ENERGY POLICY

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COMMODITY TRADING FIRMS

Fundamental Facts About CTFs

- CTFs transform physical commodities
- CTFs buy and sell commodities, so are focused on margins (price differentials) not on flat price levels
- Physical business, with profitability driven by volumes and margins
- Extensive users of derivatives but as hedgers of flat price risk
- Main exposure is to basis risk

Commodity Transformations

- CTFs perform commodity transformations at all levels of the value chain
- Transformation in space (transportation)
- Transformation in time (storage)
- Transformation in form (processing)
- Different firms focus on different transformations and different commodities: substantial diversity among firms

Trading

- Spreads and pricing relationships, not flat prices, are the essence of physical commodity trading
- Trading and managing the risk of such price exposures requires an understanding of the value chain
- CTFs specialize in understanding the value chain and enhancing value by identifying physical "arbitrages" and managing the associated risks

Commodity Trading Firms: Agents of Transformation

- Commodity trading firms specialize in making transformations in space, time, and form
- As such, they are focused on price relationships (spreads) rather than flat prices
- Flat prices matter primarily to the the extent that they affect (a) volumes/margins, and (b) financing constraints

Flat Prices & Volumes/Margins

- Relationships between flat prices and volumes/margins depends on whether supply or demand shocks are driving flat prices
- High prices due to high demand: good for margins and volumes
- High prices due to low supply: bad for margins and volumes
- Margins/volumes *much* more stable over the cycle than prices

Paper Trading by CTFs

- CTFs are extensive users of listed and OTC derivatives, but primarily as hedgers
- Use derivatives to exchange flat price risk for basis (spread) risk
- Typically major sellers of futures/swaps to hedge their inventory holdings
- Speculative trading focuses on spread trades, rather than directional trades

Asset Ownership By Commodity Trading Firms

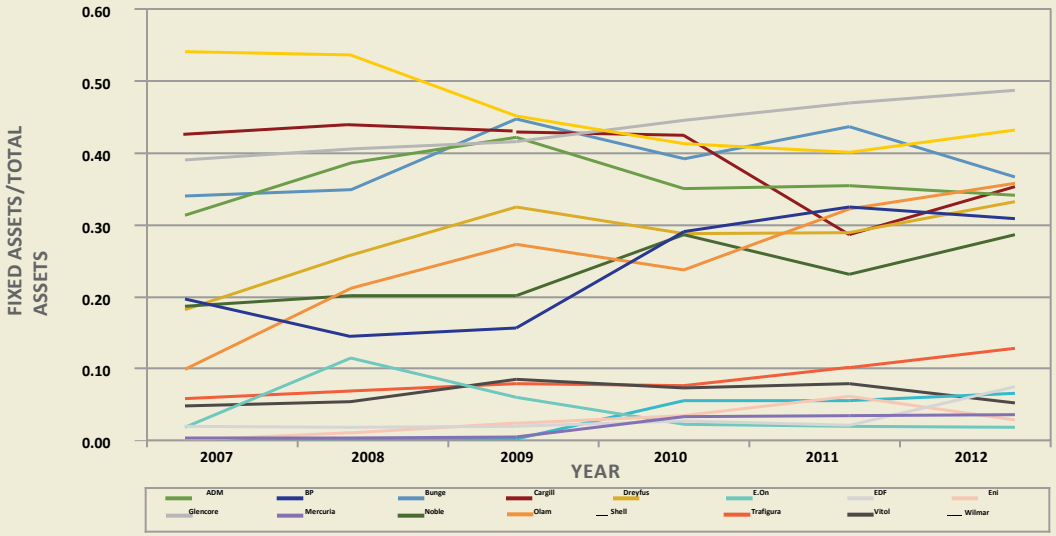
- Commodity trading firms can transform commodities without owning assets (charter a ship; rent storage space)
- Commodity trading firms quite diverse in their asset ownership patterns
- Asset light firms
- Asset heavy firms

Trends in Asset Ownership

- Widely believed that commodity trading firms becoming more asset heavy
- In reality, considerable diversity in trends across commodity trading firms

FIGURE 1

FIXED ASSETS DIVIDED BY TOTAL ASSETS AT COMMODITY TRADING FIRMS



APPENDIX B

TRADING ACTIVITY AND PHYSICAL ASSET OWNERSHIP FOR LEADING COMMODITY TRADINGFIRMS

FIGURE 1

ADM

	Corn	Wheat	Oilseeds	Cotton	Sugar	Cocoa	Coffee	Industrial Metals	Iron Ore	Petroleum	Coal	Natural Gas	Power
Trading	x		x			x							
Upstream													
Midstream	x		x			x							
Downstream	x		x			x							

FIGURE 2

BUNGE

	Corn	Wheat	Oilseeds	Cotton	Sugar	Cocoa	Coffee	Industrial Metals	Iron Ore	Petroleum	Coal	Natural Gas	Power
Trading	x	x	x		x								
Upstream													
Midstream	x	x	x		x								
Downstream		x	x		x								

FIGURE 3

CARGILL

	Corn	Wheat	Oilseeds	Cotton	Sugar	Cocoa	Coffee	Industrial Metals	Iron Ore	Petroleum	Coal	Natural Gas	Power
Trading	x	x	x	x	x	x		x	x	x	x	x	x
Upstream	x	x	x										
Midstream	x	x	x	x	x	x							
Downstream	x	x	x		x	x							

FIGURE 4

LOUIS DREYFUS

	Corn	Wheat	Oilseeds	Cotton	Sugar	Cocoa	Coffee	Industrial Metals	Iron Ore	Petroleum	Coal	Natural Gas	Power
Trading	x	x	x	x	x		x	x					
Upstream	x	x	x										
Midstream	x	x	x	x	x		x	x					
Downstream	x	x	x		x		x						

