# Futures Markets
## Applications to Food Markets

MFRE

Lecture 1

# Mission Statement

Gain experience in the workings of commodity futures markets,

Learn and practice risk management,

Formulate and test trading/hedging strategies

# Agenda

- Intro to Futures Contracts
  - History and Why
  - Pros and Cons
- Market Specifics
- Futures vs Stocks
  - Insider Trading?
- Commodity Markets

# Why Learn about Futures at All

**Markets** are fundamental to economics; efficient prices are key to maximizing social welfare

## Price Discovery:

**Futures Markets** where they exist, determine the 'correct' prices for commodities (for better or worse) – all participants base their decisions on the clearing prices

# Wrong Prices

**Wrong prices** lead to suboptimal human behaviour – deforestation, overfishing, overcultivation, overconsumption, over-construction (houses in US,Iceland, Spain, etc, New South China Mall in China)

We excel at killing the only planet we have

Nearest possible alternative exoplanet is 12 light-years away, about 142,000 years with current technology

# Intro to Futures

Have discussed futures contracts very briefly in Lecture on Storage - (Law of One Price over time)

To understand futures contracts, first:

- understand their history
- why they were created
- what problems they were meant to solve
- what problems they created (if any)

# Background Reading

## The Origin of Futures Markets: An MFRE Tale

### Additional Resources:

- Lecture by Robert Shiller on Forwards vs Futures
  http://oyc.yale.edu/economics/econ-252-11/lecture-15

# Futures History

## Start with a Forward Contract

Producers and processors need to negotiate and agree to a transaction that will take place in the future.

**Forward Contract** - a private contract between two parties (e.g. a producer and a processor) for delivery of a product in the future

You have learned how such arrangements

- reduce business risk, transaction costs,
- E.g. help the Danish Pork industry and Japanese customers

E.g. Seikatsu Club agrees to buy 100mt of healthy pork chops from the Danish at $10/kg in 3 months time

*These numbers are made up*

# Futures History 2

## Futures evolved out of Forwards

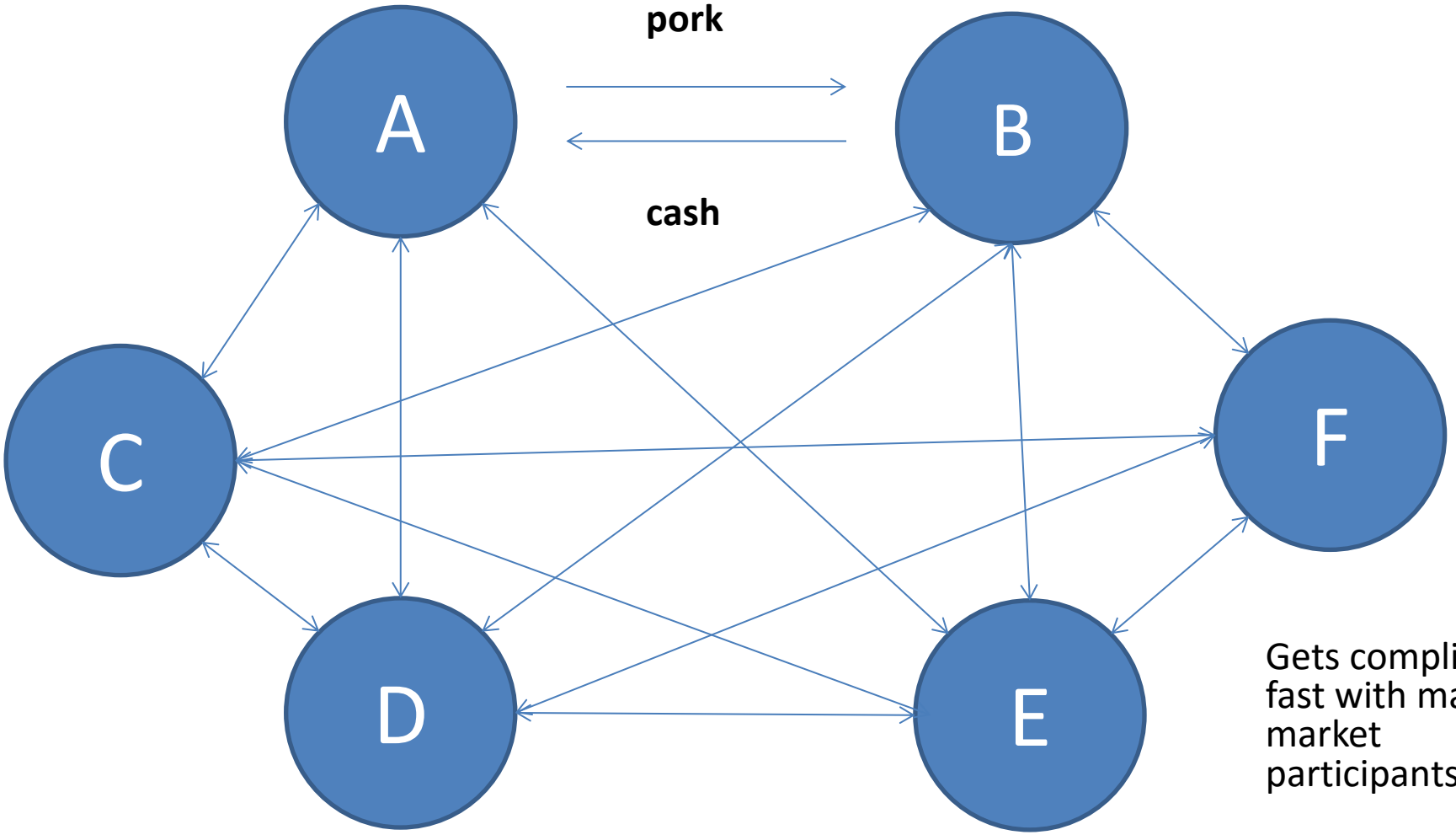
Futures evolved to simplify repeated business transactions (forward contracts) where possible

