Corporate Finance

Department of Accounting and Finance
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DERIVATIVES: ARBITRAGE, HEDGING AND SPECULATION

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Uses of Derivatives

- Hedging
- Speculation
- Arbitrage

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

Hedging Using Futures

- Suppose it is July and a US company will have to pay £1 million in September for goods it has purchased from an British supplier
- Current FX rate: 1.6920
- September futures price for contracts on the British pound: 1.6850
- Each contract is for the delivery 62,500 GBP
- The company could hedge its FX risk by taking a long position in 1 million GBP worth of September futures contracts
- A total of 16 contacts have to be purchased
- Ignoring commissions and transactions cost, effectively the price to be paid has been fixed to $1,685,000

Hedging Using Futures (continued)

- Possible outcomes in September:
  - FX rate 1.7100
    - The 1 million GBP it has to pay it will cost $1,685,000 instead of $1,710,000
  - FX rate 1.6600
    - The 1 million GBP it has to pay it will cost $1,685,000 instead of $1,660,000!
- The incentive here is not to speculate but to lock the FX rate!

Hedging with Options

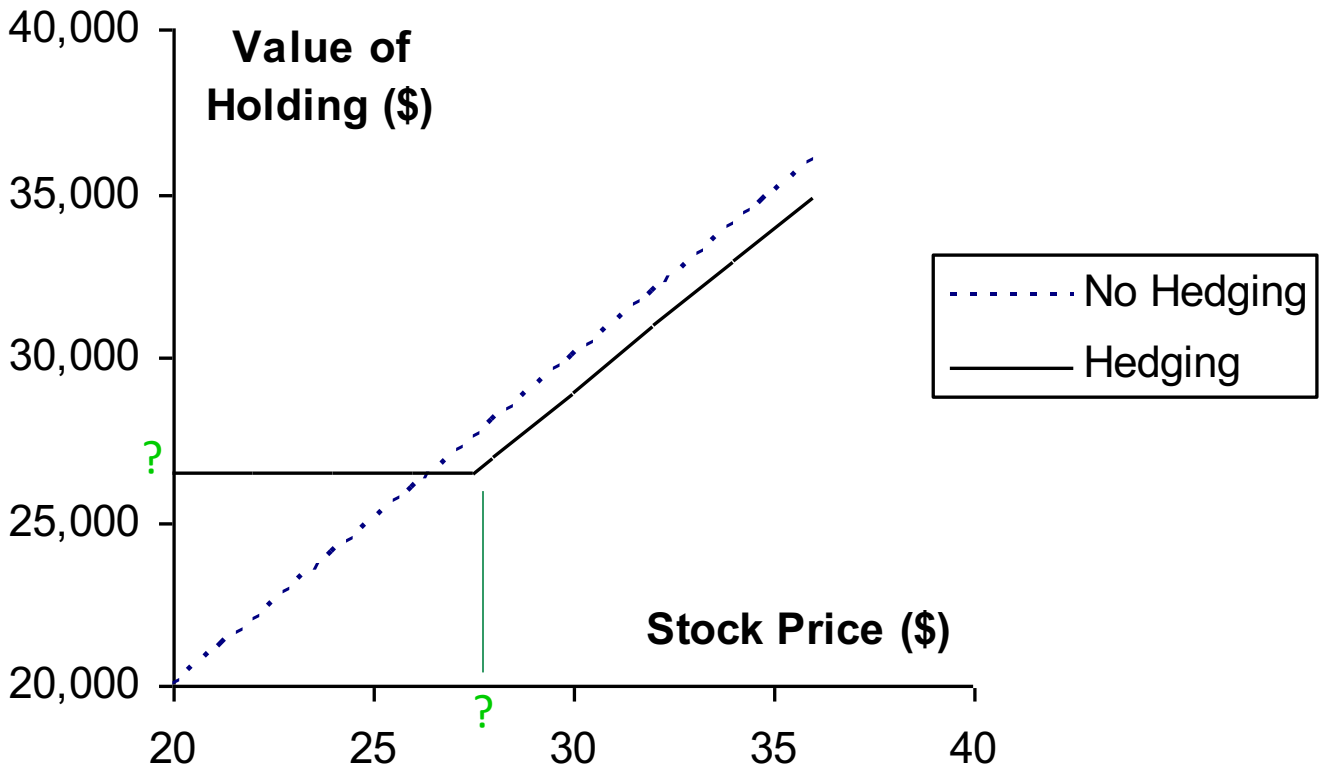
- An investor owns 1,000 Microsoft shares currently worth $28 per share. A two-month put with a strike price of $27.50 costs $1.
- Each option contact is for 100 stocks
- The quoted option price is per share
- The investor decides to hedge by buying 10 contracts (protective put)
- **Total cost** of the strategy : 10 contracts x 100 stocks x $1 = $1,000

Hedging with Options
(continued)

- When will the investor exercise the option?
  - If the market price of Microsoft falls bellow $28
  - If it falls bellow $27.5
  - If it falls bellow $26.5
  - If it falls bellow $20
  - If it rises above $28
- What happens if the option expires worthless?