FIGURE 5

GLENCORE

	Corn	Wheat	Oilseeds	Cotton	Sugar	Cocoa	Coffee	Industrial Metals	Iron Ore	Petroleum	Coal	Natural Gas	Power
Trading	x	x	x	x	x			x	x	x	x		
Upstream								x		x	x		
Midstream	x	x	x		x			x		x	x		
Downstream			x		x			x	x				

FIGURE 6

GUNVOR

	Corn	Wheat	Oilseeds	Cotton	Sugar	Cocoa	Coffee	Industrial Metals	Iron Ore	Petroleum	Coal	Natural Gas	Power
Trading												x	
Upstream										x	x		
Midstream										x			
Downstream										x			

FIGURE 7

MERCURIA

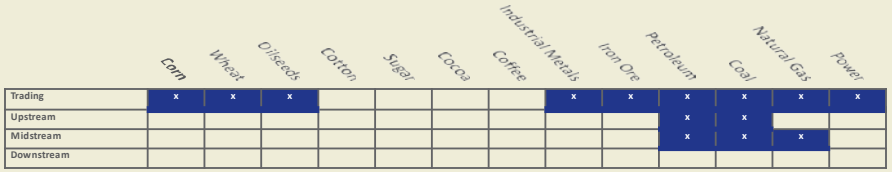


FIGURE 8

TRAFIGURA

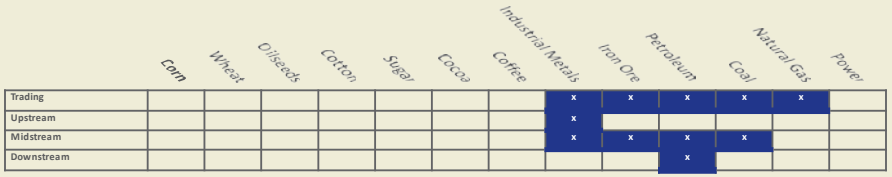


FIGURE 9

VITOL

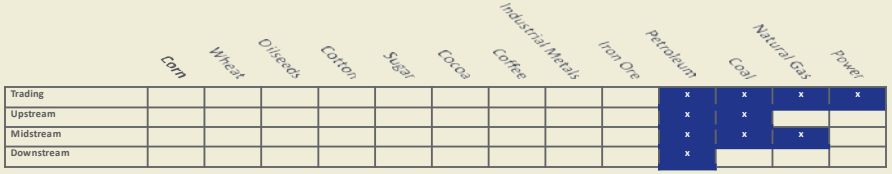


FIGURE 10

OLAM

FIGURE 11

NOBLE

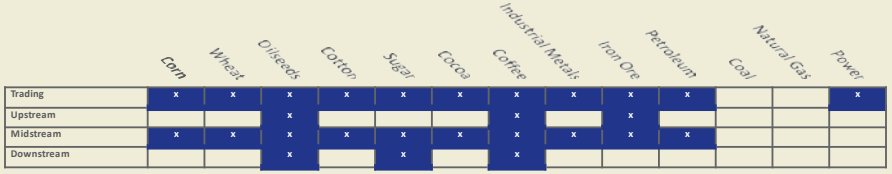
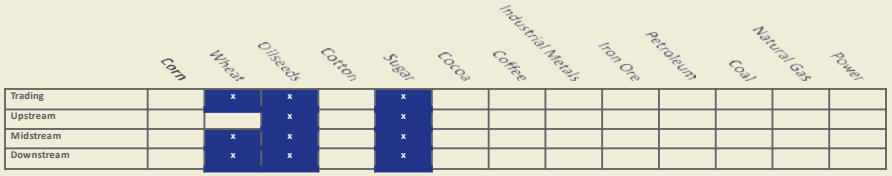


FIGURE 12

WILMAR



Why Own Assets?

- Common to say asset ownership provides optionality, but you can have optionality without ownership (shipping is a great example, or offtake agreements)
- Asset ownership can mitigate "transactions costs", notably costs associated with "holdups"
- Holdups can occur when an asset is specialized and there are few available substitutes

Example: Storage Facilities

- Efficient utilization of storage rapid response to supply and demand shocks
- The owner of a storage facility can attempt to extract concessions from a firm using the facility by threatening to delay access to the stored commodity (look at aluminum, cocoa)
- "Temporal specificity"
- The storer can avoid this problem by owning the asset

Logistics Assets

- Similar considerations pertain for other "midstream" assets, like terminals: rapid access to asset on an unpredictable basis necessary to execute arbitrage transactions
- Many midstream assets are also large scale, site specific, with few close substitutes, and users often move volumes sufficient to utilize a large fraction of capacity

Upstream Assets

- Some ownership of upstream assets by commodity traders (e.g., palm oil plantations)
- In some cases, transactions costs considerations seem to explain this: in the case of palm oil, desirable to locate processing plants on plantations, so holdups are avoided by having the same firm own both
- In other cases, notably mines, this seems less clear

Downstream Assets

- Considerable integration recently into downstream assets (e.g., fuel marketing)
- Transactions costs considerations seem important here:
- Flipside of disintegration by oil majors
- The development of robust spot markets for fuel means that majors don't need to own downstream assets to market their products

The Ownership of Commodity Traders

- Diversity here as well: some firms private, others public
- Trade off: better incentives under private ownership, but it limits ability to raise capital and limits ability of owners to diversify
- Relationship between asset intensity and ownership
- Uses of hybrid financing strategies to finesse trade off (perpetual debt; selling equity in asset-heavy subsidiaries)

Do Commodity Trading Firms Pose Systemic Risks?