Because futures have been around for >150 years, it is common to mistakenly assume:

- commodities did not trade before futures were invented
- commodities trade only on futures exchanges
- futures markets are the only ‘relevant price’ for a food commodity

# Why futures were created

Forward contracts are private bilateral agreements

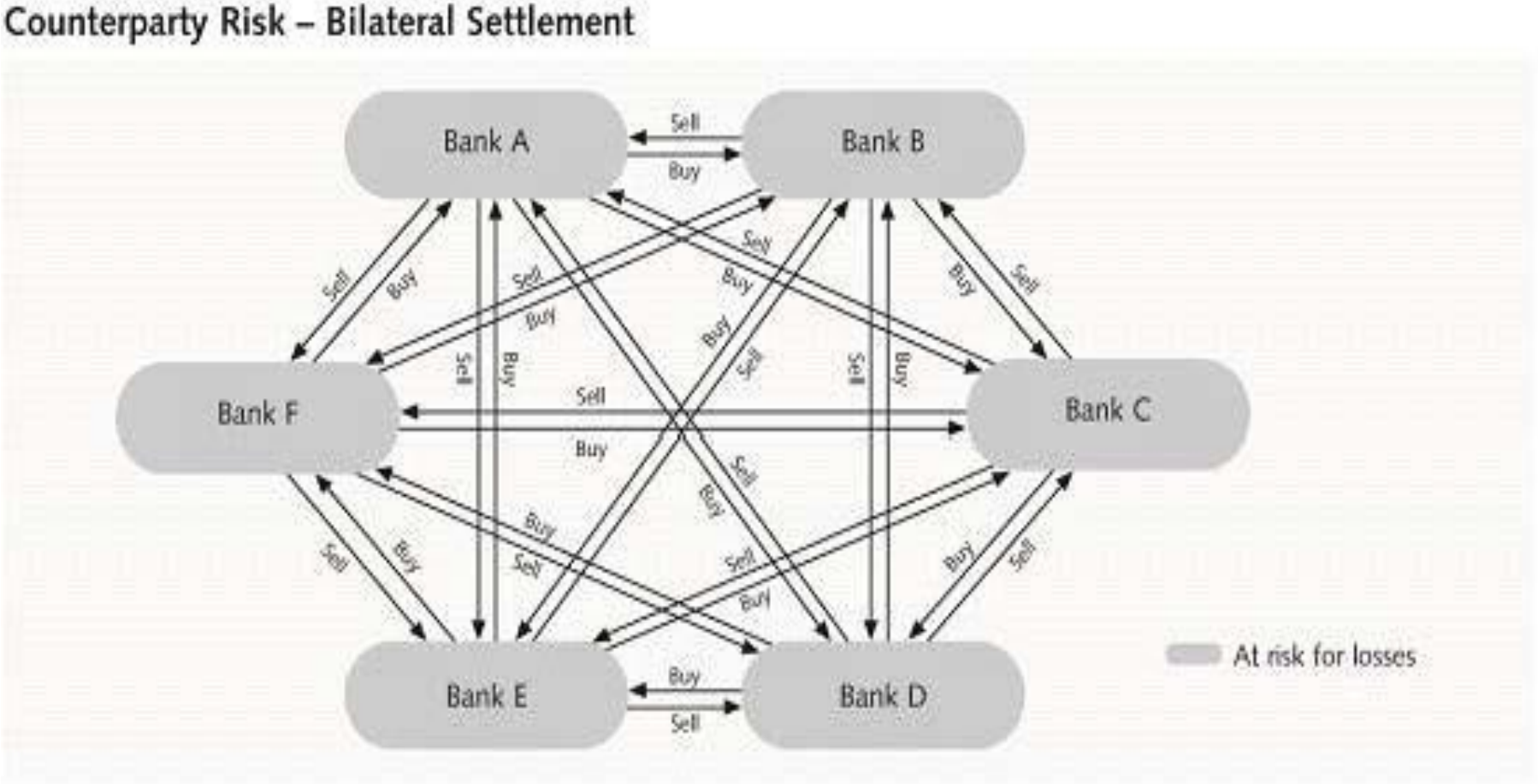



Gets complicated fast with many market participants

# What's wrong with this web of forwards?

- Forward OTC contracts operate primarily on trust
  - Usually little to no security
- Contracts not standardized, can only be closed with direct counterparty
  - Poor liquidity, contracts cannot be offset
- What happens if one major party defaults?
  - 'Lehman' contagion moment

# Lehman – OTC Derivatives




OTC Derivatives: The default of firm A in an OTC derivative transaction has a possible contagion effect. It does not only affect firm F, it leaves all connected trading counterparties from firm A to F potentially at risk.

# Futures Contracts

Evolved to address shortcomings of a ‘web of forwards’

**Characteristics:**

- Standardized Terms (Delivery location, date, quality) allow contracts to become:
  - **fungible** (identical, inter-changeable)
  - **tradeable** (easily sold to someone else)
- Bilateral contracts replaced with two separate contracts against a Central Counterparty (CCP)
  - Contains default risk, and **reduces contagion**
  - Everyone has to post **collateral (Margin)**

# Futures Pros and Cons

- Significantly improves:
  - Counterparty (default) risk, contagion risk
  - Fungibility and Tradeability

- Some downsides
  - Requires better cash management
  - More margin required, creates liquidity risk
  - Doesn’t address all markets

