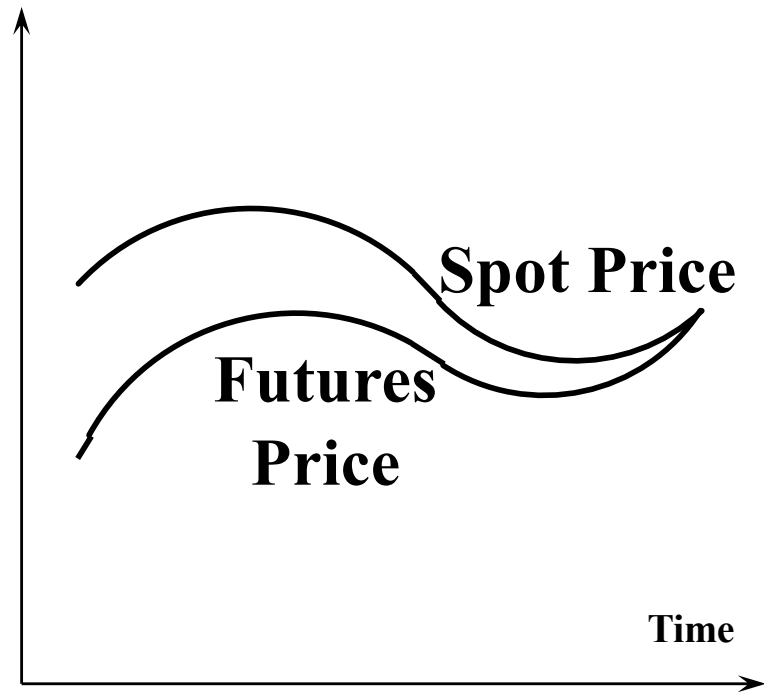
Some Terminology

- **Open interest**
 - total number of contracts outstanding
 - Equals the number of long positions or number of short positions
- **Settlement price**
 - the price just before the final bell each day
 - used for the daily settlement process
- **Volume of trading**
 - the number of trades in one day

Convergence of Futures to Spot



(a)



(b)

Regulation of Futures

- **Regulation is to protect the public interest**
- **Regulators**
 - **Are most interested in an orderly market**
 - **try to prevent questionable trading practices**
 - **Insure neither party benefits from regulation**

Accounting & Tax

- **Must recognize hedging profits (losses) at the same time as the losses (profits) on the item being hedged**
- **Must recognize profits and losses from speculation as they are incurred**
- **US regulation attempts to achieve these goals, other countries are following suit**

Forward Contracts vs Futures Contracts

<i>Forward</i>	<i>Futures</i>
Private contract between two parties	Traded on an exchange
Not standardized	Standardized
Usually one specified delivery date	Range of delivery dates
Settled at end of contract	Settled daily
Delivery or final settlement usual	Usually closed out prior to maturity
Some credit risk	Virtually no credit risk

Long & Short Hedges

- **Long futures**

- appropriate when you know you will purchase an asset in the future
- want to lock in price now

- **Short futures**

- appropriate when you know you will sell an asset in the future
- want to lock in the price now

Arguments in Favor of Hedging

- **Companies should focus on core business**
- **Need to take steps to minimize risks**
- **Financial risk can be hedged**
 - **interest rates, exchange rates, and other market variables**

Arguments against Hedging

- **Shareholders are usually well diversified and can make their own hedging decisions**
- **Hedging may increase cost / risk 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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20 MINUTE BREAK

Types of Options

- **A call is an option to buy**
- **A put is an option to sell**
- **A European option can be exercised only at the end of its life**
- **An American option can be exercised at any time**

