

# Hedging Weather & Climate Change

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# What is CME Group?

## Conglomerate of futures exchanges

- **Chicago Mercantile Exchange (CME)**
- **Chicago Board of Trade (CBOT)**
- **New York Mercantile Exchange (NYMEX)**
- **Commodity Exchange (COMEX)**
- **Green Exchange (GreenX)**
  
- **COMEX and GreenX are part of NYMEX**

# Futures Contracts

## Futures Contract

- **Standardized contract, traded on a regulated commodity futures exchange, that specifies the purchase or sale of a financial instrument or physical commodity for future delivery**
- **Every long position has an opposite short position**
  - i.e., every buyer has a seller
- **Specific terms and conditions**
  - E.g., commodity quality, contract size, pricing convention, etc.
- **Physical delivery vs. cash settlement**
- **Offset is possible before expiration**

# Option Contracts

## Option Contract

- **A contract, traded on a regulated commodity futures exchange, that gives the bearer the right, but not the obligation, to be long or short a futures contract at a specified price within a specified time period**
- **Specified price is called the strike price**
- **Exercise option if in the money**
- **Premium = cost of the option**
  - Changes as the option goes further in or out of the money

# Government Regulations

- **Regulated by the U.S. Commodity Futures Trading Commission**
- **CME Group's exchanges are registered as Designated Contract Markets (DCMs) because they allow all types of participants to trade**
  - Major commercial firms involved in trading of the underlying commodity
  - Individuals
- **DCMs are subject to the highest level of regulation**
- **Under the new Dodd-Frank rules, DCMs must satisfy 23 Core Principles**
  - Major one concerns contracts not being readily susceptible to manipulation

# Energy Contracts

- **CME offers a multitude of energy contracts**
  - Benchmark
  - OTC contracts
- **Benchmark contracts are physically delivered**
  - Crude Oil
  - Natural Gas
  - Heating Oil
  - Gasoline
- **Offer cash-settled versions of the benchmarks**
- **Offer swaps that are effected OTC and then brought to CME for clearing**
  - E.g. cash-settled contracts based on 3<sup>rd</sup>-party price indexes; spreads among contracts

# Weather Contracts

- **Temperature**
- **Hurricane**
- **Frost**
- **Snowfall**
- **Rainfall**
  
- **Both futures and options are offered**
- **Weather is traded off exchange**
  - Bilateral deals
  - Submitted to ClearPort for clearing



# Weather Contracts

- **Weather contracts are cash settled**
- **The value of the contract is some monetary figure in the local currency multiplied by the specified “weather index,” which may be based on temperature, rainfall, snowfall, etc.**
- **Weather indexes usually are determined by independent third parties, such as government agencies.**

# Weather Contracts

- **Benefit: when extreme weather hits, contract holder can use payout to:**
  - Cover additional expenses
  - Recoup losses
- **E.g., Energy supplier may need to source commodity in the spot market because its own failure to supply**
- **E.g., Energy user has higher-than-normal usage due to abnormal weather conditions; cannot obtain energy supply from the usual firms; forced to switch to a more expensive fuel source**
- **E.g., Shopping mall can use weather futures to recoup losses due to lower sales from snow storms**

# Temperature Contracts

- **Covers particular cities in various regions**
  - U.S.
  - Canada
  - Europe
  - Asia-Pacific
  - Australia
- **Offered on a monthly and seasonal basis**
- **Specify either**
  - Heating or Cooling Degree Days
  - Cumulative Average Temperature

# Hurricane Contracts

- **Hurricanes must be named**
- **Make landfall in a specified region**
  - Florida, Gulf Coast, Northern or Southern Atlantic Seaboard
- **Cash-settled based on a hurricane index, which indicates at the time of landfall**
  - Strength
  - Breadth of wind field
- **Cover either an individual event or a season**

# Snowfall/Rainfall/Frost Contracts

- **Snowfall and rainfall contracts are listed for several U.S. cities**
  - Monthly
  - Seasonal
  
- **Frost contracts are listed for Europe (Amsterdam)**
  - Similar to HDD contracts
  - Points are accrued when the temperature dips below a certain level
  - Monthly and seasonal offerings