# Eleni Gabre-Madhin

Real-life example of need for a commodities exchange in Ethiopia

http://www.ted.com/talks/elene_gabre_madhin_on_ethiopian_economics?language=en

# Market Specifics

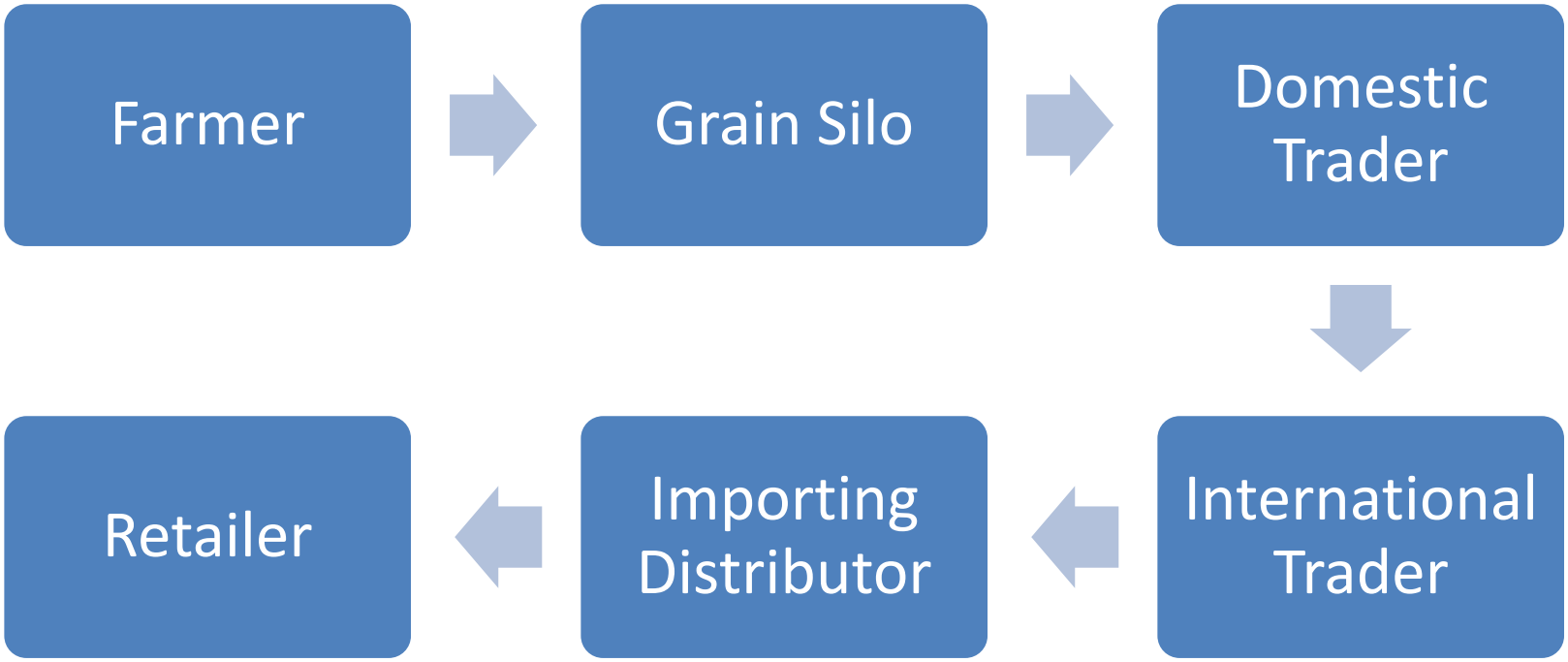
# Futures applies to some food commodities and not others:

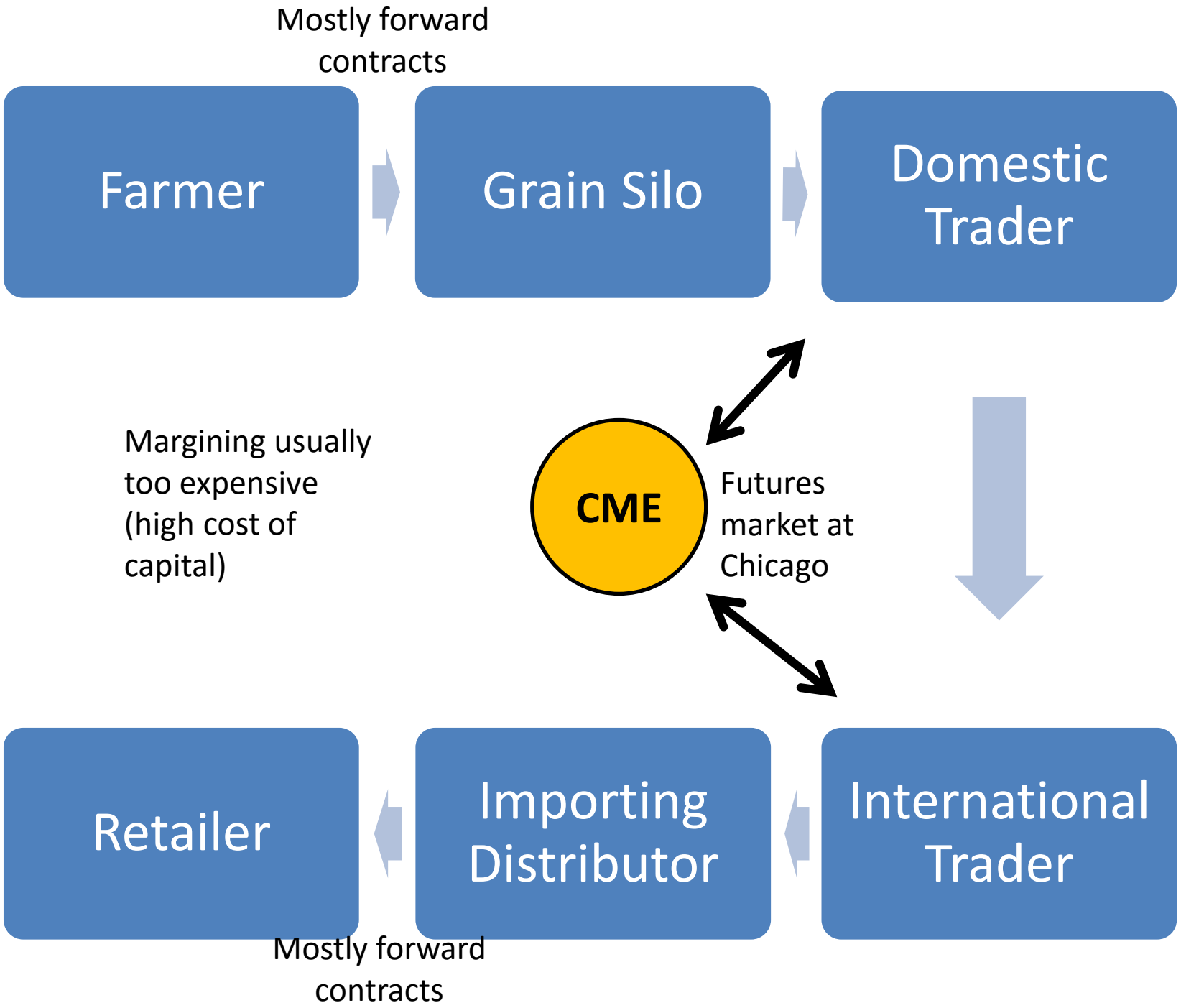
| Applicable | Not Applicable |
| --- | --- |
| Corn | Chicken |
| Soybean | Wine |
| Rice | Beer |
| Rapeseed | Lettuce |
| Wheat | Potatoes |
| Palm Oil | Eggs |
| Cattle | Bean Sprouts |