- Post-crisis, it has been asserted that commodity trading firms pose systemic risk like banks do
- "Too big to fail"
- Commodity trading firms very different from banks, and hence do not pose even remotely similar systemic risks

Why Commodity Traders Aren't Systemically Risky

- Not really that big
- Balance sheets not "fragile" (no maturity transformation)
- Don't supply credit like banks do: mainly conduits of credit from banks to customers/suppliers
- Little concentration
- Assets redeployable
- Less vulnerability to major economic downturns

RISK PREMIA & SPECULATION

Risk Premia

- A forward price is often described as the market's expectation of the future spot price
- NO!
- An expectation is a mathematical concept, not a traded price
- A forward price is a traded price
- A forward transaction involves the transfer of risk, so the forward price also incorporates a price of risk—the risk premium
- Risk premium=profit from speculation/cost of hedging

Theories of the Risk Premium

- "Keynesian Normal Backwardation"—nomenclature alert: this use of the term "backwardation" is different than the common market usage
- Keynes posited that hedging pressure determines the risk premium
- Hedgers want to go short: forward price must be below the expected spot price to attract specs to take the opposite side ("downward bias/upward trend")
- If hedgers want (on net) to go long, get upward bias
- In the Keynes theory, idiosyncratic commodity price risks determine risk premia

Implications

- Speculation affects the risk premium (the price of RISK), not the overall level of prices (except to the extent that speculators are informed and their trades cause prices to reflect that information)
- Some hedgers don't like speculators: specifically, hedgers on the same side of the market as speculators don't like the competition

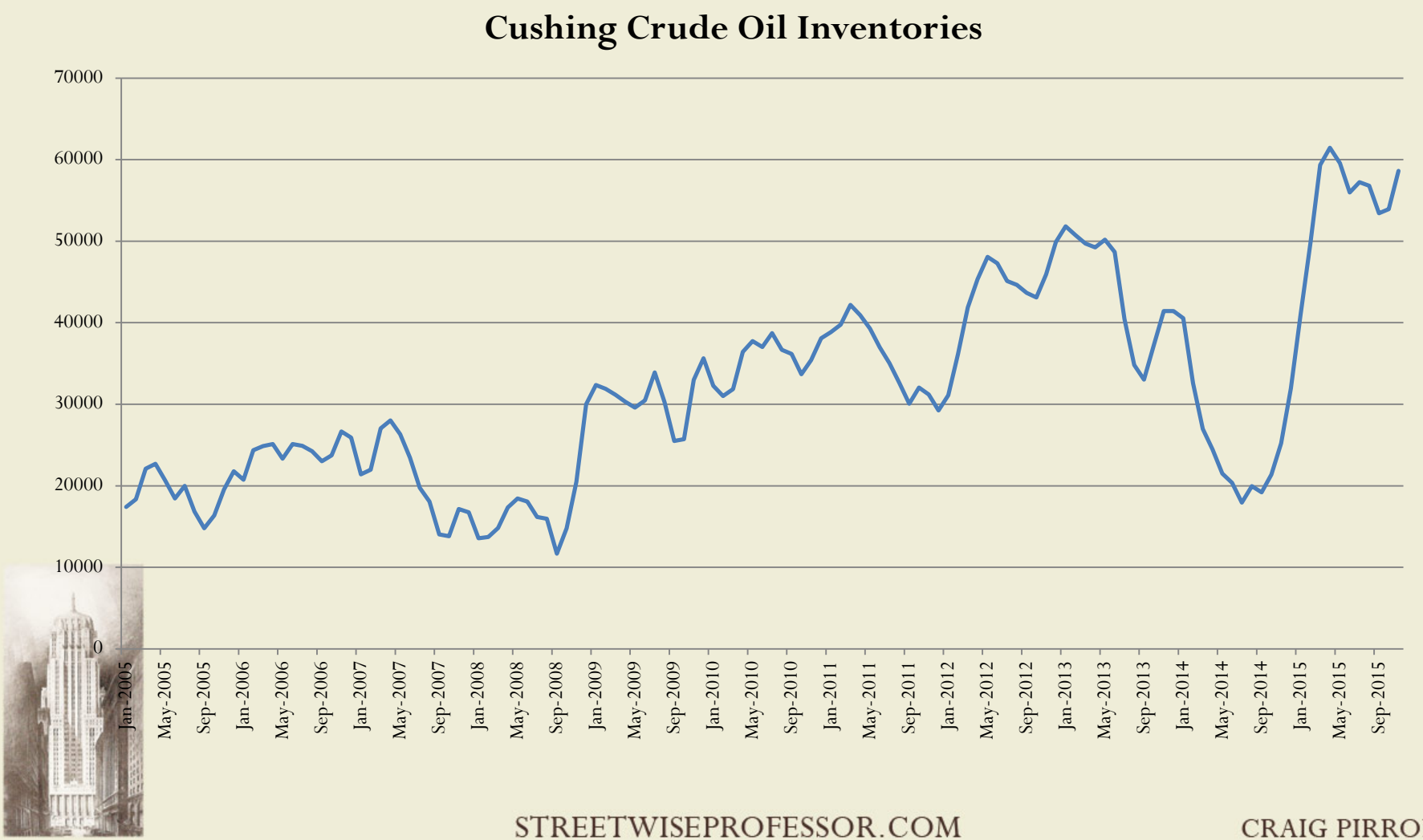
Speculation and Price Levels

- Commonly asserted that speculation distorts price *levels*
- EG, oil prices in 2006-2008, Grains 2006-2007
- Hard to disprove: if we knew what prices *should* be, wouldn't need markets ("knowledge problem")
- Evidence on quantities is important

