Fact & Fantasy: Risk Management in Electricity Markets

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Outline

- Seeing Risk Management Comprehensively
- Why Its Important:

  …2 Troublesome Facts
- Risk Management in Electricity:

  …Trading Operations

Seeing Risk Management Comprehensively

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Traditional View of Risk Management

- Risk management as a unitary activity defined by the particular types of instruments used.
- Therefore the place of risk management is delimited.
  - Trading operations – investment bank commodity desk.
  - Hedging policy for the company's operations – a liability problem.

An Alternative, Comprehensive View of Risk Management

- Risk management is practiced throughout the various functional departments of the corporation, in different ways, each appropriate to the objectives and tasks of the different department.
- Risk management is simply the higher order analysis of the traditional finance preoccupation with risk.
  - Old analysis was 2-dimensional: more or less risk.
    - Debt / Equity binary poles
  - Old analysis was poorly calibrated.
  - New tools empower a multi-dimensional analysis of risk.
    - Securities can be packaged in any form.
    - Various risk factors can be isolated or remixed.
  - Tools have crossed over to the general management of the non-financial corporation.
    - Analogous to the ubiquitous role of DCF analysis.

A Balance Sheet Framework

Assets	Liabilities
Pricing Decisions	Cash Management
Supply Chain Mgmt.	Tax Minimization
Operating Decisions	Debt Management
Investments	Strategic Hedging
Performance Evaluation	

How is Value Added on the Right Hand Side?

Assets	Liabilities
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How is Value Added on the Right Hand Side?

- Negotiate the firm’s relationship with the capital markets.
- Usually involves <u>reducing</u> risk.
- MM Theorem of Hedging:
  - Price of risk is taken as given by the capital markets.
  - No direct value from shifting risk.
  - Source of value must be indirect – alter the firm’s engagements with the capital markets.
- Different levels of engagement:
  - Short-term cash management: the comptroller’s responsibility.
  - Liability management: the CFO’s responsibility.
  - Strategic hedging & investment: the CEO/CFO/Board responsibility.

How is Value Added on the Left Hand Side?

Assets	Liabilities
Pricing Decisions	Cash Management
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How is Value Added on the Left Hand Side?

- No profit without risk!
- Risk management has nothing to do with increasing or decreasing risk, per se.
- Risk management is about valuation.
  - Pricing products with embedded risk to properly reflect their costs.
  - Finding supply chain options with the lowest cost and highest value contribution, including risks.
  - Optimizing the use of assets against risky external conditions.
- Measuring risk properly.
- Pricing risk properly.
- Identifying the most profitable line of operations.
- The details are handled in different ways depending on where the decisions are being taken.

Why It’s Important:
2 Troublesome Facts

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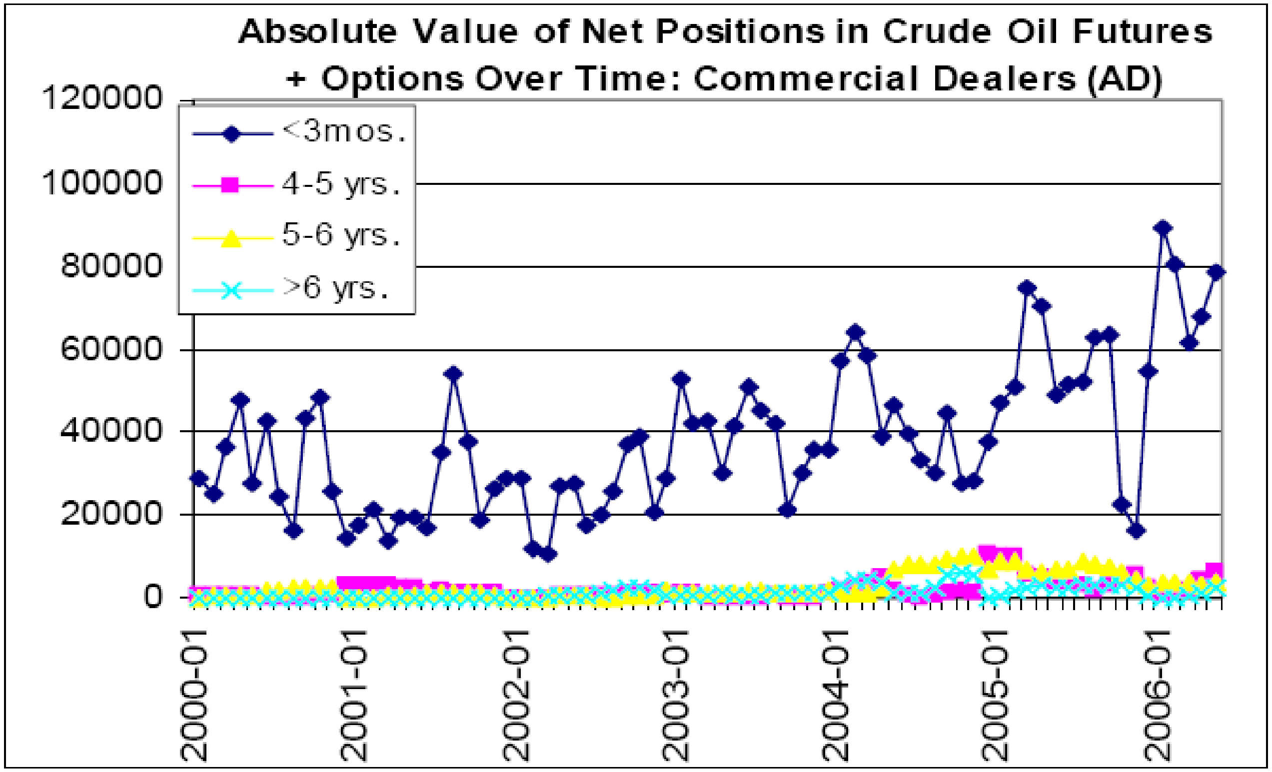
Troublesome Fact #1:
Hedge Ratios Are Too Small