# Futures Contracts

Even when futures contracts are used for a commodity, many parts of the supply chain remain forward contracts between parties.

Eg. Let's look at how Wheat might physically flow through supply chain:




Mostly forward contracts
Farmer
Grain Silo
Domestic Trader
Margining usually too expensive (high cost of capital)
CME
Futures market at Chicago
Retailer
Importing Distributor
International Trader
Mostly forward contracts

# What market characteristics make futures contracts advantageous?

- **Many buyers and sellers**
- Buyers and sellers converging at **One hub**
- Commodity is **Storable**
- Commodity is **Homogenous**
  - (not wine)
- Reasonably **long production cycle**
  - (no need for eggs futures)

# Futures vs Stocks

What’s the difference?

# Some Terminology ('Lingo')

Futures are both **securities** and also **derivatives**

**Securities**: in essence assets that are

- fungible (inter-changeable)
- tradeable

**Derivatives:** instruments that derive their value from the price of some other underlying entity

**Futures differ from stocks/bonds**

- Stocks/Bonds➔ **transfer capital**
- Futures ➔ **transfer price risk**

# Futures vs Stocks

- Futures markets don't raise money from public – not governed by SEC regulations in the U.S. (though there are CFTC rules about speculation)
- Futures represent contracts between willing buyers and sellers of commodity
- No such thing as **'insider trading'**
- $100,000 phone call

# Insider Trading: Trading Places

http://www.youtube.com/watch?v=1tmI867fAYU

# Distortions in the Futures Markets

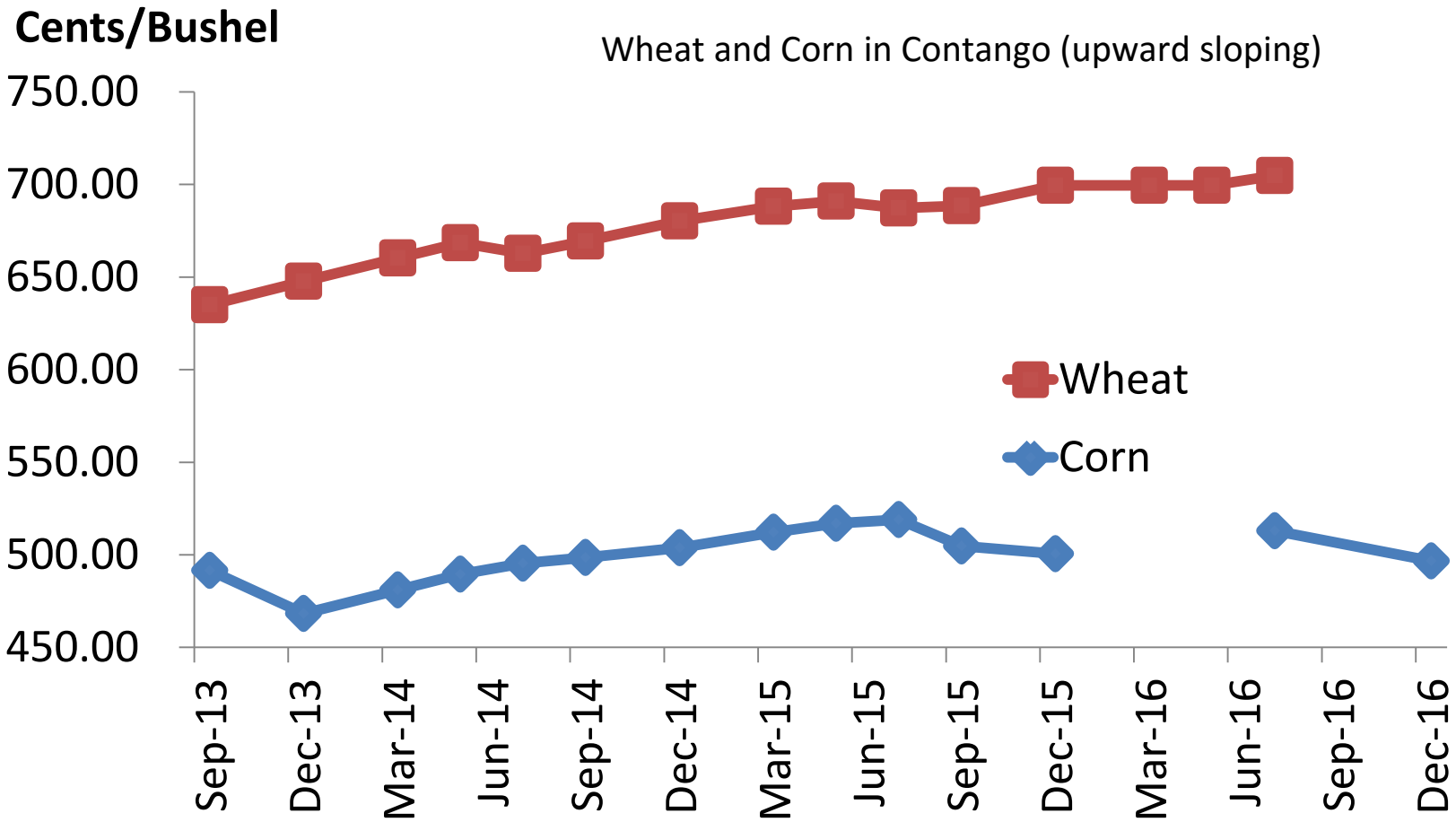
Read the testimonials of Michael Masters , an honest Hedge Fund Manager who fought for better markets:

- 2008: To the Committee on Homeland Security and Governmental Affairs, US Senate
- 2009: To the CFTC

Strongly argued that indiscriminate speculative inflows from ‘passive’ commodity funds (e.g. commodity ETFs) were driving up commodity prices – totally true

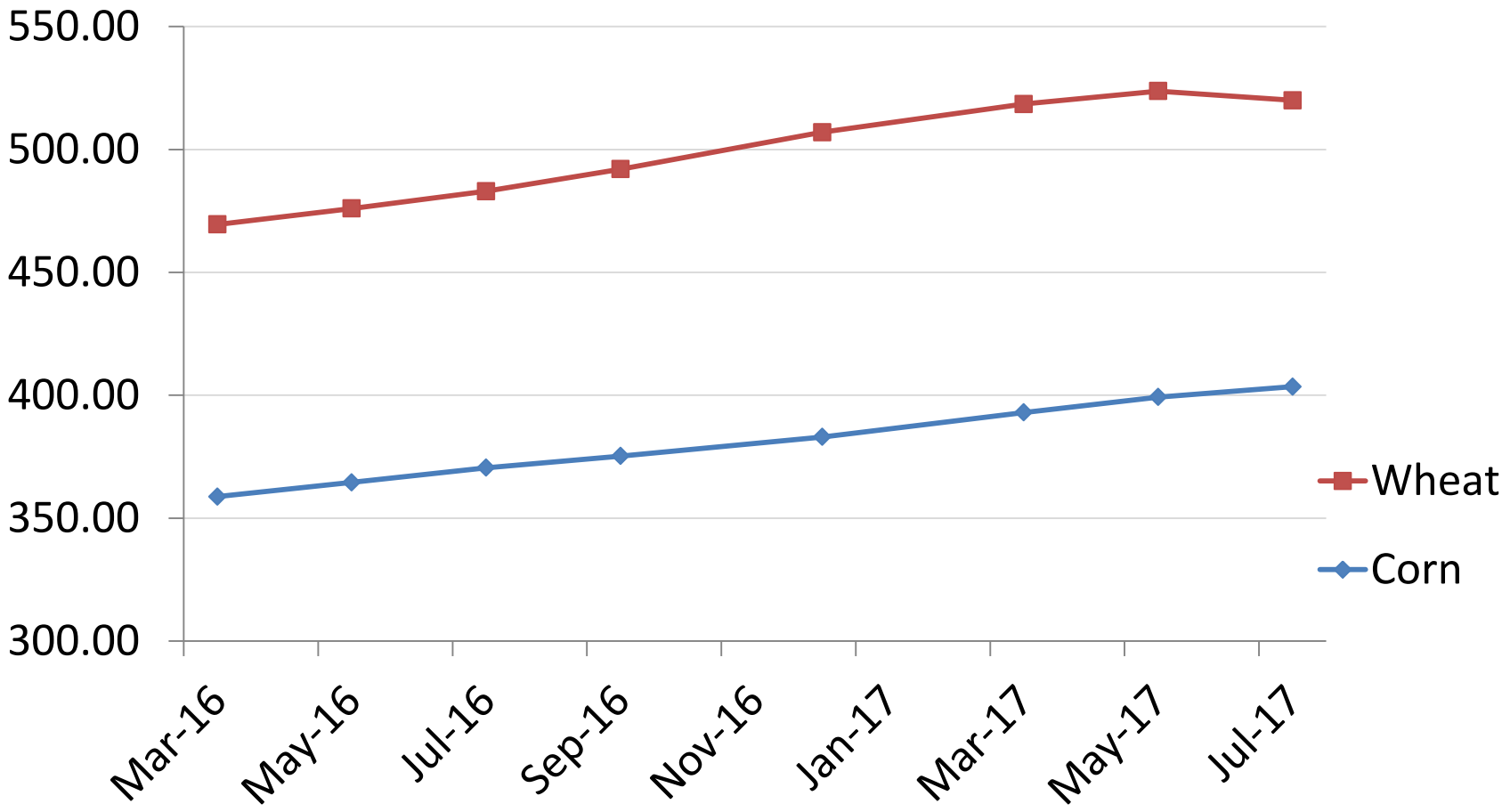
# Markets

# Futures Curves

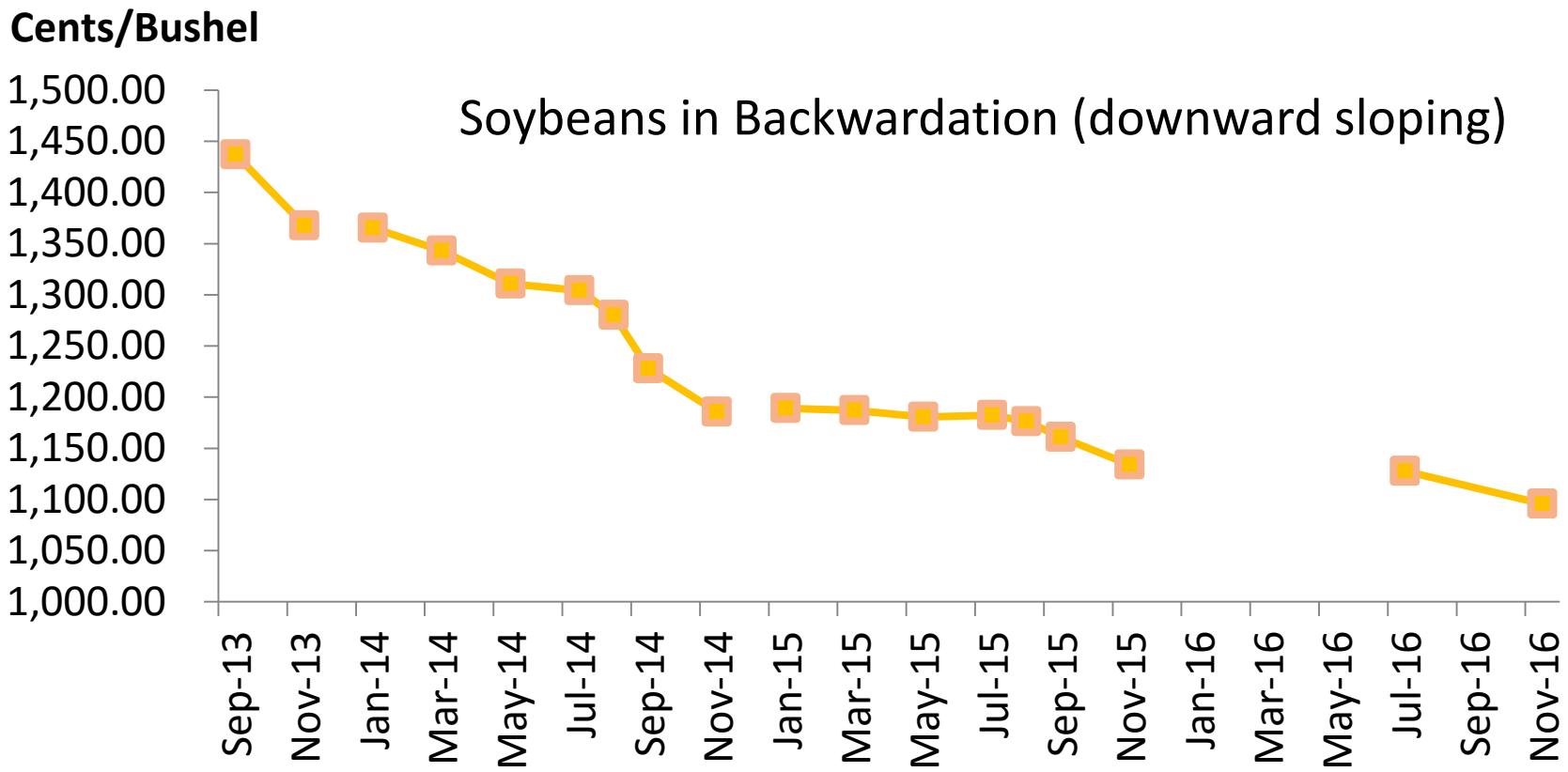



There are many prices for a commodity
Each point represents a futures contract for delivery in that month