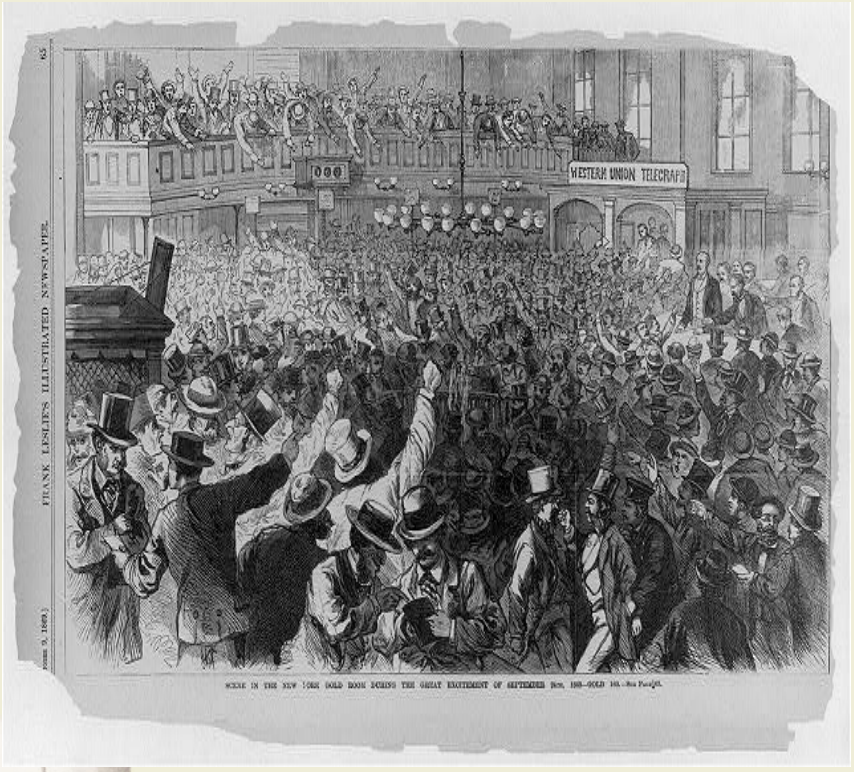
Evidence on Quantities and Speculation

- Prices send signals about how to allocate resources: distort prices, quantities should be distorted
- Driving prices up should lead to higher inventories in hands of speculators
- EG, Hunts, government price supports
- No evidence of quantity distortions during commodity price boom
- Inventories of oil fell when prices rose, and fell when prices plummeted in '08-'09
- Similar experience in metals markets

Oil Inventories During Booms & Busts



MANIPULATION



Non-Competitive Pricing: Manipulation

- The foregoing analysis is predicated on the assumption that the market is competitive
- But there is no guarantee that will be the case
- Indeed, futures and forward markets create the potential for the exercise of market power
- Market power can distort forward curves (and basis relations)

Corners, Squeezes, Hugs

- A large trader can sometimes accumulate a futures/forward position that is larger than the supply of the commodity in the delivery market at the competitive price
- Additional supplies can be brought into the market, but only by distorting flows, and distortions are costly
- Upward sloping supply curve in the delivery market due to transformation costs

Exploiting Transformation Costs/Frictions

- By demanding delivery of more than the competitive quantity, a large long can force the market up the supply curve, thereby driving up prices
- The large long can liquidate his remaining positions at this elevated price
- If his position is sufficiently larger than the competitive quantity in the delivery market, the profit on the contracts liquidated at the inflated price is larger than the loss he takes on the units delivered to him, making this profitable