- Yanbo Jin and Philippe Jorion, *Journal of Finance*, 2006, study of risk disclosures of 119 oil and gas producers in the US between 1998-2001.
- Fewer than half of the companies with oil exposure hedge.
- Among hedging firms, the mean oil hedge ratio was 33% of next year's oil production and 4% of oil reserves: the median values were 24% and 2%.

Troublesome Fact #1: Hedge Ratios Are Too Small (cont.)

- Wayne Guay and S.P. Kothari, *Journal of Financial Economics*, 2003 studied hedging of interest rates, foreign exchange and commodity prices by a diverse collection of 234 non-financial corporations in many lines of business.
- They find that the hedge ratios employed are so small that “[i]f interest rates, currency exchange rates, and commodity prices change simultaneously by three standard deviations, the median firm’s derivatives portfolio, at most, generates $15 million in cash and $31 million in value.”
- The $15 million cash flow exposure amounts to less than 10% of the next three year’s cash flow at the typical firm. The $31 million market value exposure amounts to approximately 2% of the book value of assets and 1% of the market value of assets. For three-quarters of the firms it is less than 4% of the book value of assets and less than 3% of the market value of equity.

Troublesome Fact #2:
Hedges Are Too Weighted to Short-Maturities



Haigh, Harris, Overdahl, Robe, Market Growth, Trader Participation and Derivative Pricing, Working Paper, 2007.

Amendment #1: Liquidity risk is central

- Exchange traded instruments involve mark-to-market settling up of even long-maturity hedges.
- Underlying exposures generate only unrealized value gains and these exposures are illiquid.
- The mismatch between cash flows on hedge instruments and underlying exposures means non-financial corporation that hedge face huge liquidity demands.
- The optimal hedge ratio based on traditional theory declines dramatically. Mello and Parsons, *Review of Financial Studies*, (2000): A value hedge is always far too large. Even a short-term cash flow hedge may be too large.

Amendment #2: Actual hedges are a cash management tool minimizing liquidity demand

- Cash management is an overlooked, unfashionable topic in corporate finance theory.
- But it is the real heart of much day-to-day non-financial hedging.
- Objective is to reduce the uncertainty of near term cash inflows and outflows: economize on liquid cash balances; maximize the money return on short-term assets.
- Near term uncertainty is what matters for cash management.
- Best to utilize short-maturity contracts.

A Comprehensive View of Risk Management is Necessary

- Negative Argument: Traditionally highlighted motive for hedging—the CFO strategically managing the company's liabilities to serve the investment program—is overplayed; the impact of liquidity risk from hedging with exchange traded instruments is greater than widely realized.
- Affirmative Argument: Overlooked motive for hedging is the management of short-term cash flows.
- The Mystery of the Black Crayon

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- Affirmative Argument: Overlooked motive for hedging is the management of short-term cash flows.
- The Mystery of the Black Crayon
  - Looking in the wrong places.
  - Grand issues obscuring the mundane tasks.
  - Multiplicity of objectives and functions.