# Wheat and Corn (31 Dec 2015)

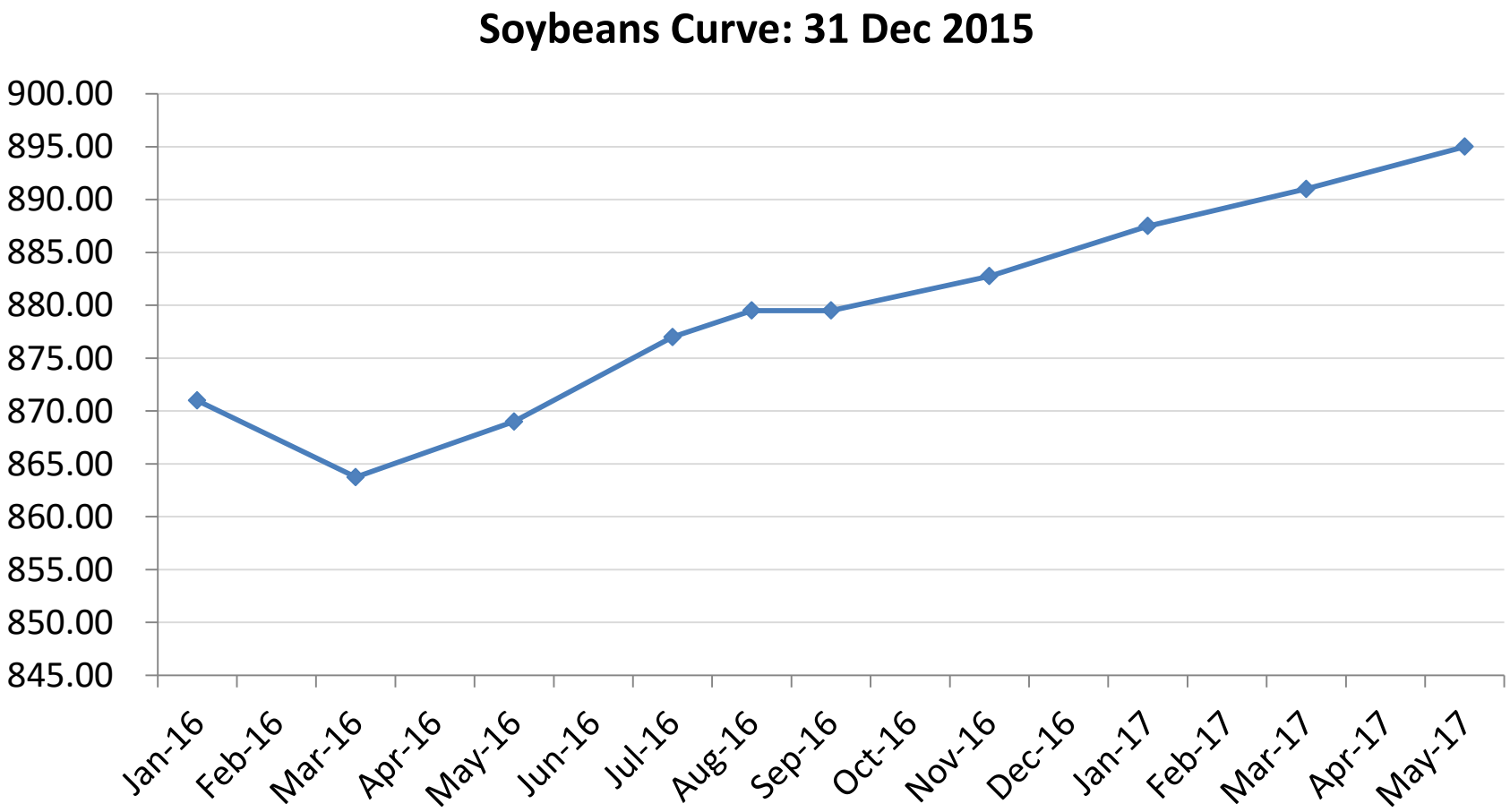


# Futures Curves




Time Series usually refer to just spot price or, 1st nearby price

# Soybeans back in Contango



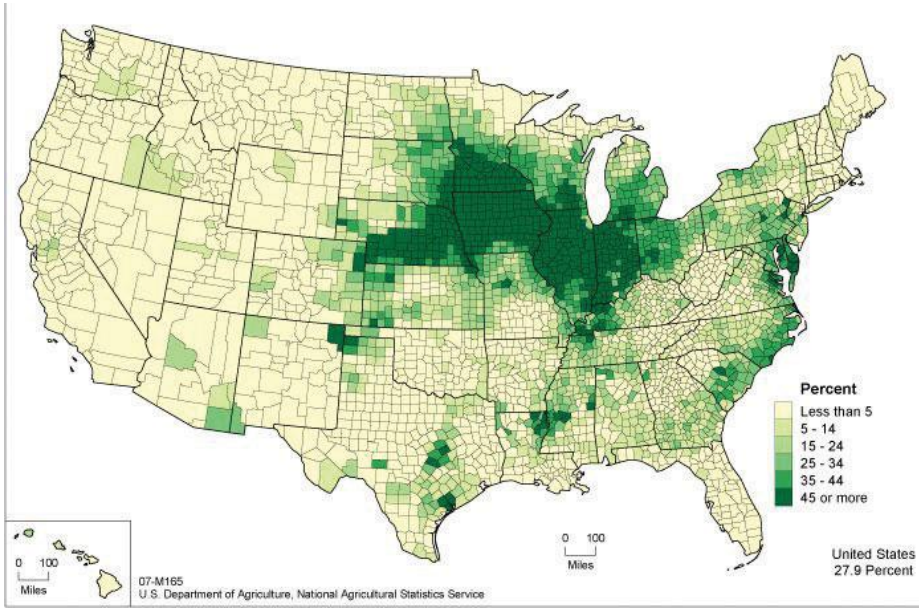
# Month Codes for futures contracts

| Month Codes | |
|---|---|
| **Code** | **Month** |
| | |
| **F** | **January** |
| **G** | **February** |
| **H** | **March** |
| **J** | **April** |
| **K** | **May** |
| **M** | **June** |
| **N** | **July** |
| **Q** | **August** |
| **U** | **September** |
| **V** | **October** |
| **X** | **November** |
| **Z** | **December** |