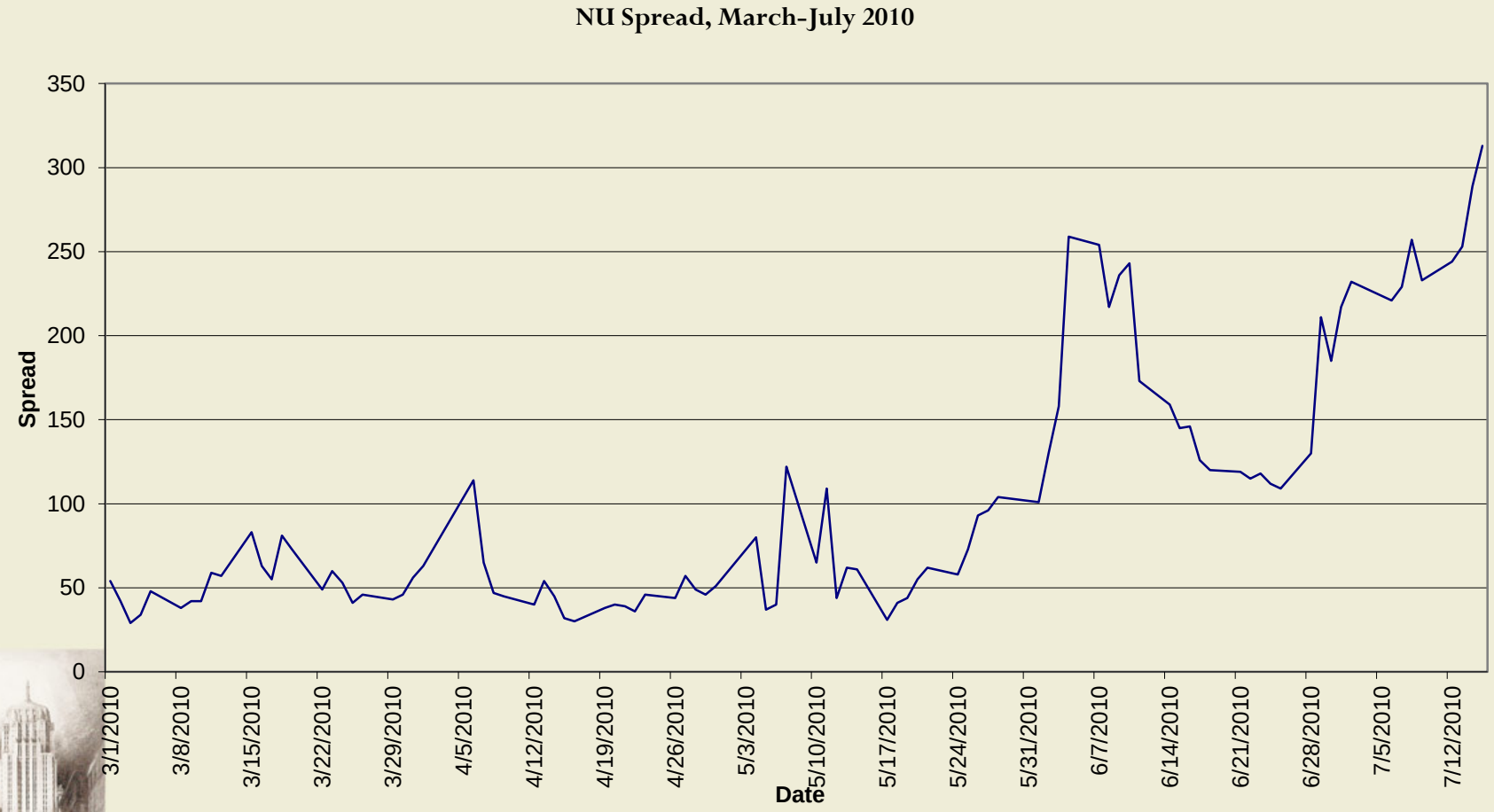
Burying the Corpse

- A corner works by demanding excessive deliveries
- The cornerer has to dispose of this stuff after the corner is over: it is said that this is the "corpse he has to bury"
- Lose money on burying the corpse

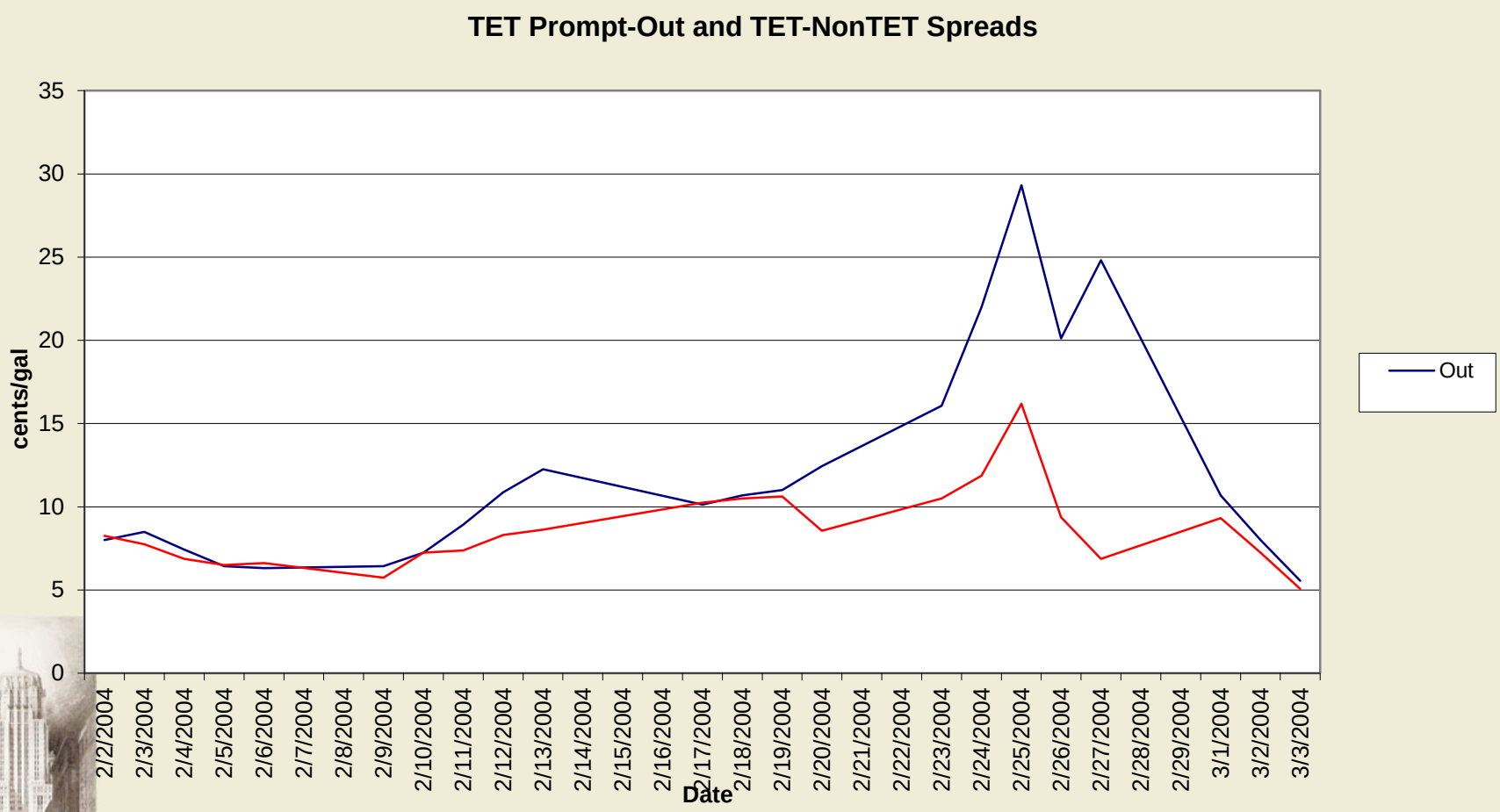
Price Effects of a Corner

- Artificial demand for the commodity elevates the price of the manipulated contract (and the spot price) until the manipulation ends
- Anticipation of the corpse being dumped on the market depresses forward price for expiries later than cornered contract
- These effects mean that corners can cause backwardations
- Price of deliverable rises relative to prices of related commodities, or of the same commodity at other locations (i.e., basis effects)
- Spot price crashes when corpse is buried

Cocoa Corner



Propane


TET Prompt-Out and TET-NonTET Spreads
cents/gal
35
30
25
20
15
10
5
0
2/2/2004
2/3/2004
2/4/2004
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Date
Out

Quantity Effects of a Corner

- Excessive flows of the commodity to the delivery point before the corner ends, excessive flows away from the delivery point after it ends
- Atypical directions of commodity flows ("water flowing uphill")
- Inventories in delivery market elevated
- Level of inventories high even though market is in backwardation (or less than full carry): completely contrary to what you'd expect if the market were competitive

How Do You Know Somebody Wants to Corner?