Markets for Power
Trading for Profit

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Trading Operations

- Many Firms in Commodity Related Business Run a Trading Operation.
- Many of the trappings of the operations are the same
  - …a big trading floor with screens tracking the movements of prices of key commodities
  - …scores of telephone connections with traders at potential counterparties
  - …high turnover activity with significant back office support, critical control functions
  - …a rocket science research department for pricing complicated structures.
- These trappings belie significant differences in the objectives and role these operations play within the firm.
- Many companies are not sure how to best utilize and integrate these operations with the rest of their business,… or, indeed, whether they should be strictly separated, and handled as a stand-alone bsns.

A Taxonomy: 3 Types of Trading Ops.

Mrkt & Fin Support Function

Integrated Arm of Asset Management

Pure-Play Trading Desk Profit Center

A Taxonomy

Mrkt & Fin Support Function	
Integrated Arm of Asset Management	
Pure-Play Trading Desk Profit Center	

- **trading is an after thought to the company's main operations**
- **trading helps to realize the returns of the business, but does not generate them**
- **trading is a support function, essential to completing the sale at the best price**
- **hedging is purely a cash management task**
- **trading is not a profit center**

A Taxonomy

Mrkt & Fin Support Function

Integrated Arm of Asset Management

Pure-Play Trading Desk Profit Center

- **trading is disconnected from the remainder of the firm's business**
- **trading is a profit center**
- **essentially a financial institution**

A Taxonomy

Mrkt & Fin Support Function

Integrated Arm of Asset Management

Pure-Play Trading Desk Profit Center

- **trading is closely tied to other parts of the firm's business**
- **trading is a component part of firm's other profit center**
- **trading is a source of intelligence on prices and value enabling the firm to optimize its operations and generate the highest profit**

A Tale of 3 Businesses

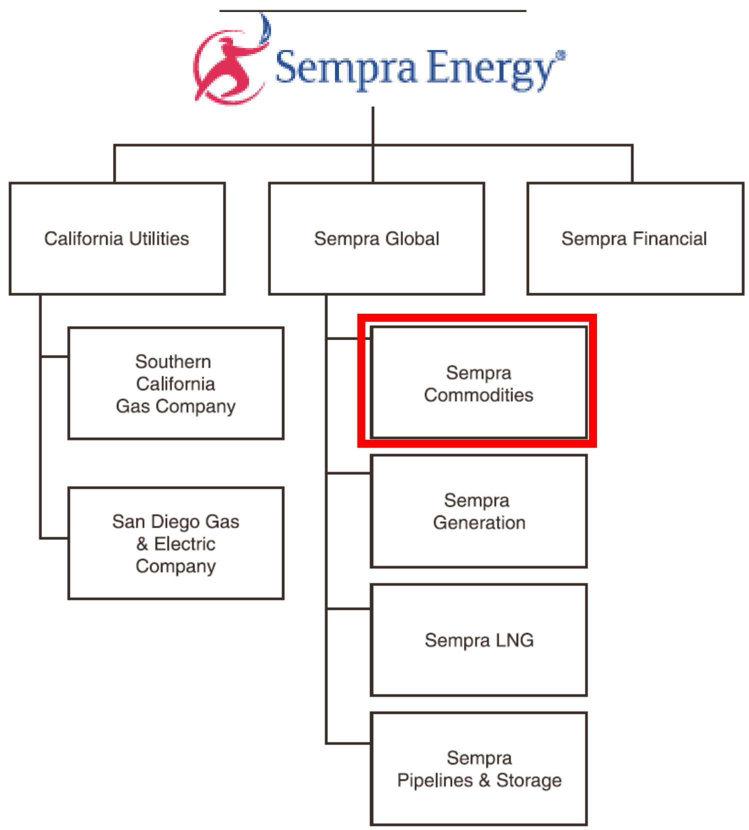
- Trading as a Support Function
  - US small natural gas producers
  - municipal electric utilities, regulated US utilities
- Trading as a Stand-alone Financial Business
  - Sempra
- Trading as Integral to Operations
  - AEP

US Small Natural Gas Producers

- Producers.
- Bid Week.
- Selling & Hedging
  - maximizing revenue, finding the best location, lining up transportation, storage
  - minimizing near-term cash flow risk

Sempra Energy

2005



Sempra Commodities… what they do

"Sempra Commodities provides worldwide marketing and risk-management services to wholesale customers for natural gas, power, crude oil, petroleum, base metals and other energy products.