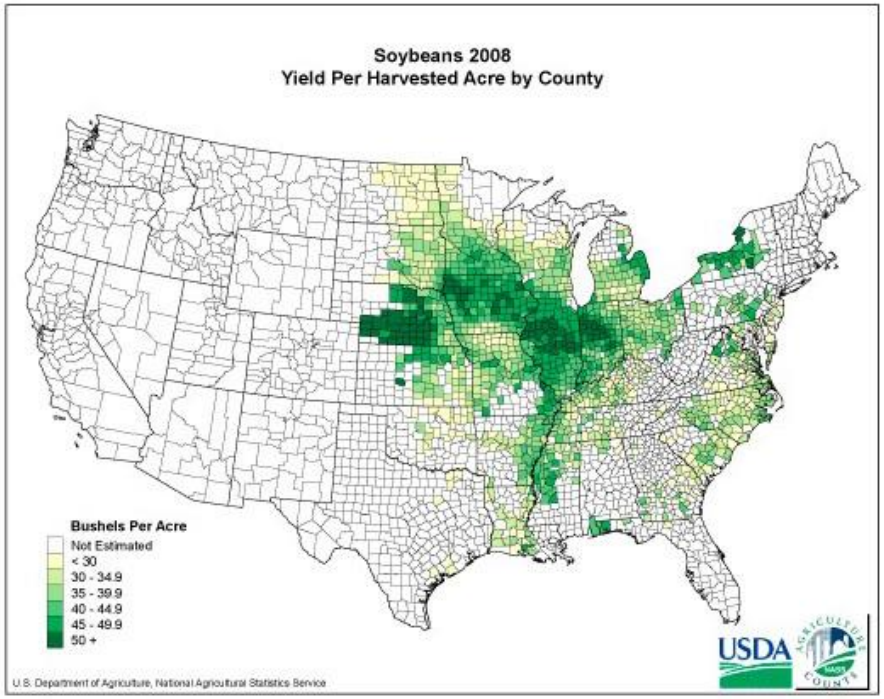
# Basic Relationships

# Corn and Soybeans are production substitutes

**You can figure out price implications on your own – that's the fun part!**




**CORN**




**SOYBEANS**

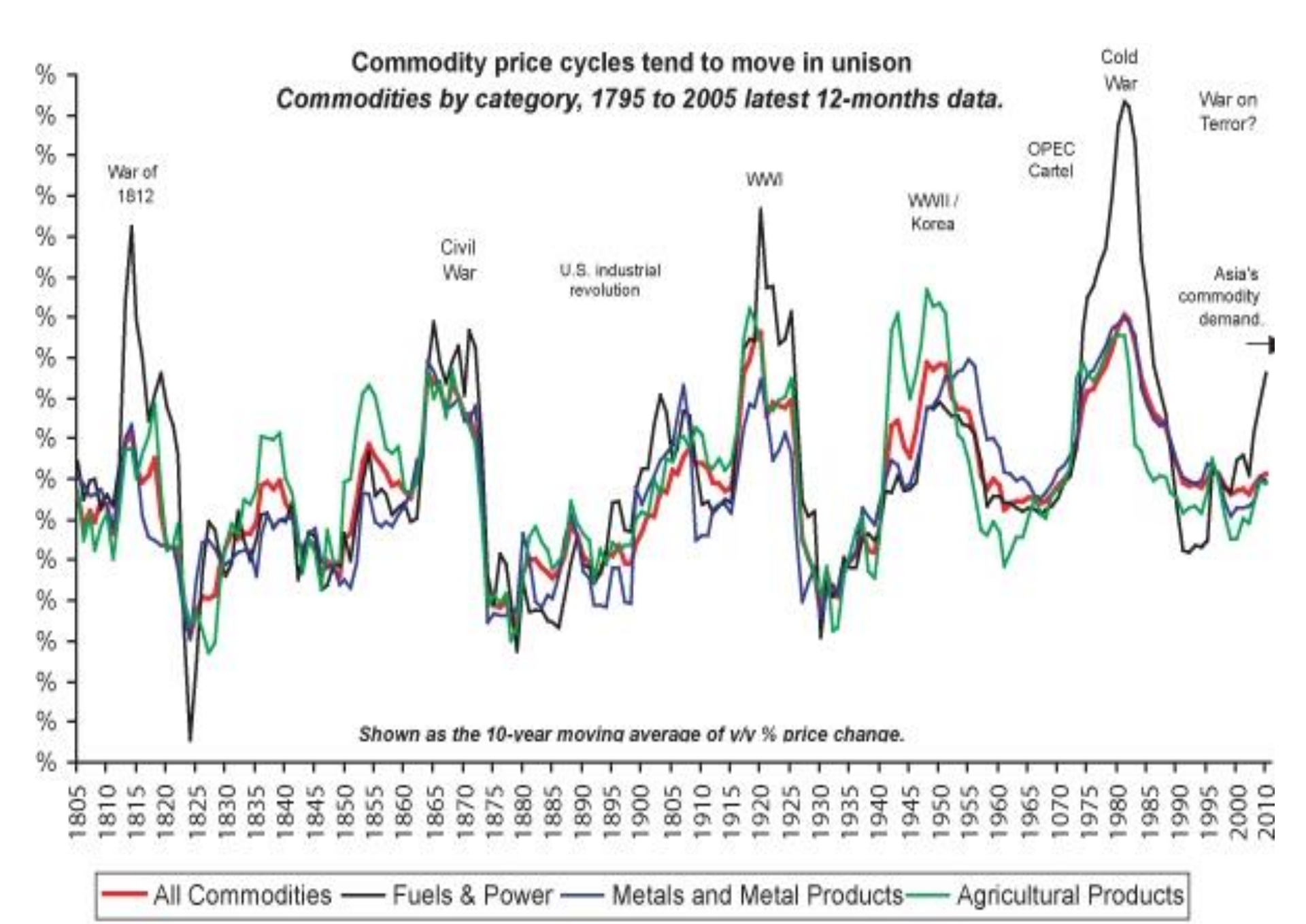
# Wheat – best left to Canadians


Brendan can tell us about wheat

# Demand Side

- Corn and Wheat are demand substitutes, in both human feed and animal feed
- Corn and Soybeans are also demand substitutes – oil and protein
  - Corn-ethanol and soybean methyl ester (biodiesel) linked through energy markets and biofuel policies
  - Remaining protein are substitutes in animal feed

You can do the historical price charts
and correlations yourselves to see
the relationships




Source: Barry Bannister

# Energy Price is the leader

Why does the price of energy lead all other commodities?

Everything we harvest from the planet requires energy. If energy were infinitely cheap, it would be possible to convert a mountain into pure elements for no cost. All commodity prices would move toward zero.

Food still requires other inputs (biological and chemical transformation in addition to mechanical transformation) but modern day ag. production is highly energy intensive

# Examples of drivers

- Supply
  - Crop reports, weather reports, planting
  - Competitor production, planting
- Demand
  - Import Demand (e.g. BRIC countries)
  - Biofuel Regulations
  - Crude Oil price
  - Macroeconomic / Political Events:
    - FX and Bond markets go first
    - Energy and Industrials next
    - Soft commodities usually go last, but biofuel has tightened the relationship
    - Equity (Stock) markets are temperamental

# USDA crop reports
# (See sample calendar)

http://www.usda.gov/wps/portal/usda/usdahome?navid=AGENCY_REPORTS

Expect heavy volume of trading just before and just after the announcement, as markets adjust to new information.

# Economic Calendars

Yahoo Economic Calendar:
http://biz.yahoo.com/c/ec/201338.html
Bloomberg Economic Calendar:
http://www.bloomberg.com/markets/economic-calendar/
CME Economic Calendar:
http://www.cmegroup.com/education/econ_calendar.html

# Summary of Futures

- **3 Main Risks for economic agents to manage:**
  - Price Risk
  - Counterparty Risk
  - Liquidity Risk
- **Unmanageable risks:**
  - Risks from ‘acts of God’ that result in supply shocks can only be transferred but not removed from the system

# Summary of Futures

- **Forward contracts are:**
  - Bilateral-traded
  - Non-standard (delivery locations, dates, quality)
  - May or may not be tradeable
  - Significant counterparty risk, high contagion risk
  - Less liquidity risk (depends on negotiated terms)
- **Futures contracts are:**
  - Standardized, Fungible and Tradeable
  - Exchange-traded and Centrally cleared
  - Less counterparty risk, less contagion risk
  - Requires better cash management (more margin required and liquidity risk)
  - Enables easier non-commercial participation