

# LECTURE I

ACE 428  
Commodity Futures and Options

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# Last class

Ownership  $\implies$  bundle of risks

Derivative product  $\implies$  management of **one** of these risks

INSTITUTIONAL BACKGROUND:  
Exchanges, Products, and Market Participants

## 1.1 EXCHANGES AND PRODUCTS **now**

# Types of derivatives: where/how they trade

We can divide modern derivatives markets into:

1. **Listed derivatives** (our main focus):

- ▶ Highly standardized products (contracts)
- ▶ Central venue and central counterparty (CCP): the exchange and the clearinghouse

2. Over-the-counter (OTC):

- ▶ Highly customized (almost no imposed structure)
- ▶ Bilateral private trading, usually with dealers (without supervision of an exchange)

3. Listed OTCs:

- ▶ OTCs booked with a clearing house
- ▶ Less standardized than listed derivatives, but more structured than OTC derivatives

# Futures and options by volume, 2017 (FIA)

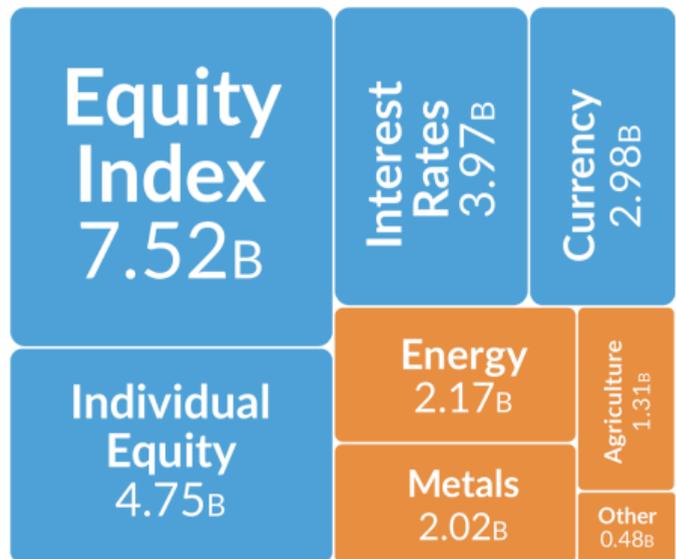
## Volume by Type

**14.8 Billion**  
FUTURES CONTRACTS TRADED  
Down 6.6% from 2016

**10.4 Billion**  
OPTIONS CONTRACTS TRADED  
Up 11.0% from 2016

**25.2**  
Billion Contracts  
Down 0.1% from 2016

## Volume by Category

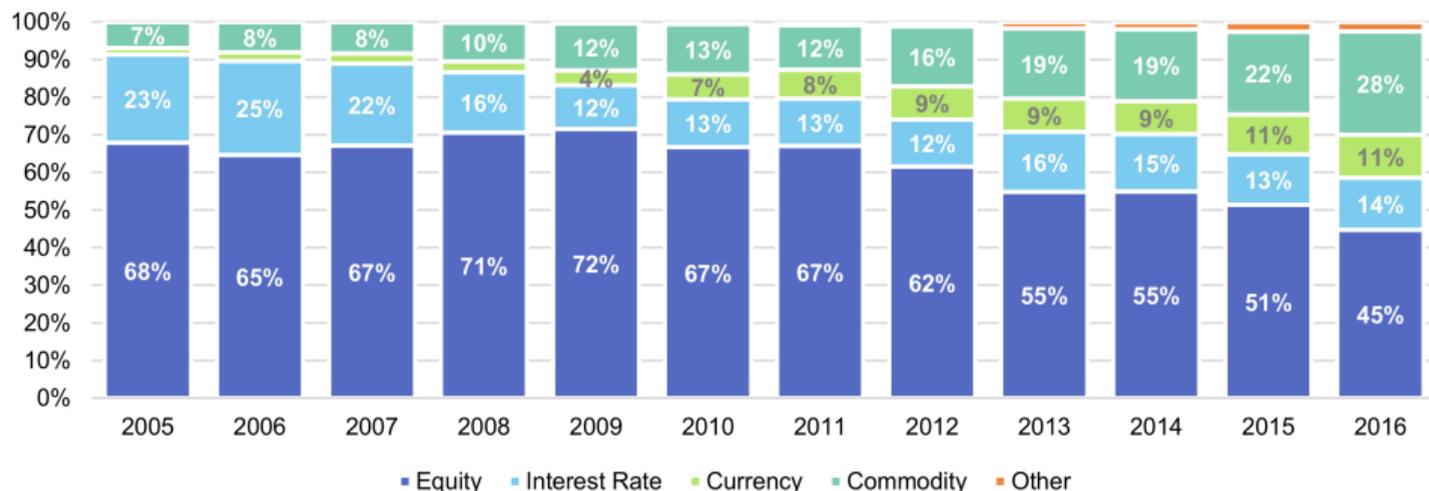


■ Financial Contracts ■ Commodity Contracts

- Futures accounted for 59% of total exchange-traded derivatives volume in 2017.
- Financial contracts accounted for 76% of total volume in 2017.
- Interest rate futures and options set a record of 3.97 billion contracts in annual volume.
- Agricultural futures and options trading fell to lowest level since 2013.

# Futures and options by volume: a decade (WFE)

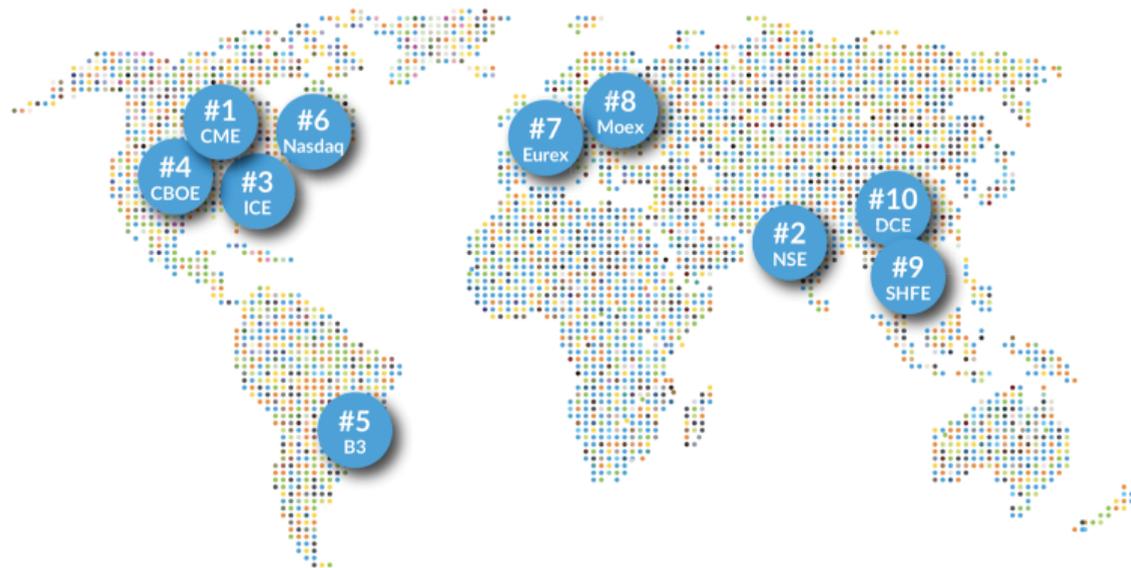
Product composition over time by number of contracts traded



