Options on Futures

- Separate market
- Option on the futures contract
- Can be bought or sold
- Behave like price insurance
  - Is different from the new insurance products

Options on Futures

- Two types of options
  Four possible positions
  - Put
    » Buyer
    » Seller
  - Call
    » Buyer
    » Seller

Put option

- The Buyer pays the premium and has the right, but not the obligation to sell a futures contract at the strike price.
- The Seller receives the premium and is obligated to buy a futures contract at the strike price.
Call option

- **The Buyer** pays a premium and has the *right, but not the obligation* to buy a futures contract at the strike price.
- **The Seller** receives the premium but *is obligated to sell* a futures contract at the strike price.

Find options on web

- CME Options quotes

Options as price insurance

- Person wanting protection pays a **premium**
- If damage occurs the buyer is reimbursed for damages
- Seller keeps the **premium** but must pay for damages
Options

- May or may not have value at end
  - The right to sell at $2.20 has no value if the market is above $2.20
- Can be offset, *exercised*, or left to expire
- Calls and puts are *not* opposite positions of the same market. They are different markets.

Strike price

- Level of price insurance
- Set by the exchange (CME, CBOT)
- A range of strike prices available for each contract

Premium

- Is traded in the option market
  - Buyers and sellers establish the premium through open out cry in the trading pit.
- Different premium
  - For puts and calls
  - For each contract month
  - For each strike price
Premium

◆ Depends on five variables
  – Strike price
  – Price of underlying futures contract
  – Volatility of underlying futures
  – Time to maturity
  – Interest rate

Premium relationship to:

◆ Strike price
  – Increases with the level of protection
◆ Futures volatility
  – Increases with riskiness of the contract

Premium relationship to:

◆ Time to maturity
  – Decreases exponentially as contract expires
  – Reflects carrying charge and risk
◆ Interest rates
  – Increases as rates increase
Premium relationship to:

- Underlying futures price
  - In-the-money
  - At-the-money
  - Out-of-the-money

In-the-money

- If expired today it has value
- Put: futures price below strike price
- Call: futures price above strike price

At-the-money

- If expired today it would breakeven
- Strike price nearest the futures price
Out-of-the-money

- *If expired today it does not have value*
- *Put:* futures price above strike price
- *Call:* futures price below strike price

Option buyer alternatives

- *Let option expire*
  - Typically when it has no value
- *Exercise right*
  - Take position in futures market
  - Buy or sell at strike price
- *Re-sell option rights to another*

Buyer decision depends upon

- Remaining value and costs of alternative
- Time mis-match
  - Most options contracts expire 2-3 weeks prior to futures expiration
  - Cash settlement expire with futures
  - Improve basis predictability
**Option seller**

- Obligated to honor option contract
- Can buy back option to offset position
  - Now out of market

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**Put option example**

- A farmer has corn to sell after harvest.
  1) In May, buy a $2.80 Dec Corn Put
     - Expected basis = -$0.25
     - Premium = $0.15
     - Commission = $0.01
     - Expected minimum price (EMP) = SP + Basis - Prem - Comm = $2.39

     Notice that you subtract the premium because it works against you and you are trying to reduce cost.

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**Put option example Lower**

2) At harvest futures prices lower.
   - Futures = $2.50
   - Cash market = $2.25
   - Option value = $2.80 - $2.50 = $0.30
   - Net price = Cash + Return - Cost = $2.25 + $0.30 - $0.15 - $0.01 = $2.39
**Put option example Higher**

3) At harvest futures prices higher.
   Futures = $3.15
   Cash market = $2.90
   Option value = $0
   Net price = Cash + *Return* - Cost
   = $2.90 + 0 - 0.15 - 0.01 = $2.74

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**Call option example**

- A feedlot wants to buy corn to feed after harvest.
  1) In May, buy a $3.00 Dec Corn Call
     Expected basis = -$0.25
     Premium = $0.20
     Commission = $0.01
     Expected maximum price (EMP) =
     \[ SP + \text{Basis} + \text{Prem} + \text{Comm} = $2.96 \]

     Notice that you add the premium because it works against you and you are trying to reduce cost.

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**Call option example Lower**

2) At harvest futures prices lower.
   Futures = $2.50
   Cash market = $2.25
   Option value = $0
   Net price = Cash - Return + Cost
   = $2.25 - 0 + 0.20 + 0.01 = $2.46
Call option example *Higher*

3) At harvest futures prices higher.
   Futures = $3.15
   Cash market = $2.90
   Option value = $3.15 - $3.00 = $0.15
   Net price = Cash - Return + Cost
   = $2.90 - 0.15 + 0.20 + 0.01 = $2.96

Net Price with Options

- **Buy Put**
  - Minimum price
  - Cash price - premium - comm
- **Buy Call**
  - Maximum price
  - Cash price + premium + comm

Position Diagram w/ Options

- Graph of expected payoff at alternative futures prices at contract expiration
1. Futures prices on horizontal axis
2. Expected net price on vertical axis
   Adjust for basis and commission if needed
3. Draw in Cash and Hedge lines
4. Identify Strike Price that will form “hinge”
   Flat to one side
   Follow the cash to the other side
Home work due Feb 2