The short-term nature of Sempra Commodities' portfolio reflects the liquidity and transparency of its contracts.

Sempra Commodities is one of the top three physical marketers of natural gas in North America and one of the top marketers of base metals in the world."

Sempra Commodities… in their own words

"Sempra Commodities is a family of commodity trading companies worldwide whose senior management has evolved from Drexel, Burnham & Lambert in the 1980s to AIG Trading Corporation in the mid-90s to where we are today. Our Wall Street heritage, commitment to flexibility and creative mind-set separate us from our competition. We think "outside the box" to create customized solutions to the issues that confront our customers daily. These solutions are tailored to strengthen their bottom line.

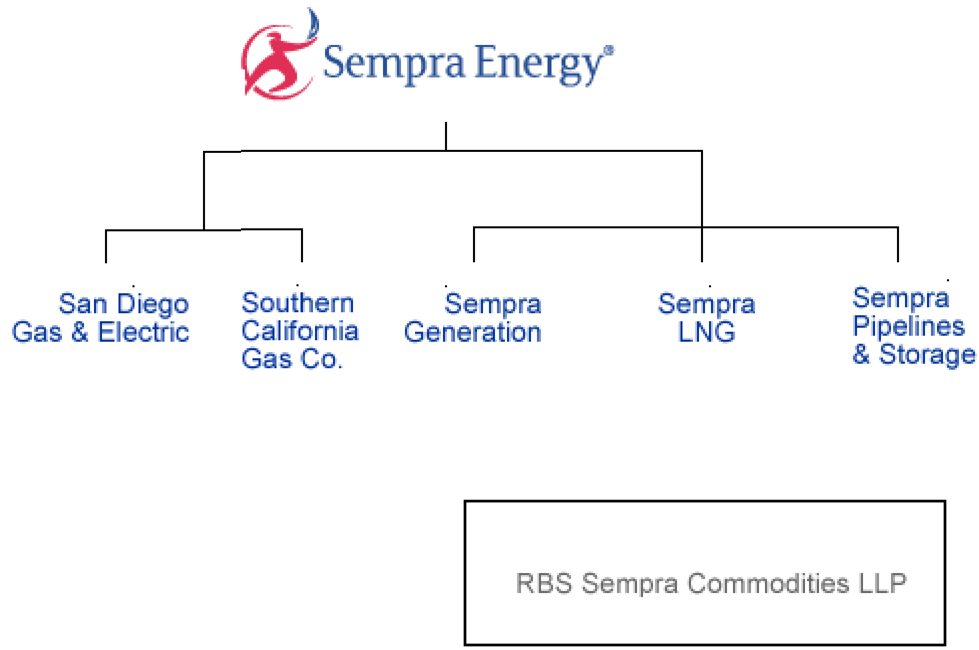
With a growing family of commodity trading companies and an expanding market presence throughout Europe, Asia and the Americas, our resources and strengths have established us as a major liquidity provider in the global gas, power and metals markets and solidified our status as a global player in oil trading. The Sempra Commodities family is meeting the strong demand throughout Europe and Asia for commodity marketing and risk management services and fulfilling the needs of a growing and diverse customer base. We are constantly exploring new markets and working to create partnerships with local utilities/establishments aimed at providing optimal energy solutions for our customers."

Sempra Commodities…

- It's an investment bank commodities trading desk
- Does not directly augment or improve the utility operations, the merchant generation, etc.