# Leading derivatives venues, 2017 (FIA)

## Top 10 Derivatives Exchanges

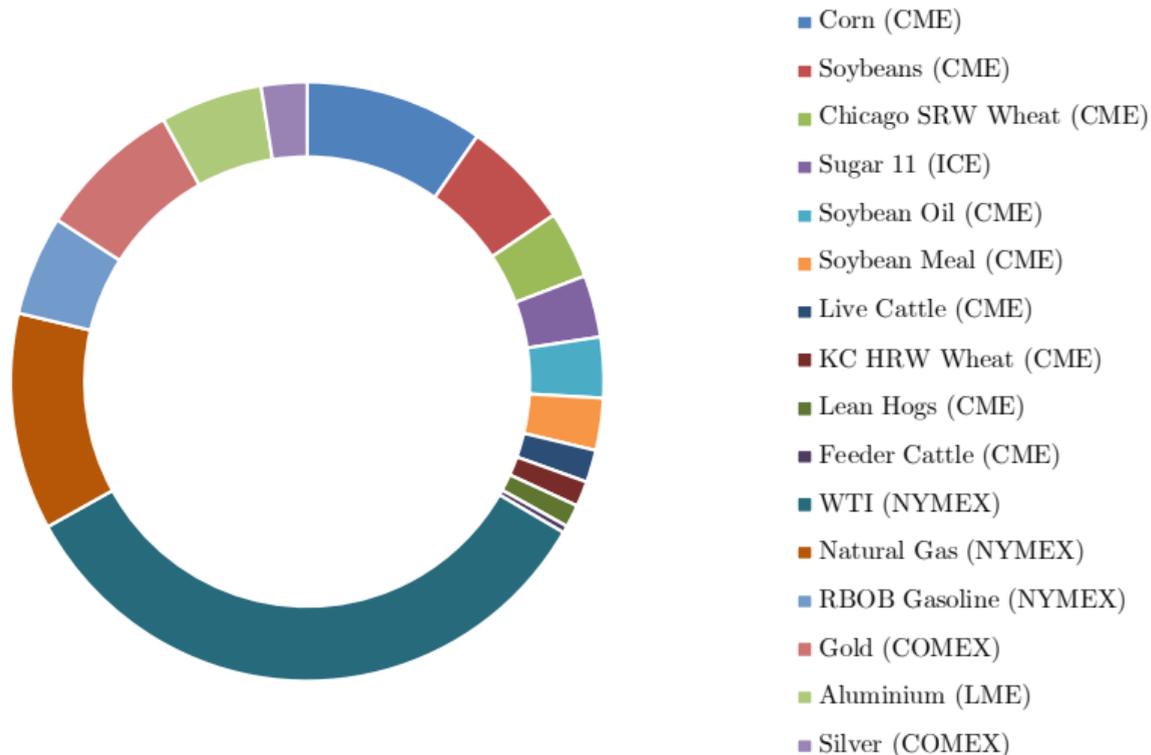
Ranked by number of futures and options traded and/or cleared in 2017



- CME Group was the top exchange by 2017 volume with more than 4 billion contracts.
- NSE India was the second ranked exchange with nearly 2.5 billion contracts traded.
- Exchanges in North America accounted for 34% of total volume in 2017.
- See the full exchange ranking at <http://bit.ly/2017ETDVolume>.

# Commodity products, 2017 (FIA)

*Excel file on Compass "Top Contracts - Ranked by Volume - 2017"*



THAT IS THE CURRENT LANDSCAPE OF  
EXCHANGE-TRADED DERIVATIVES

## 1.2 EXCHANGES AND PRODUCTS **before**

# Origins of futures markets

Very historical account: [http://farmdoc.illinois.edu/irwin/archive/books/Futures\\_Seminar\\_V3/Futures%20Seminar%20V3\\_Bakken.pdf](http://farmdoc.illinois.edu/irwin/archive/books/Futures_Seminar_V3/Futures%20Seminar%20V3_Bakken.pdf)

- ▶ Dōjima rice market (17th Century)

The best way to understand how derivatives exchanges appeared:

- ▶ **Why** did they appear?
- ▶ Must-read (really, it's great): Tom Hieronymus' "*The economics of futures trading*" (ch. 4)

## Origins of futures markets (2): US

- ▶ In the 1840s, the commerce of corn along the Illinois-Michigan canal had the following stylized setting:
  - ▶ Farmers would bring corn to local elevators during late fall and winter
  - ▶ Merchants would receive the corn and hold it until spring, when they would ship the corn to Chicago
  - ▶ Farmers wanted to be paid when delivering the corn
  - ▶ But merchants would only sell the commodity months later
- ▶ **Possible solution:** Merchant goes to bank and asks for a loan, using the corn held as collateral
  - ▶ Bank says: *“There is substantial **price risk** here. I might know the value of this corn you hold today (spot price), but I don’t know its value when you’ll actually sell it in spring”*

What is the economic problem here?