- Cornerers make transactions that would otherwise be uneconomic
- They take delivery of the commodity at a higher price than they could obtain it in the markets where they actually want to consume it (example to follow)
- Hold inventories of the commodity even though spreads say that is very costly
- "Sharp pencil tests"

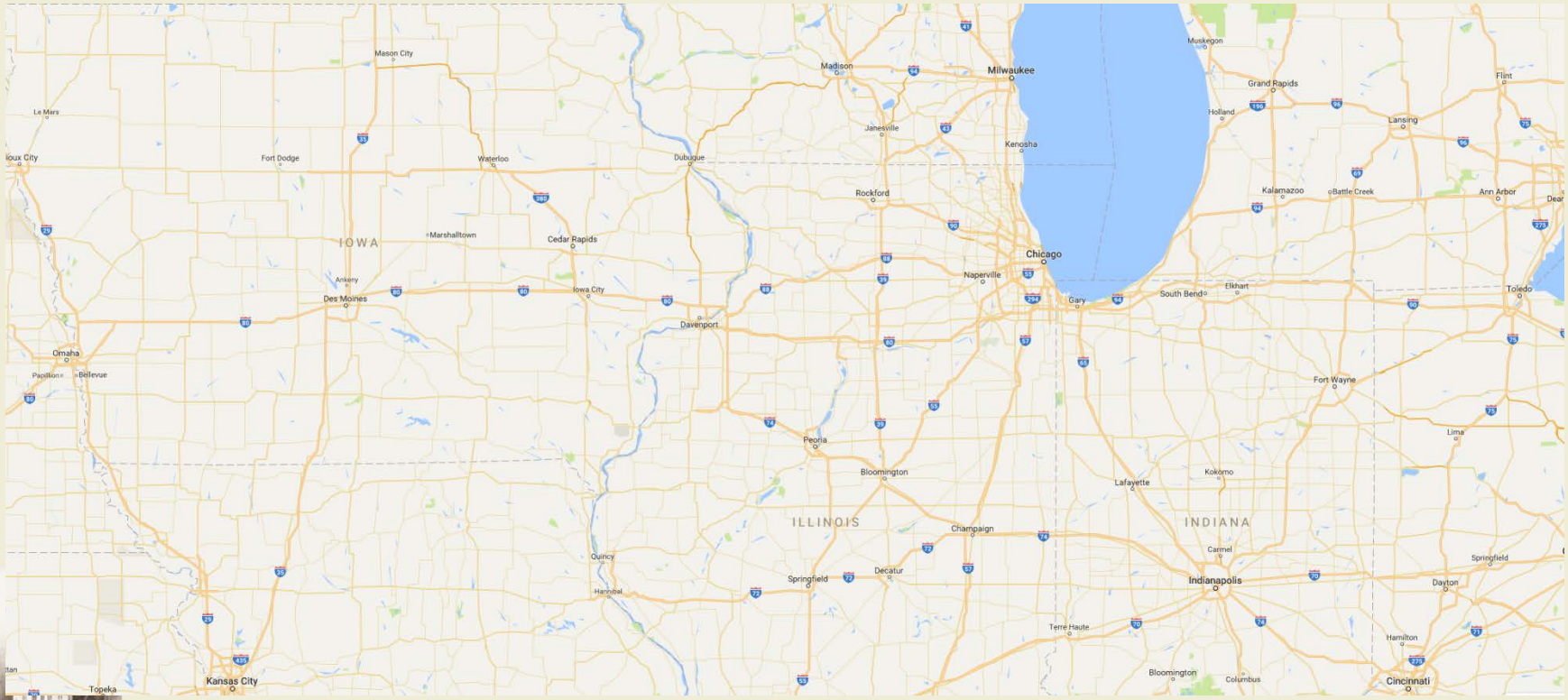
Corner Examples

- Ferruzzi soybeans, 1989
- Sumitomo copper, 1995
- BP propane, 2004
- Cocoa, 2010

An Example: Ferruzzi Soybean Corner

- In 1989 Ferruzzi accumulated ~20mm bu futures position when deliverable supplies were ~8mm bu, of which Ferruzzi owned half
- There were soybeans in western Iowa, but it was economical to process those locally or to ship them to the Mississippi River to load for shipment to NOLA—shipment to Chicago inefficient