Option Positions

- **Long call**

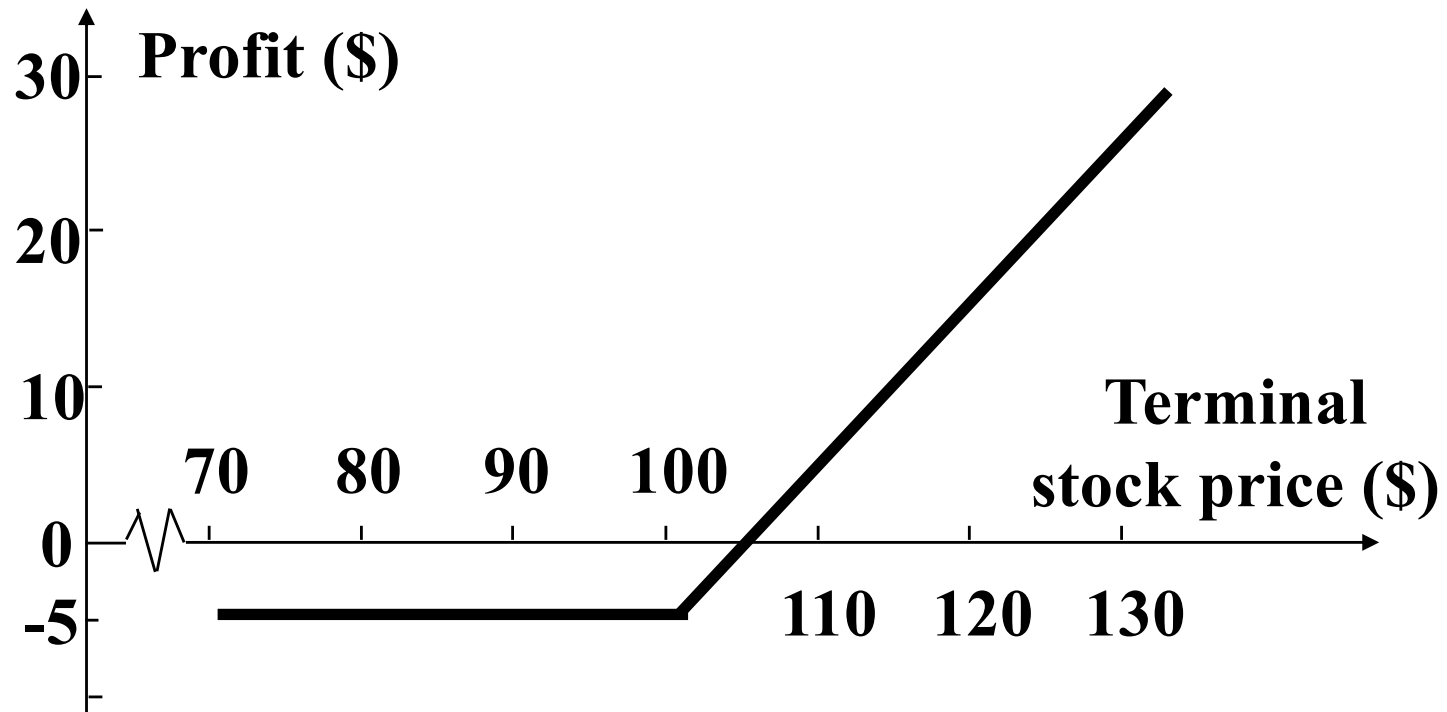
- **Long put**

- **Short call**

- **Short put**

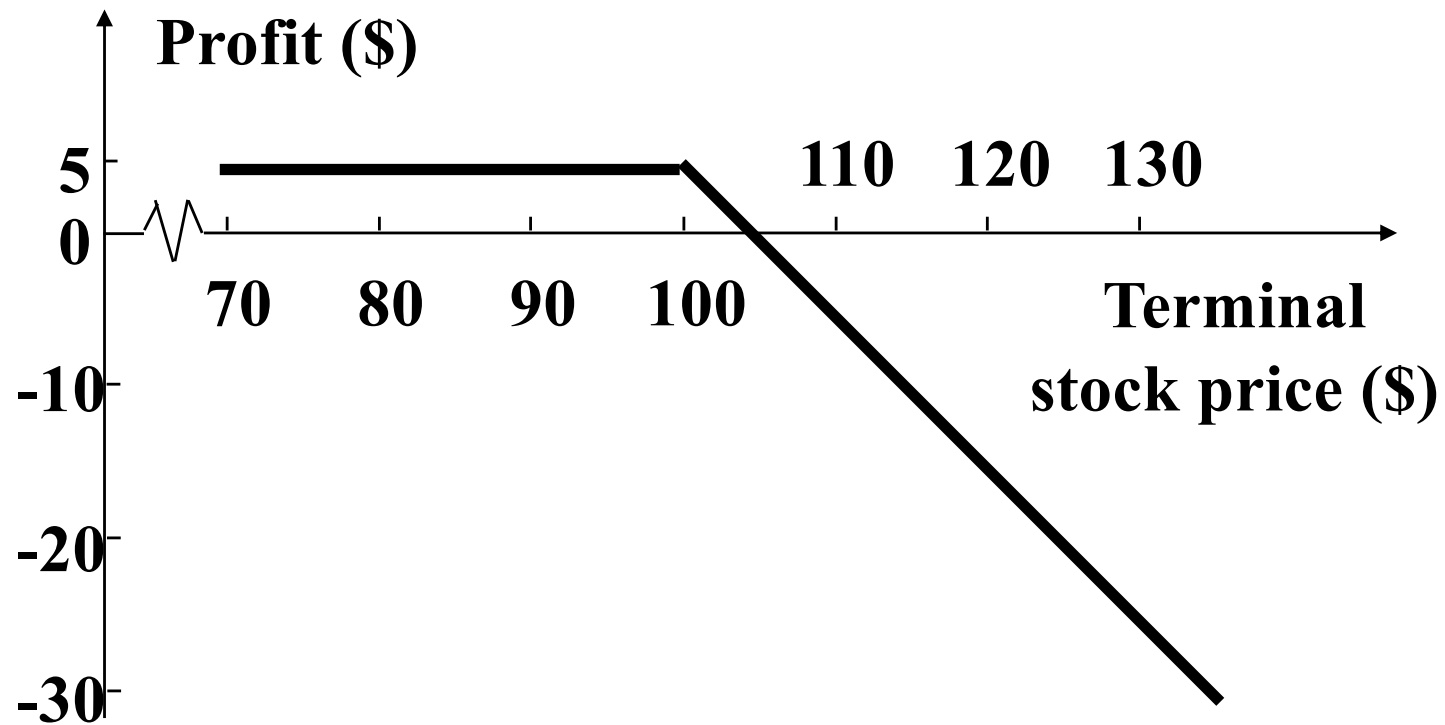
Long Call

Profit from buying one European call option: option price = \$5, strike price = \$100.