## Origins of futures markets (3): US

- ▶ What if the merchant could guarantee by how much she would be able to sell the corn during spring?
  - ▶ This was first done on March 13, 1851
  - ▶ A merchant made a contract for the delivery of corn in the spring
  - ▶ It called for delivery of 3,000 bushels of corn in June at a price one cent per bushel under the March 13 price

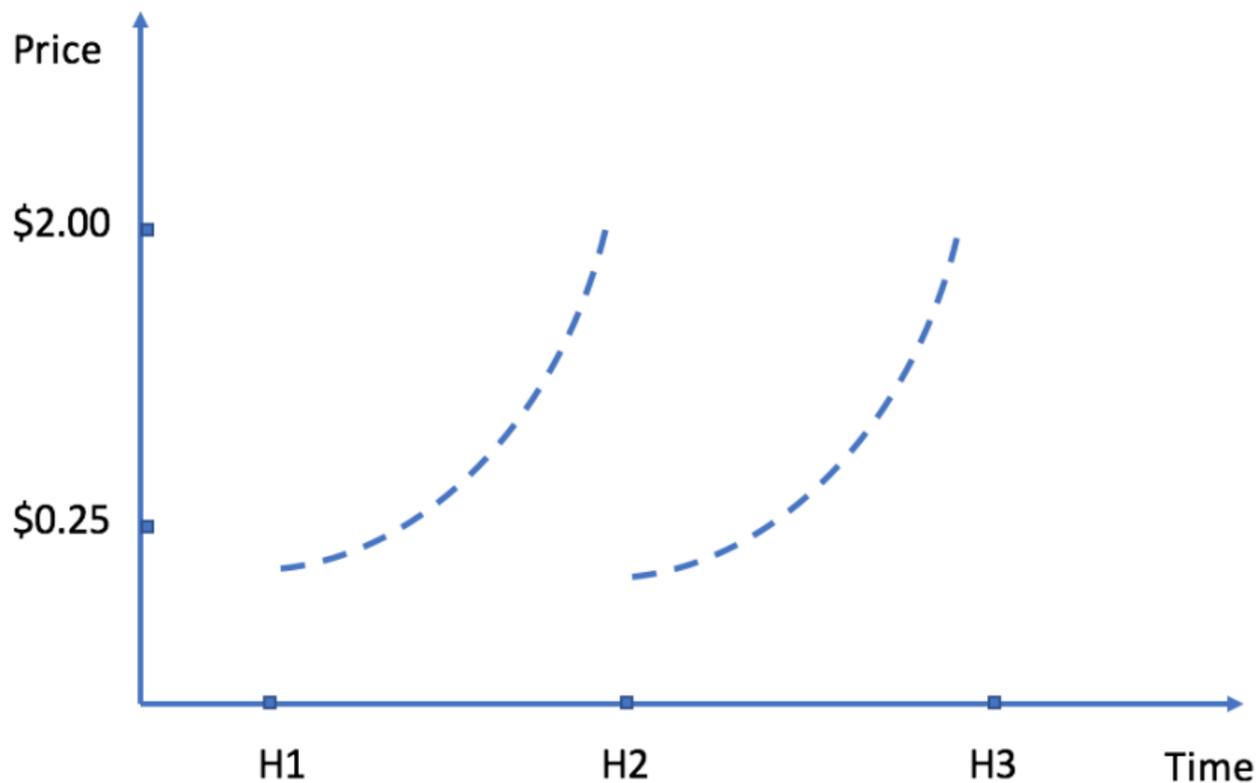
This is a forward contract.

**How does forward contracting solve the economic problem here?**

## Origins of futures markets (4): US

- ▶ In the 1840s, the commerce of wheat differed from the case we just saw (corn):
  - ▶ Wheat could be transported to Chicago just after harvested
  - ▶ Supply shock: effects?
- ▶ Think about the economic process at play:
  - ▶ It's harvest time in year  $t$ . Huge amounts of wheat become available. Next year, it's harvest time again. The year after the next and so on...

- ▶ Seasonal price swings (what is the economic problem here?)