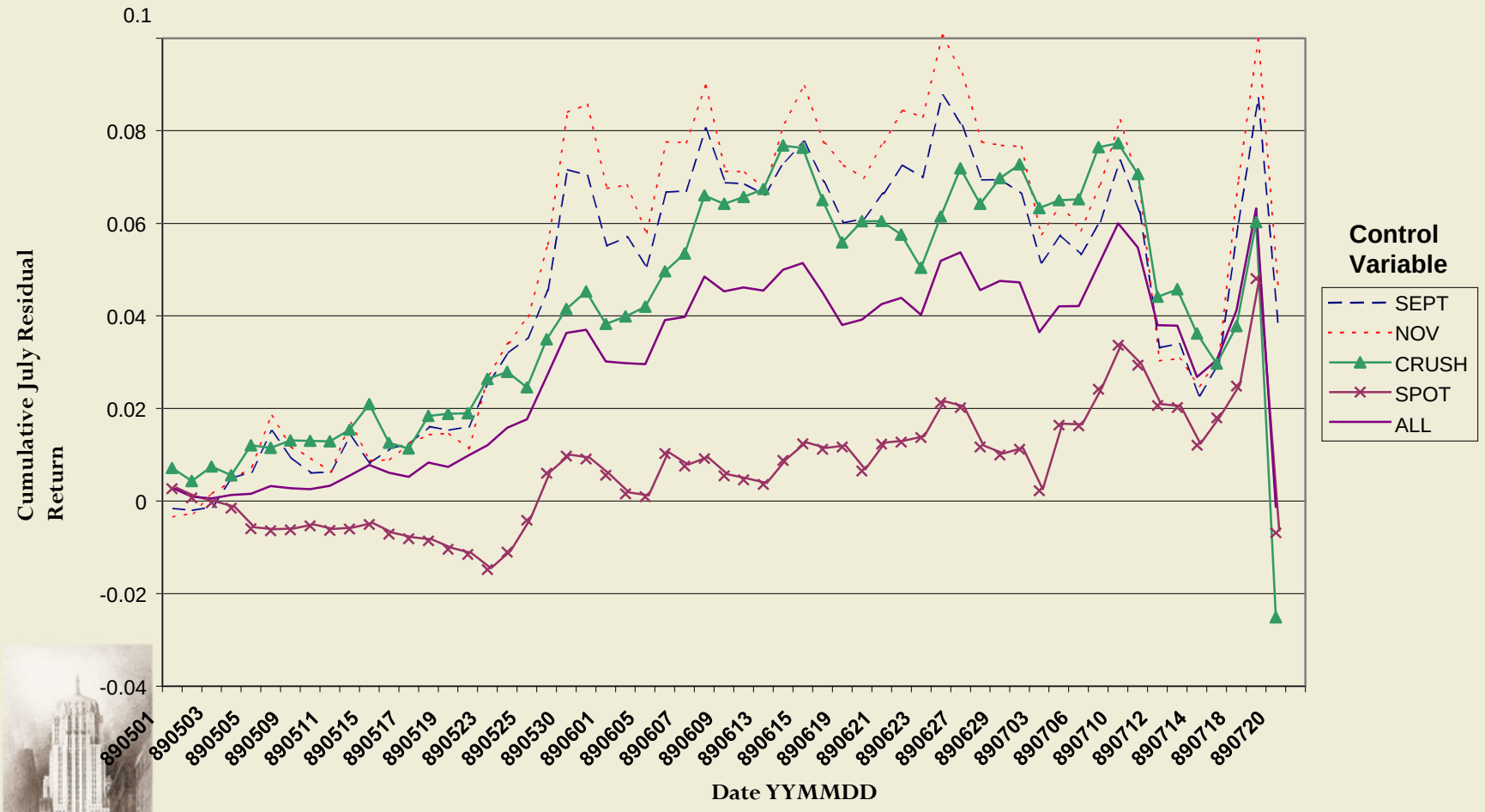
Economic Geography



Ferruzzi's Impact

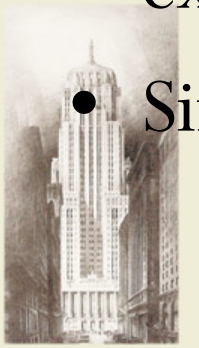
- July futures price (and Chicago cash price) rose relative to deferred futures prices, and cash prices outside Chicago
- NOLA basis went from about +35 to -1, and then post-manipulation rose to +40
- Increase in shipments to Chicago, including movements up-river, with barges loaded with beans passing one another along the Illinois River, some going to Chicago, others from Chicago

July Soybean Futures Cumulative Residuals



Ferruzzi's Intent

- Ferruzzi claimed it needed soybeans to satisfy export contracts "to the Russians" and for domestic processing
- But, taking into account loadout (.06/bu), barge freight (.225/bu), grade differentials (.075/bu #2 delivered vs. #1 export quality), it was $.365/bu to export delivered SY than buy at NOLA for export
- Similar calculation for domestic processing



Implications for Trading

- Don't do it—it's illegal (both in the US & the EU)
- Try not to get caught short in a corner
- Commercial intelligence is important: want to know about positions being accumulated in the market, because they might be used to run a corner
- Keep an eye out for anomalous pricing relations, and anomalous commodity flows

