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# HEDGING TOOLS

## *Swaps:*

- Paper (not physical) transactions
- Buy fixed price / Sell variable price
- Buy fixed basis risk value /  
Sell variable basis risk value

## Basis Risk Examples:

- Buy Jet Fuel versus NYMEX heating oil
- Buy NYMEX heating oil versus NYMEX crude oil  
(this is the Heating Oil Crack Spread)

# HEDGING TOOLS

## *Call (Cap) Options:*

- Buy Calls (End-User hedge)
  - Premium risk only
  - Unlimited upside *profit*
- Sell Calls (OTC Calls utilizes credit line)
  - Premium revenue only (use to purchase Puts or buy-down lower priced purchased Caps)
  - Unlimited upside *loss*

# HEDGING TOOLS

## *Put (Floor) Options:*

- Buy Puts (Producer hedge)
  - Premium risk only
  - Unlimited downside *profit*
  - used as hedging tool for inventory control
- Sell Puts (OTC Puts utilizes credit line)
  - Premium revenue only (use to purchase Calls or to lower fuel costs)
  - Unlimited downside *loss*

# HEDGING TOOLS

## *Collar (Cap/Floor) Options:*

- Buy Calls (Cap) and at the same time  
Sell Puts (Floor)
- If the Call and Put Premiums are the same (and volumes are the same) it is a *Costless Collar*
- Selling the Put finances the cost of the Call  
(Selling a Put option has unlimited downside risk, so be willing to buy the commodity at the strike price of the Put)

*COLLARS NEUTRALIZES VOLATILITY*

# SWAP



## *Buy Fixed:*

- Fixed price for commodity
- Relationship (basis risk hedge)
  - Jet Fuel vs NYMEX heating oil
  - NYMEX heating oil vs NYMEX crude oil

## *Sell Variable:*

- Variable price - Platts monthly average

# SWAP



## *Risk:*

- Unlimited *loss* as the market moves against the fixed price during the variable pricing period
- Margin requirements
  - OTC (over-the-counter) utilizes credit lines
- Performance of counterparty is at risk
  - Continuously monitor counterparties' credit

# SWAP



## *Reward:*

- Unlimited *profit* as the market moves in favor of the fixed price during the variable pricing period
- Paper transaction does not affect physical deliveries
- Apply fixed cost against budget

# *SWAP EXAMPLE (1)*



*Fixed Price Swap: Buy 25,000 bbl. of Jet Fuel  
for calendar month August'08*

- Price: \$2.00 per gallon
- U.S. Gulf Coast delivery
- FOB Pasadena, Texas
- Colonial Pipeline 54 grade

## *SWAP (1) RESULTS*

- If the monthly average Platts Jet Fuel price for the delivery month is:
  - \$2.05 / gal. = \$.05 profit = \$52,500 profit
  - \$2.00 / gal. = \$0 profit
  - \$1.95 / gal. = \$.05 loss = (\$52,500) loss

## *SWAP EXAMPLE (2)*

*Fixed Price Swap: Buy 25,000 bbl. of Crude  
for calendar month August'08*

- Price: \$65.00 per barrel
- OTC (over-the-counter) NYMEX Crude
- Monthly Average APO
  - (APO –average price option)

## *SWAP (2) RESULTS*

- If the monthly average NYMEX Crude price for the delivery month is:
  - \$69.00 / bbl. = \$4.00 profit = \$100,00 profit
  - \$65.00 / bbl. = \$0 profit
  - \$61.00 / bbl. = \$4.00 loss = (\$100,000) loss

## *SWAP EXAMPLE (3)*

*Basis Risk Hedge: Buy 25,000 bbl. of Jet Fuel versus NYMEX heating oil for calendar month August'08*

- Pay a premium of \$.09 per gallon over the NYMEX heating oil price

## *SWAP RESULTS (3)*

- If the difference between the monthly average Platts Jet Fuel price for the delivery month and the monthly average NYMEX heating oil settlement price is:
  - plus \$.12 / gal. = \$.03 profit = \$31,500 profit
  - plus \$.09 / gal. = \$0 profit
  - plus \$.05 / gal. = \$.04 loss = (\$42,000) loss

## *SWAP EXAMPLE (4)*



*Basis Risk Hedge: Buy 25,000 bbl. of Jet Fuel versus NYMEX crude (jet crack spread) for calendar month August'08*

- Pay \$12.00 per barrel over the NYMEX crude oil price for jet fuel

## *SWAP (4) RESULTS*

- If the difference between the monthly average Platts Jet Fuel price for the delivery month and the monthly average NYMEX crude settlement price is:
  - \$14.00 / bbl. = \$2.00 profit = \$50,000 profit
  - \$12.00 / bbl. = \$0 profit
  - \$9.00 / bbl. = \$3.00 loss = (\$75,000) loss

# CALL / PUT



*Buy Call (End-User hedge):*

- Pay Premium

*Buy Put (Producer hedge):*

- Pay Premium

# CALL / PUT



## *Risk:*

- Premium cost
- “Style of Option” as defined later
- Performance of counterparty
- Physical Delivery

# CALL / PUT



## *Reward:*

- Unlimited upside protection – Call
- Unlimited downside protection – Put
- Limit loss to the cost of insurance (premium)
- Premium is the only financial risk
- Downside-Call or Upside-Put participation in the market
- Apply fixed cost against budget

