ENGY/MECO 3330: Energy Economics

Course Information
ENGY/MECO 3330 Fall 2016
Lecture hours: Mon, Wed 11:30am-12:45pm
Location: JSOM 1.217

Professor: Anastasia Shcherbakova
Email: anastasia.shcherbakova@utdallas.edu
Office: JSOM 14.314
Office hours: Wednesdays 2:00pm-4:00pm
and by appointment

Prerequisites: ECON 2302 or instructor permission

Course description: Effective management of modern energy initiatives requires a comprehensive understanding of energy market fundamentals. This course provides such knowledge through a detailed examination of the history, structure and functioning of modern energy markets. The course focuses on market models for petroleum, natural gas, electricity, and renewable energy, and outlines existing and potential complications related to economic, financial, and regulatory circumstances. Theoretical framework is blended with current event analysis to give students an understanding of how theoretically formulated models can be applied to real world circumstances, and especially to current issues in global energy markets. Topics include models of supply, demand, and transportation; market structure; game theoretic strategies and risk management; environmental issues; and policy and regulation.

Course objectives:

1. To introduce fundamental economic principles and institutional knowledge of energy industries.
2. To develop modeling, information acquisition, critical thinking, and communication skills necessary to evaluate existing and potential risks and opportunities in energy markets in the context of public policy, investment, and regulation.
3. To promote engagement in energy-related developments through literature and discussion in and outside of the classroom.

Recommended texts:

1. *International Energy Markets: Understanding Pricing, Policies, and Profits*, Carol A. Dahl, PennWell Corporation, Tulsa OK, 2004. ISBN 0878147993
2. *The Prize: The Epic Quest for Oil, Money & Power*, Daniel Yergin, Free Press, New York, NY, 1991. ISBN 1439110123
3. *The Quest: Energy, Security, and the Remaking of the Modern World*, Daniel Yergin, Penguin Books, New York, NY, 2012. ISBN 0143121944
4. *The Wealth of Nations*, Adam Smith, Modern Library, New York, NY, 1994. ISBN 0679424733
5. *The Wall Street Journal*
6. *The Economist*
7. *GlobalEnergyDigest.blogspot.com*

Course outline

1. A global perspective on energy economics
    a. The Simon-Ehrlich wager, commodity price forecasting, and the role of technology
        i. Cavallo, A.J. (2004). "Hubbert's Petroleum Production Model: An Evaluation and Implications for World Oil Production Forecasts," *Natural Resources Research*, Vol. 13 No. 4.
    b. Adam Smith on the value of commodities
        i. Adam Smith, The Wealth of Nations, Book I, Chapters VI-VII
    c. A set of hypotheses on the resource curse
    d. Understanding crude oil prices
        i. History of oil pricing regimes: who controls the price of oil?
        ii. Crude oil and the macroeconomy
            1. Smith, James L. (2009). "World Oil: Market or Mayhem?" *The Journal of Economic Perspectives*, Vol. 23, No. 3: 145-164.
            2. Hamilton, James D. (1983). "Oil and the Macroeconomy since World War II," *Journal of Political Economy*. Vol.91 No. 2: 228-248.
            3. Hamilton, James D. (2009). "Understanding Crude Oil Prices," *The Energy Journal*, Vol. 30, No. 2: 179-206.
            4. Kilian, Lutz. (2009), "Not all oil price shocks are alike: disentangling demand and supply shocks in the crude oil market," *American Economic Review*.
    e. Clearing the market: supply, demand, elasticities, and taxation (Dahl Ch. 3)
    f. Optimal depletion of exhaustible resources
        i. Hotelling's model for competitive and monopolistic industries
            1. Hotelling, Harold (1931). "The Economics of Exhaustible Resources". *The Journal of Political Economy*, 39: 137-175.
            2. Devarajan, S. and A. C. Fisher, (1981). "Hotelling's Economics of Exhaustible Resources: Fifty Years Later". *Journal of Economic Literature*, 19(1): 65-73.
            3. Sweeney, "Economic theory of depletable resources: an introduction"
            4. Pindyck, Robert S. "The Optimal Exploration and Production of Nonrenewable Resources." *The Journal of Political Economy* (1978), 86(5): 841-861.
            5. Pindyck, R.S. (1980). "Uncertainty and Exhaustible Resource Markets," *Journal of Political Economy*, 88(6): 1203-1225.
            6. Stiglitz, J.E. (1976). "Monopoly and the Rate of Extraction of Exhaustible Resources," *American Economic Review*, 66: 655-661.
        ii. Implications of stopgap technologies, including renewable resources, and changes in industry dynamics
        iii. Optimal extraction and resource wars
            1. Acemoglu et al., "A dynamic theory of resource wars"