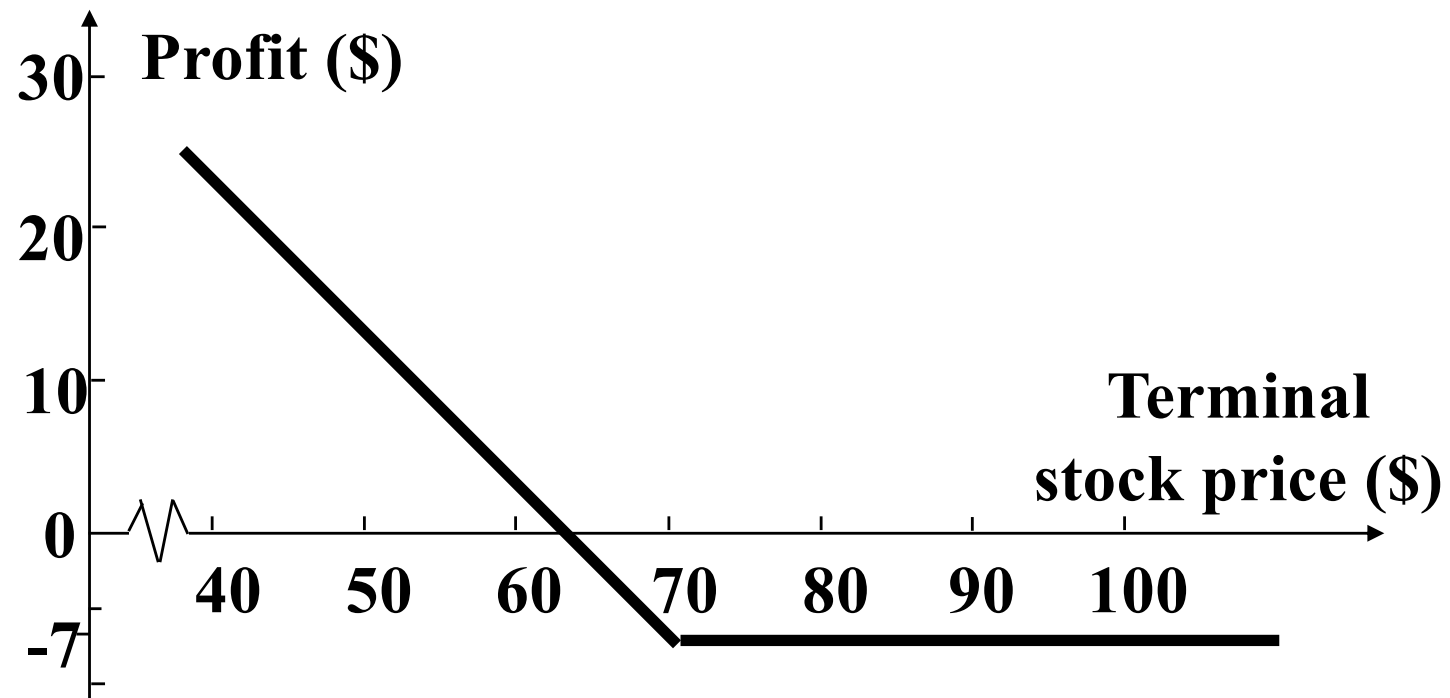
Short Call

Profit from writing one European call option: option price = \$5, strike price = \$100