## CALL EXAMPLE (1)

*Basis: Buy a calendar August'08 crude Call option (25,000 bbl.) at a \$65.00 strike price for a \$2.00 per barrel Premium*

- Pay \$2.00 per barrel
- Contract expires 8-31-08
- Asian style (cash settlement)
- OTC calendar month \$65.00 Call

## *CALL RESULTS (1)*

- The monthly average price for August NYMEX crude on 8-31-08 is:
  - \$71.00 / bbl. = \$6.00 profit -\$2.00 cost = \$100,000 profit
  - \$67.00 / bbl. = \$2.00 profit -\$2.00 cost = \$0 profit
  - \$65.00 / bbl. = \$2.00 cost = (\$50,000) loss
  - \$55.00 / bbl. = \$2.00 cost = (\$50,000) loss

# COLLAR



- Buy Call ( Cap )
  - Unlimited upside *profit*
- Sell Put ( Floor )
  - Unlimited downside *loss*
- Neutralizes volatility
- Very bullish transaction (both positions favor upside)

# *Costless COLLAR EXAMPLE (1)*

*Buy an August'08 Jet Fuel Call (25,000 bbl.)  
at \$2.20 per gallon*

- Pay a Premium of \$.05 per gallon  
(offset by the sale of the Put)
- Expires on 8-31-08
- Asian style (cash settlement)
- U. S. Gulf Coast jet fuel
- Colonial pipeline 54 grade quality
- Physical delivery (Option)

*and*

# *Costless COLLAR EXAMPLE (1)*

*Sell an August'08 Jet Fuel Put (25,000 bbl.)  
at \$1.80 per gallon*

- Collect a Premium of \$.05 per gallon  
(offset by the purchase of the Call)
- Expires on 8-31-08
- Asian style (cash settlement)
- U. S. Gulf Coast jet fuel
- Colonial pipeline 54 grade quality
- Physical delivery (Option)

## *Costless COLLAR RESULTS (1)*

- If the August monthly average settlement price for Jet Fuel U.S. Gulf Coast on 8-31-08 is:
  - \$2.30 / gal. = \$.10 Call profit = \$105,000 profit
  - \$2.20 / gal. = \$.00 profit
  - \$1.80 / gal. = \$.00 profit
  - \$1.65 / gal. = (\$.15) Put loss = (\$157,500) loss

# *“STYLE OF OPTION”*



## *European*

- One day Expiration
- Typically used in NYMEX look-alike quotes
- Medium cost

# *“STYLE OF OPTION”*



## *Asian (APO - Average Price Option)*

- Each day of the pricing period determines the value
- Each day of the pricing period reduces the hedging volume
- Low cost

# *“STYLE OF OPTION”*



## *American*

- Buyer can exercise the option anytime before expiration
- Highest cost ( greatest risk to seller)
- NYMEX options are this style

# “*STYLE OF OPTION*”



## *Option Issues*

- Volatility
- Time value

## *Market Issues*

- Contango  
(prompt prices are lower than forward)
- Backwardation  
(prompt prices are higher than forward)

# *BASIS RISKS*



*Highest Liquidity = Lowest Premium Cost*

- Highest to lowest liquidity as follows:
  - NYMEX crude oil
  - Natural Gas
  - IPE Brent
  - NYMEX heating oil
  - IPE gasoil
  - U. S. Gulf Coast jet fuel

# *BASIS RISKS*



*Logistics – Arbitrages*

*Buy one location and sell the other:*

- Los Angeles vs Gulf Coast
- New York vs Gulf Coast
- New York vs Europe
- Pacific rim vs United States
- Pacific rim vs Europe

# *BASIS RISKS*



## *Jet Fuel Basis Risks*

- Relative value to NYMEX heating oil
  - Jet fuel versus NYMEX heat
- Relative value to NYMEX crude oil
  - Jet fuel versus NYMEX crude  
(Jet fuel crack spread)

# *VOLUME & VALUE SENSITIVITY*



## *Volumes*

- Hedge at least 60% of monthly demand

## *Total Working Volume*

- Hedge at least 90-180 days of demand with high percentage volume at all times
- Hedge forward based on absolute prices
  - Target at least 24 months, consider 3-5 years

# VOLUME & VALUE SENSITIVITY

*Continue to Participate*

*(no one can forecast the market)*

- Is it better to own \$2.00 jet fuel in a \$1.80 market ? (You are short and can buy more)

*or*

- Is it worse to not own \$2.00 jet fuel in a \$2.30 market ? (You are short and locked out of buying forward)

# *VOLUME & VALUE SENSITIVITY*



*Determine Value Sensitivity relative to  
Volume of hedge*

- If prices are at \$1.70, be aggressive and hedge a minimum of 80% of your demand
- Extend hedging period longer when prices are low and volatility is low

# *VOLUME & VALUE SENSITIVITY*



## *Volume versus Value*

The incremental cost relative to the percent of monthly hedged volume on total demand:

- $\$.02 \text{ /gal on } 10\% = \$.002 \text{ /gal on total}$
- $\$.01 \text{ /gal on } 30\% = \$.003 \text{ /gal on total}$
- $\$.02 \text{ /gal on } 50\% = \$.01 \text{ /gal on total}$
- $\$.01 \text{ /gal on } 100\% = \$.01 \text{ /gal on total}$