Sempra Energy Now

2008

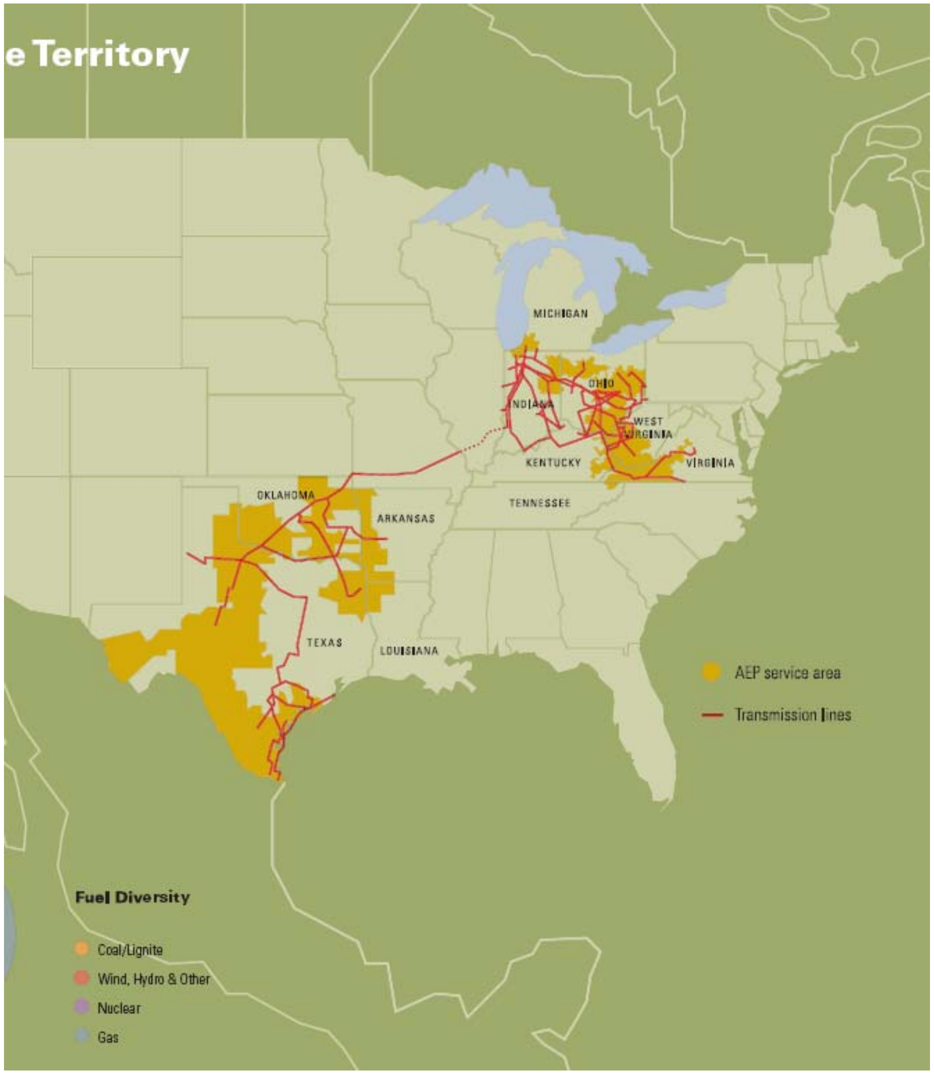


What Do Financial Institution Traders Do?

- Brokers, dealers…
  - job shop, profit on volume
  - competitive advantage is contacts in the market, ability to execute, low cost administration/back office, management of a dynamic portfolio
  - MINIMIZE risk
- Structured transactions
  - service business
  - high margin
  - competitive advantage is human capital appended to functioning broker/dealer bsns
  - MINIMIZE risk
- Proprietary portfolio
  - taking positions
  - competitive advantage is knowledge of markets
  - to maximize return, accept taking on risk, but
  - must MINIMIZE extraneous risk

AEP

- Integrated generation and retail electricity company owning a mix of regulated and deregulated generation.
- Early foray into trading during the Enron era
- Scaled back but remains sizeable.
- No speculation, no proprietary trading … "only trading around own hard assets."



Role of Trading at AEP

- Short-term fuel sourcing and power marketing
- Longer-term market intelligence, forward pricing, risk assessment, asset valuation
- Asset optimization… reshaping investment and operating decisions to capture maximum value in the face of changing market conditions and complicated risk measurement and risk pricing.

What's Special About Trading?

- Electricity is a volatile commodity. Price risk is enormous. Finding the most efficient, lowest cost generation and transmission is complicated. The answer changes, regularly.
  - How true is this for gas?
  - What about the the various feedstocks for power generation?
  - What about carbon?
- Risk measurement is central.
- Pricing risk is key. And it's complicated in electricity.
- These are skills that have been highly developed in the traditional trading functions.

Fourth Type of Model?

- Roles are not mutually exclusive.
- Trading can run a proprietary portfolio while also augmenting the operation of hard assets

The End

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