

Finance 6224
Energy Risk Management

SYLLABUS

Meeting Time:

Lectures: Mondays, 6:30-9:20 pm, 277 Crow Bldg.
Office Hours: Thursdays, 9:00-11:00 am, or by appointment.

Course Readings:

Entries that appear below in **bold** are required. Other selections are optional, but recommended if you want further background in a particular area. All reading materials are available on the internet, via links from the course page, or as handouts. A set of lecture notes outlining the technical material covered during each class meeting is also available on the course page.

Laptop Computer:

You are required to bring a laptop computer to class, equipped with Excel (including the "Data Analysis Pak" add-in) and with sufficient battery/power connections to last the entire period.

Grading:

The overall course grade will be determined solely by performance on four assigned projects. Individual work, not group collaboration or joint effort, is required on the assigned projects. There will be no quizzes or exams.

Each project will be graded on a pass/fail basis. Any project that is "failed" may be redone and re-graded (one-time) to secure partial credit. The final grade distribution will be curved to produce an *average* course grade around A-/B+.

CLASS SCHEDULE

- 3/15 1. Introduction to Energy Risk Management and Price Volatility
Readings: **Jin and Jorian, “Firm Value and Hedging: Evidence from U.S. Oil and Gas Producers.”** October, 2004. (pdf available on course page)
EIA, “An Analysis of Price Volatility in Natural Gas Markets”
McCracken et. al., “VeraSun Seeks Bankruptcy Protection”
Grace, “Southwest Airlines Swings to a Loss”
Project #1: **Volatility Analysis** (see handout, due 3/22)
- 3/22 2. Energy Forward and Futures Markets
Readings: **AGF, “Strategies for Managing Price Volatility” (ch. 4)**
WSJ, “On a Roller Coaster: One Energy Firm Tries Hedging Bets”
WSJ, “Chesapeake Seeks Cash”
NYMEX, “Glossary of Terms”
- 3/29 3. Futures Hedges and Swaps
Readings: **NYMEX, “A Guide to Energy Hedging”**
BMO, “Managing Heavy Oil Price Risk”
NYMEX, “Risk Management with Natural Gas Futures and Options”
Stulz, “Rethinking Risk Management”
Project #2: **Hedging Simulator** (see handout, due 4/12)
- 4/5 4. Futures Hedges and Swaps (continued)
Readings: **HBS, “Risk Management at Apache”**
Carter, Rogers, and Simkins, “Does Fuel Hedging Make Sense?”
Parsons, “Do Trading and Power Operations Mix?”
- 4/12 5. Financial and Real Options
Readings: **Siegel, Smith, and Paddock, “Valuing Offshore Oil Properties with Option Pricing Models”**
WSJ, “Futures Shock”
EIA, “Derivatives and Risk Management...”
Project #3: **Real Option Calculator** (see handout, due 4/26)
- 4/19 6. Real Options
Readings: **Pickles and Pickles, “Petroleum Property Valuation: A Binomial Lattice Implementation of Option Pricing Theory”**
- 4/26 7. VAR and Project Finance
Readings: **Spencer, “Derivatives in Energy Project Finance”**
Project #4: **VAR Calculator** (see handout, due 5/3)
- 5/3 8. Optional class meeting (in lieu of final exam) will serve as work session to complete Project 4.

READING LIST

- American Gas Foundation (AGF), "Strategies for Managing Price Volatility," ch. 4 in *Natural Gas and Energy Price Volatility*, October, November, 2003. (pdf available on course page)
- Bank of Montreal (BMO Commodity Products Group, "Managing Heavy Oil Price Risk," February 2006. (pdf available on course page)
- Carter, David A., Daniel A. Rogers, and Betty J. Simkins, "Does Fuel Hedging Make Economic Sense? The Case of the U.S. Airline Industry," September 16, 2002. (pdf available on course page)
- Energy Information Administration (EIA), "Derivatives and Risk Management in the Petroleum, Natural Gas, and Electricity Industries," October, 2002. (pdf available on course page)
- Energy Information Administration (EIA), "An Analysis of Price Volatility in Natural Gas Markets," August, 2007. (pdf available on course page)
- Harvard Business School (HBS), "Risk Management at Apache," case no. 9-201-113, August 27, 2001. (handout)
- Jin, Yanbo, and Phillippe Jorian, "Firm Value and Hedging: Evidence from U.S. Oil and Gas Producers," October, 2004. (pdf available on course page)
- McCracken, Jeffrey, Jessica Resnick-Ault, and Lauren Etter, "VeraSun Seeks Bankruptcy Protection," *Wall Street Journal*, November 2, 2008. (pdf available on course page)
- New York Mercantile Exchange (NYMEX), "A Guide to Energy Hedging," January 9, 2002. (pdf available on course page)
- New York Mercantile Exchange (NYMEX), "Glossary of Terms," June 4, 2001. (pdf available on course page)
- New York Mercantile Exchange (NYMEX), "Risk Management with Natural Gas Futures and Options", June 4, 2001. (pdf available on course page)
- Parsons, John E., "Do Trading and Power Operations Mix? The Case of Constellation Energy Group 2008, MIT Center for Energy & Environmental Policy Research, Working Paper No. 08-014, November 2008. (pdf available on course page)
- Pickles, Eric, and James L. Smith, "Petroleum Property Valuation: A Binomial Lattice Implementation of Option Pricing Theory," *Energy Journal*, vol. 14, no. 2, 1993. (pdf available on course page)
- Siegel, Daniel R., James L. Smith, and James L. Paddock, "Valuing Offshore Oil Properties with Option Pricing Models," *Midland Corporate Finance Journal*, vol. 5, no. 1, Spring 1987. (handout)
- Spencer, Lloyd, "Derivatives in Energy Project Finance, ch. 4 in *Managing Energy Price Risk*, 2nd edition, Risk Books, 1999. (handout)