## Origins of futures markets (5): US

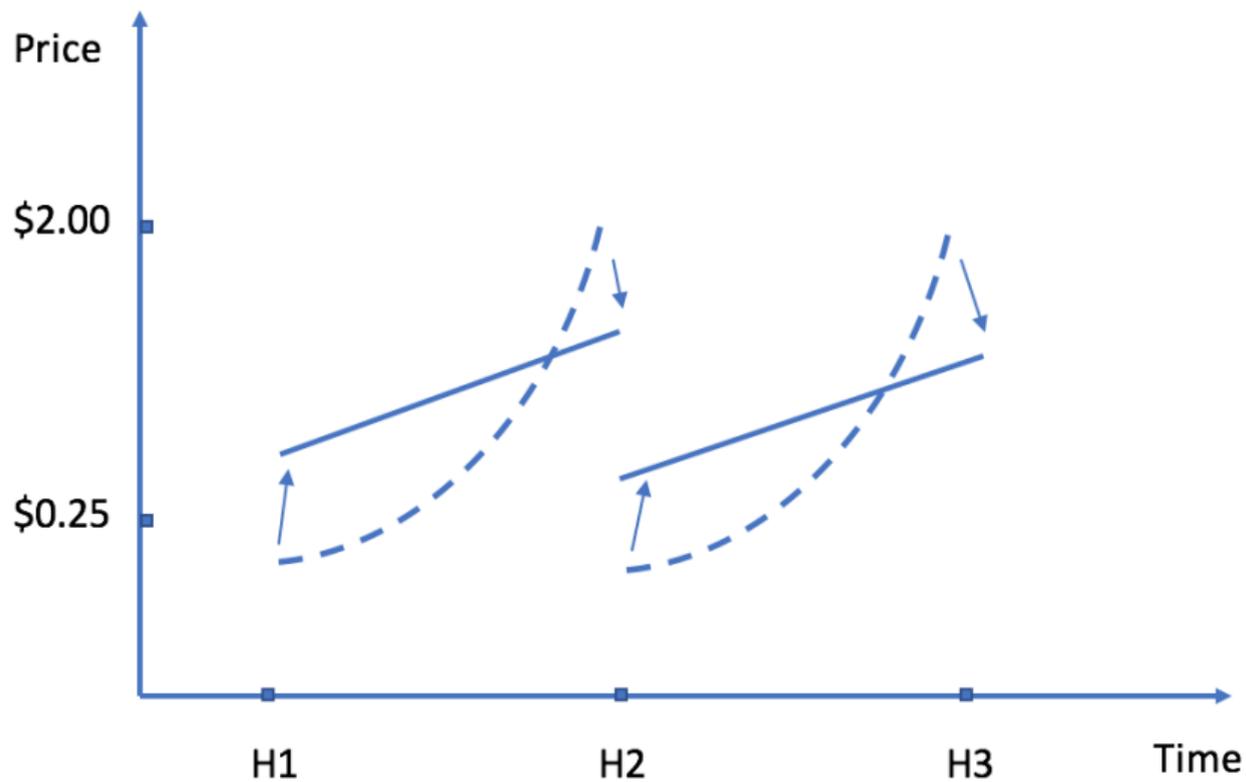
What if the seller of wheat at harvest peak could sell the commodity by more, and the buyer off harvest-peak could buy wheat cheaper...

- ▶ **Possible solution:** Farmer holds on to the wheat after harvesting, because she expects prices to increase few months ahead (can sell for more)
- ▶ Will most farmers adopt the same strategy?
- ▶ **Think about the incentives** a particular farmer would have to store her wheat production

Again, forward contracts emerged as a solution:

- ▶ The seller agrees to deliver a specific amount of grain at a future period and for a pre-established price
- ▶ The buyer consents to accept delivery at the future point in time for the agreed upon price
- ▶ Provide economic incentives to store grains!

- ▶ Seasonal price swings after the introduction of forward contracts



## Origins of futures markets (6): US

- ▶ A **forward contract** is a **private agreement between a buyer and seller** for the future delivery of a commodity at an agreed price
  - ▶ Can be customized to accommodate any commodity, in any quantity, for delivery at any point in the future, at any place
- ▶ **Issues:**
  - ▶ Counterparty who agrees to trade given:
    - same delivery date and location
    - same product quality and quantity
  - ▶ Too customized: differences of opinion?
  - ▶ Counterparty risk (**default risk**)
    - could not deliver (or take delivery) on the agreed date and location
    - could deliver different quality and quantity of the commodity

Think of the two first issues as mechanical, bureaucratic elements. **Counterparty default risk is really the economic problem** (just like price risk)

## Origins of futures markets (7): US

Just like forward contracts emerged to ameliorate the economic problems we just saw, they also introduced their own issues...

... Which explains why derivatives exchanges appeared:

- ▶ In 1848, the Chicago Board of Trade (CBOT) organized futures trading as it exists in principle today
  - ▶ Standardized terms for quality and quantity of the commodity
  - ▶ Delivery procedures and payment terms
  - ▶ A requirement for a margin, or good faith, deposit

Effectively creating futures contracts:

- ▶ Futures contracts are standardized forward contracts
- ▶ Grain markets essentially gave birth to futures trading [\[link\]](#)