# Environmental Contracts

- **Climate change risk is largely dependent on politics and government regulations**
- **Most active climate change market is Europe**
- **U.S. does not have a nation carbon cap-and-trade program**
- **GreenX offers futures and/or options on:**
  - European Union Emission Allowances (EUAs) – cap-and-trade
  - Certified Emission Allowances (CERs) – developed to underdeveloped countries
  - Joint Implementation Mechanism Contracts (JI) – developed to developed countries
  
  - SO<sub>2</sub> and No<sub>x</sub> -- U.S. national cap-and-trade but with regulatory uncertainty
  - California Carbon Allowances -- regional cap-and-trade
  - Regional (New England) Greenhouse Gas Initiative contracts -- regional cap-and-trade
- *Climate Action Reserve contracts – voluntary, offers project verification*

# Environmental Contracts

- **Allowances or credits are physically delivered but not “physically handled.”**
- **Typically in electronic form**
- **Physical delivery entails transferring allowances from one member account to another**

# Implications for CME

- **Variability in weather and the potential for increased environmental regulations will affect:**
  - Commodity prices
  - Operating costs
  - Profits/Losses of businesses
- **For CME, variability is a good thing!!!**
- **Variability may be the result of actual occurrences or perception**
- **Short term:**
  - CME should promote the benefits of futures and options trading in terms of hedging (lock in prices) and insurance (payment for negative outcomes).
  - Ensure terms mirror cash market practices; make changes as necessary
  - Do not want contracts that are readily susceptible to manipulation, a CFTC requirement
  - Have “work around” solutions for widespread delivery failure or cash-settlement problems



# Implications for CME

- **Longer term:**
  - Develop new products, as needed
  - Contracts should reflect a functioning, efficient market
  - Be aware of frequency in delivery or cash settlement problems
  - If widespread delivery or cash settlement failure happens often, contract may not be viewed as useful

# Implications of Extreme Weather for Physical Delivery/Cash Settlement

- **Cases of Force Majeure**
  - Delivery for many or all participants cannot be completed
  - Includes Acts of God
- **Example: Hurricane Ike and the Henry Hub**
  - In September 2008, delivery point was shut down for 6 days
- **Exchange has the power to allow extensions in order for delivery to be completed**
- **Possibly utilize “Alternate Delivery Procedures”**
  - E.g., Change delivery location
  - Both parties must agree
- **Cash settlement index: may permit alternate arrangements if the index is not available**

# Implications of Extreme Weather for Energy Markets

- **Extreme weather can impact...**
  - Energy production
  - Energy transportation
- **Supply to the end user is reduced**
- **Effect is a rising commodity price**
- **The best way to avoid price fluctuations is to hedge future needs by locking in prices now.**
  - Choice #1: Take delivery at the hedged price
  - Choice #2: Hedge in a cash-settled contract, take the profit, and buy/sell in the cash market when commodity is needed
- **Good to remind oneself that energy prices fluctuate and may even be volatile. Low and/or stable prices likely will not last forever.**

# Implications of Extreme Weather for Energy Markets

- **What does one do when market failure happens often?**
- **May not be a futures contract at all!**
- **If there is a futures contract, it may not as useful as one in a properly functioning market**
- **Not being able to deliver or figuring out alternate delivery procedures is a pain!**
  
- **May be a good idea to build infrastructure to handle extreme weather**

# Implications of Climate Change for Energy Markets

- **Perspective of an energy producer**
  - Regulations that reduce the negative impacts of climate change increase the cost of doing business
  - Choice: reduce emissions (plant upgrades are costly) or buy allowances
  - Potentially exposed to large fluctuations in allowance prices
  - Weigh upgrade costs against allowance purchases
  - Hedge compliance costs by using allowance-related futures
- **Perspective of an energy buyer**
  - Cost of energy would rise
  - Lock in lower prices with futures on the underlying commodity
- **Perspective of a business or government entity affected by weather**
  - Unexpected weather may affect bottom line
  - E.g., Shops in beach resorts, town that plans for a certain number of snow removals
  - Use weather contracts to recoup losses or cover additional expenses