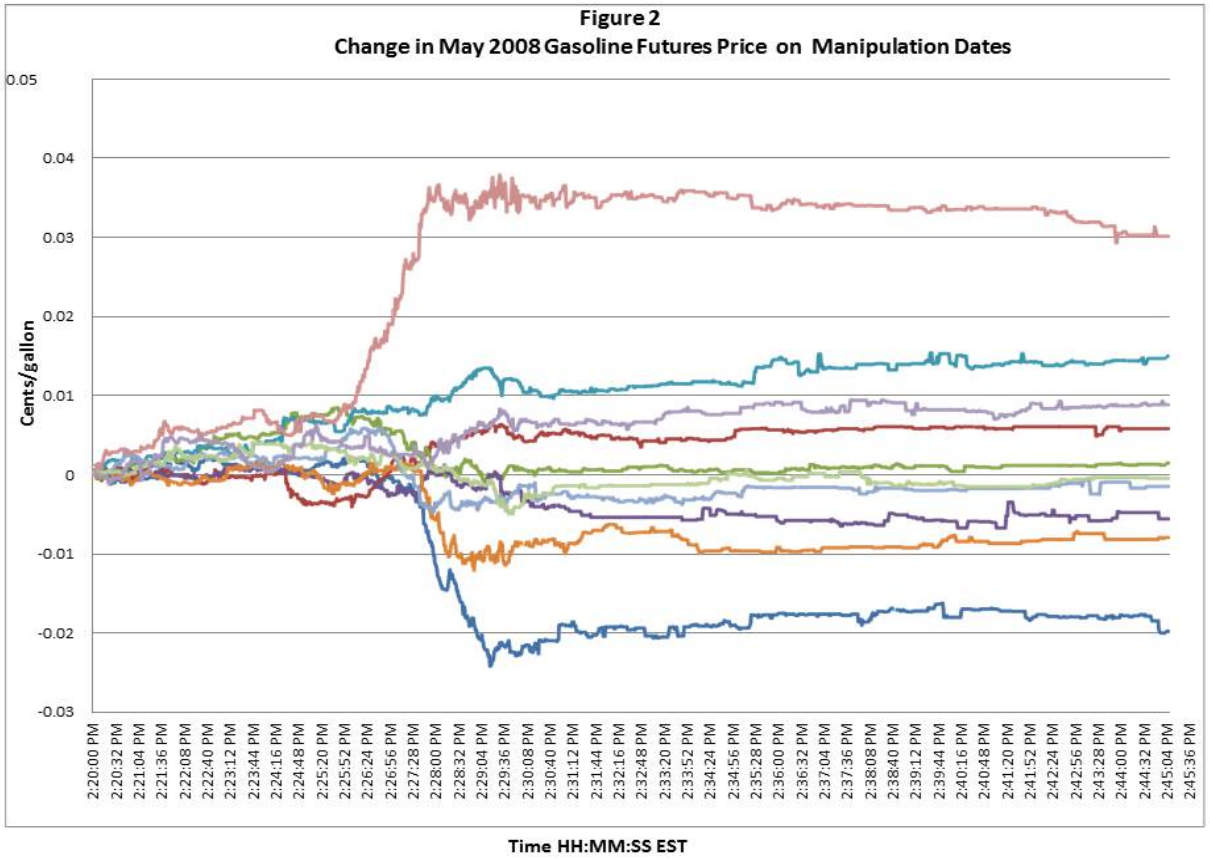
Some Takeaways

- Face some risk when you hedge, but less
- Variability of the basis determines the risk of the hedged position
- Hedges are speculations on the basis
- No hedge is perfect: all hedges are dirty
- Foregoing example assumes 1-for-1 hedge. Can sometimes to better by choosing a different hedge ratio (statistical methods)

Other Kinds of Manipulation

- "Bang the settlement"—trade-based manipulation
  - Trade in large quantities to move the price
  - Usually Done to benefit another position
  - Optiver (RB,HO, CL) & Amaranth (NG)
  - Platts Window
- Fraud (e.g., price reporting, LIBOR)

Optiver RB "Bully Trades"



CLEARING

Clearing and Centralized Markets

- To facilitate anonymous trade in which only P & Q need be negotiated, it is necessary to standardize credit/performance risk
- Exchanges do this now through clearing
- Clearinghouse is the central counterparty—seller to every buyer, buyer to every seller
- This standardizes credit risk as everybody has the same counterparty—the CCP

Clearing

- Clearing is actually a little more complicated: CCP deals directly only with its members. Non-members must deal through members.
- Non-members do not benefit directly from CCP guarantee
- CCPs require initial margin and collect daily variation margin (marking to market)

Principles of Clearing

- "No credit/loser pays" system: margins supposed to reduce credit exposure to minimal levels
- Residual exposure remaining after margin cover is borne by CCP (usually in a minimal way) and clearing members *via* default/guarantee funds
- Risk is "mutualized"

Default "Waterfall"

- Initial margin
- Defaulter's default fund contribution
- CCP capital (may fall behind default fund)
- CM default fund contributions
- ???? (VM haircutting? Tear-ups?)
- Note tranched structure, like a CDO or CLO. (This should make you nervous . .. More later)

Performance Risk and OTC

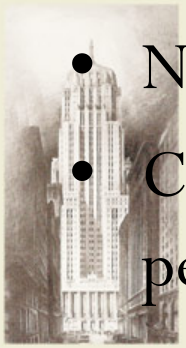
- Traditionally, performance risk remained with original counterparties on OTC deals—"bilateral" deals, no central clearing
- In energy in particular, many OTC deals are cleared
- ICE Clearing
- NYMEX Clearport (EFS)
- Deals negotiated bilaterally, then given up for clearing
- Post-Financial Crisis, major governments have implemented "clearing mandates" that require clearing of most transactions

The Rationale for CCP and Collateral Mandates

- Widespread belief that OTC derivatives are a major source of systemic risk, and indeed contributed to the recent Financial Crisis
- OTC exposures too large and too leveraged (undercollateralized) and OTC markets too interconnected
- CCP mandate: reduce exposures through multilateral netting and collateral (IM and VM)
- Mandatory (and arguably punitive) margining of non-cleared trades to reduce exposures

The Reality

- This rationale is, ironically, profoundly un-systemic
- The primary effect of greater netting and collateral is to redistribute risk in the system
- CCP and collateral mandates transform counterparty risk into liquidity risk, which can be more systemically destabilizing
- Capital structures will adjust: level and fragility of leverage in the system may not change dramatically
- New market structure creates CDO-like wrong way risks
- CCPs don't have information or incentives to take systemic perspective



Netting and Collateral

- Increased netting of exposures and greater collateralization raise the payouts of derivatives counterparties in an insolvency ("defaulter pays"): but that means others get paid less
- These others may be systemically important (e.g., money market funds holding SIFI debt)

Transforming Credit Risk Into Liquidity Risk

- Collateralization-and especially VM-is very liquidity intensive
- During periods of stress, rigid VM/MTM mechanism can lead to substantial increases in need for short-term credit precisely when liquidity is in short supply
- Greater exposure to operational risks
- Increases the tightness of coupling in the financial system: this can increase systemic risk

More Focus on VM is Imperative

- Much of the policy debate has focused on the liquidity implications of greater IM: VM has been all but ignored. This is unsettling.
- Greater reliance on tightly sequenced VM mechanism increases "tight coupling", which increases the potential for system failure ("normal accident") (Operational risks—e.g., Fedwire on 19 October, 1987)