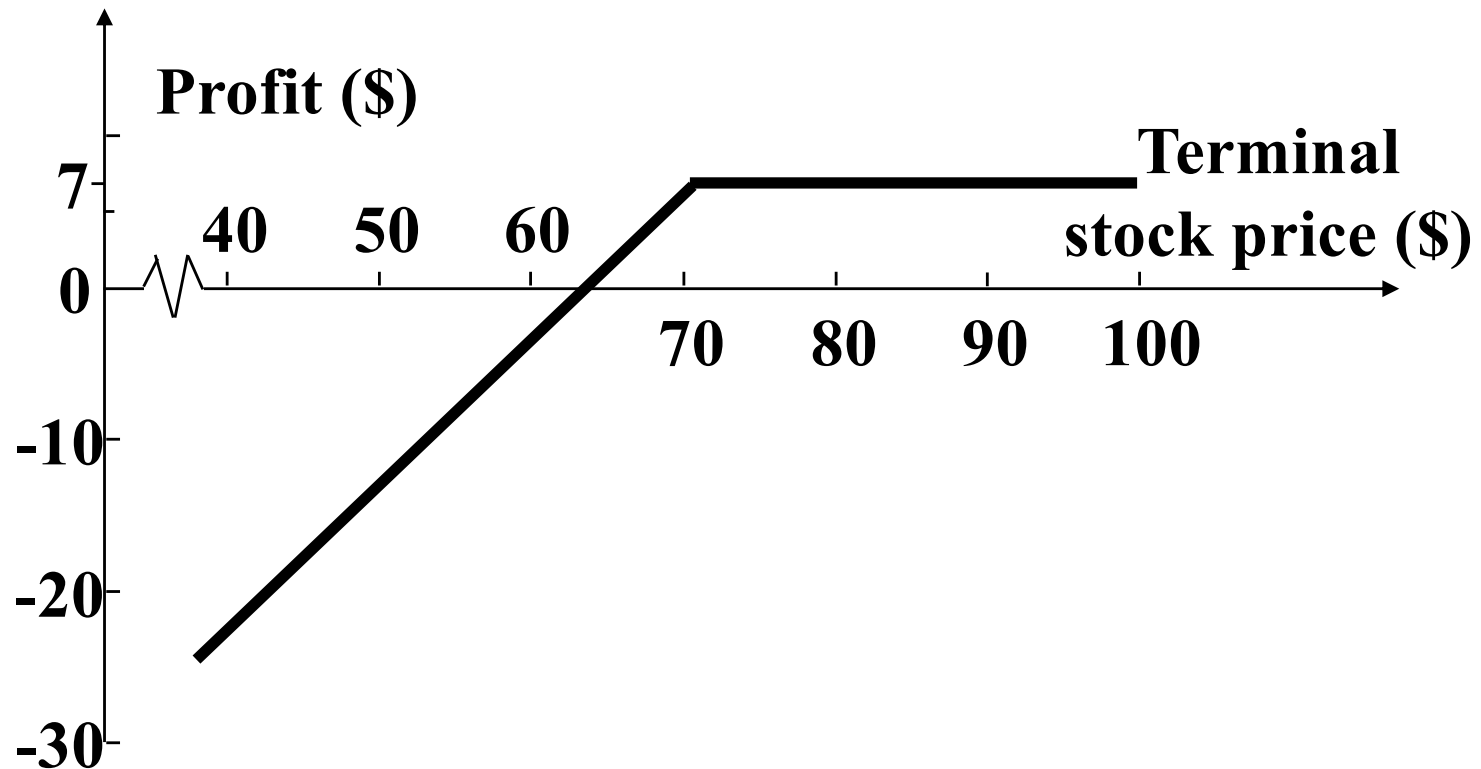
Long Put

Profit from buying a European put option: option price = \$7, strike price = \$70



Short Put

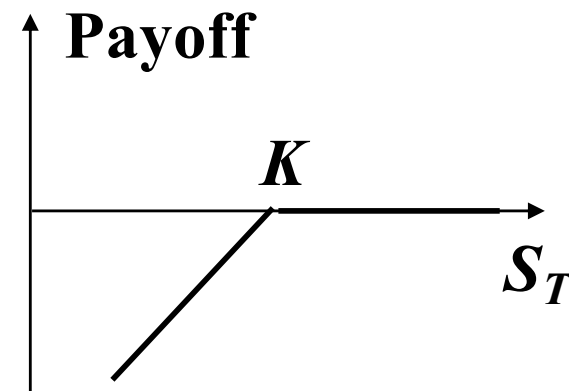
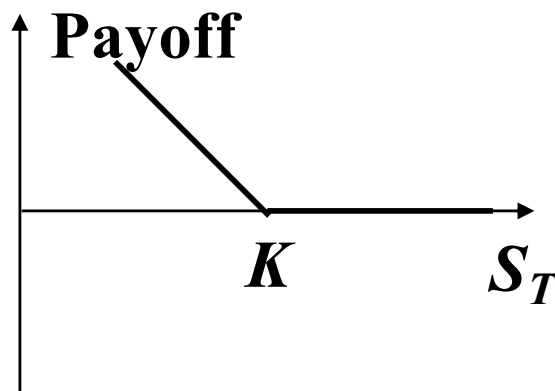
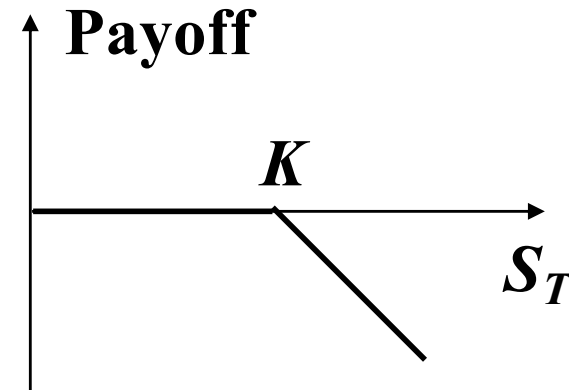
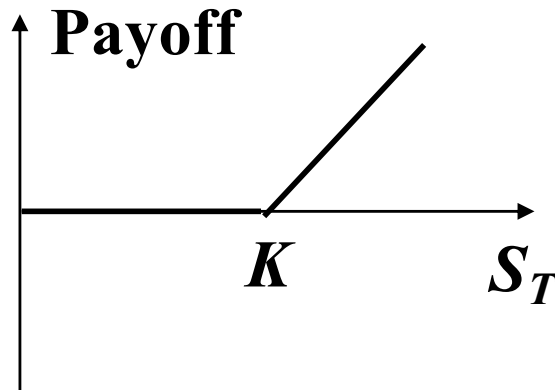
Profit from writing a European put option: option price = \$7, strike price = \$70



Payoffs from Options

Think of the Option Position in Each Case

K = Strike price, S_T = Price of asset at maturity



Assets Underlying Exchange-Traded Options

- **Stocks**
- **Foreign Currency**
- **Stock Indices**
- **Futures**

Specification of Exchange-Traded Options

- **Call or Put (option class)**
- **Underlying asset**
- **Expiration date**
- **Strike price**
- **European or American**

Terminology

Moneyness :

- At-the-money option**
- In-the-money option**
- Out-of-the-money option**

Terminology

(continued)

- **Option class**
- **Option series**
- **Intrinsic value**
- **Time value**

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