Hedging with Options
(continued)

Value of Microsoft Shares with and without Hedging



Speculation Using Futures

- Consider a US speculator who in February thinks that GBP will strengthen relative the USD over the next two months
- The speculator is prepared to back his/her hunch to the tune of 250,000 GBP
- **Alternative strategies**:
  1. purchase 250,000 GBP, in the hope that it can be sold later at a profit – the sterling once purchased would be kept in an interest bearing account
  2. take a long position on April futures contracts on sterling

Speculation Using Futures
(continued)

- Current FX rate: 1.6470
- April futures price: 1.6410

- **<u>Cost of alternative strategies</u>**:
  1. purchase 250,000 GBP

     250,000 x 1.6470 = $411.750
  2. long position on April futures

     250,000 x 1.6410 = $410,250

Speculation Using Futures
(continued)

- **Possible outcomes**:
  - FX rate is **1.7000** in two months
    - Strategy: purchase 250,000 GBP

      Gain: (1.7000 – 1.6470) x 250.000 = **$13,250**
    - Strategy: long position on April futures

      Gain: (1.7000 – 1.6410) x 250.000 = **$14,750**
  - FX rate is **1.6000** in two months
    - Strategy: purchase 250,000 GBP

      Loss: (1.6470 – 1.6000) x 250.000 = **$11,750**
    - Strategy: long position on April futures

      Loss: (1.6410 – 1.6000) x 250.000 = **$10,250**

Speculation Using Futures
(continued)

- The alternatives appear to give rise to slightly different profits/losses
- However, these calculations do not reflect the interest that is earned or paid
- When the interest earned in sterling or paid in dollars is taken into account, the profit/loss from the two alternatives is the same!
- **What is then the difference between the two alternatives?**

Speculation Using Futures
(continued)

- **Purchase 250,000 GBP**
  - requires an up-front investment of $411.750
- **Long position on April futures**
  - requires only a percentage of the nominal value of $410,250 to be deposited as a margin
  - for a 6% margin requirement that is $25,000
  - if the speculator deposits $410,250 as a margin the notional value of the futures position will be more than $6.7 million! (more than 16 times the initial)
  - The speculators profit if the FX rate rises to 1.7000, will not be $14,750 but more than $242,000!
  - What about his losses???

Speculation Using Options

- Suppose it September
- A speculator with $7,800 to invest feels that IBM's stock price will increase over the next 2 months
- The current stock price is $78 and the price of a 2-month call option with a strike of 80 is $3
- What are the alternative strategies?

Speculation Using Options
(continued)

- **Alternative strategies**:
  - Straight purchase of 100 IBM shares

    Cost : 100 x $78 = $7,800

  - Buy the option to buy IBM in December

    With $7,800 the speculator can purchase:

    $7,800 / 3 = 2,600 options

    = 26 contracts (2,600 / 100)

    Cost : $7,800

Speculation Using Options
(continued)

- **Possible outcomes**:
  - IBM's price rises to **$90** by December
    - Strategy: Straight purchase of 100 IBM shares

      Gain: ($90 - $78) x 100 = **$1,200**
    - Strategy: Buy IBM December call options

      Gain: ($90 - $80) x 2600 - $7,800

      = $26,000 - $7,800 = **$18,200** (x15)
  - IBM's price falls to **$70** by December
    - Strategy: Straight purchase of 100 IBM shares

      Loss: ($78 - $70) x 100 = **$800**
    - Strategy: Buy IBM December call options

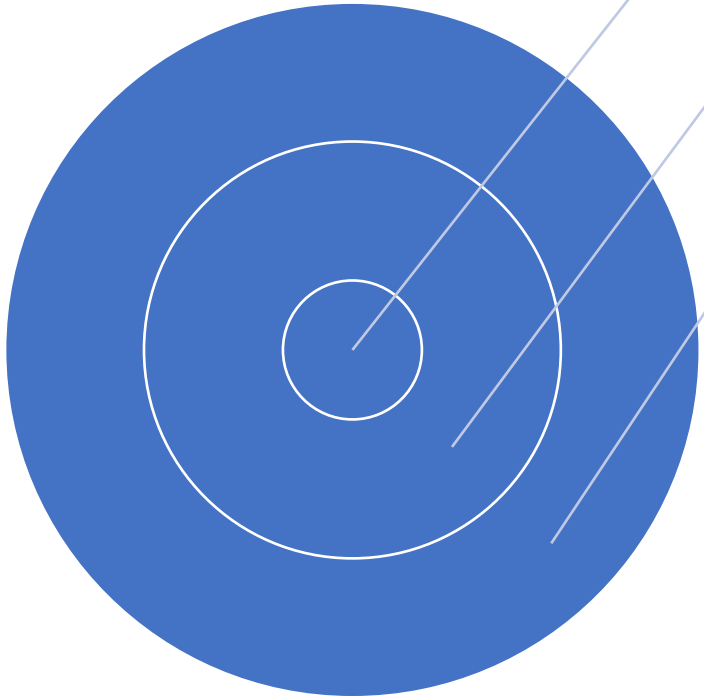
      Loss: up to **$7,800**

The Notion of Arbitrage: Example

NY stock Exchange: USD 172 per share

London Stock Exchange: GBP 100 per share

Value of 1 GBP: USD 1.7500



CONVERT THE SALE PROCEEDS FROM POUNDS TO DOLLARS

SELL SHARES IN LONDON

BUY 100 SHARES IN NEW YORK

<u>THE PROFIT</u>:

100 x ($1.75 x 100 – 172) = $300

Hedge Funds

- Hedge funds are not subject to the same rules as mutual funds and cannot offer their securities publicly.
- Mutual funds must
  - disclose investment policies,
  - makes shares redeemable at any time,
  - limit use of leverage
  - take no short positions.
- Hedge funds are not subject to these constraints.
- Hedge funds use complex trading strategies are big users of derivatives for hedging, speculation and arbitrage