g. Externalities and public goods: energy pricing, pollution, and climate change (Dahl Ch. 8, 9)

2. A company perspective on energy economics
    a. Competitive markets (Dahl Ch. 3, 7)
        i. IOCs, coal, U.S./U.K. natural gas, Texas electricity
        ii. Measures of competitiveness
    b. Monopoly and natural monopoly (Dahl Ch. 4-6)
        i. NOCs, Electricity markets
            1. Hartley, Peter and Kenneth B. Medlock III (2008). "A Model of the Operation and Development of a National Oil Company". *Energy Economics*, Vol. 30 No.5: pp. 2459-2485.
            2. Eller, Stacy, Peter Hartley and Kenneth Medlock III (2010). "Empirical Evidence of the Efficiency of National Oil Companies," *Empirical Economics*, March 2010.
        ii. Market equilibrium and welfare implications of monopolies
        iii. Regulating monopolies
            1. Taxes and subsidies, price and quantity controls, rate of return regulation
        iv. Vertical integration in the oil and gas industry
            1. Deck & Wilson, "Economics at the pump"
            2. Vita, "Regulatory restrictions on vertical integration and control: the competitive impact of gasoline divorcement policies"
            3. Masten, "The organization of production: evidence from the aerospace industry"
            4. Williamson, "The vertical integration of production: market failure considerations"
    c. Dominant firm and competitive fringe (Dahl Ch. 6)
        i. A brief history of OPEC
    d. Oligopoly and game theory (Dahl Ch. 11)
        i. Cournot, Stackelberg, and Bertrand competition
            1. Wolfram, "Measuring Duopoly Power in the British Electricity Spot Market"
        ii. OPEC as a cartel
            1. Griffin, "OPEC behavior: a test of alternative hypotheses"
    e. Monopsony (Dahl Ch. 10)
        i. LNG markets, energy transportation, and other historic examples of monopsonies and pseudo monopsonies
        ii. Equilibrium and welfare implications of monopsonies
3. An individual perspective on energy economics
    a. Mineral extraction: the U.S. vs. the rest
    b. Economics of oil, gas, and wind energy lease negotiations
    c. Jevon's paradox and the demand for durable and non-durable energy goods

Grade breakdown:

Mini economic analyses: 50%
International economic strategy project:
Part 1: 20%
Part 2: 15%
Class participation / discussion: 15%

Note: there will be no class on September 7, 2015 (Labor Day) and November 23 – 28 (fall break and Thanksgiving holiday).

UT Dallas Syllabus Policies and Procedures:
All students enrolled in the course are expected to abide by the academic standards set forth by the University. Details of academic standards and other University policies and procedures can be found at http://go.utdallas.edu/syllabus-policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.

I. Global perspective
    a. Global trade flows (oil, gas, coal, renewable technology)
    b. Hotelling's optimal depletion
        i. With changes in extraction costs, interest rates, etc.
        ii. With backstop technology
        iii. Under monopoly
    c. Peak oil
    d. Effect of oil price shocks on macroeconomy
II. Company perspective
    a. Competition
        i. IOCs
    b. Monopoly
        i. NOCs
    c. Dominant firm
        i. OPEC
    d. Oligopoly
    e. Monopsony
III. Individual perspective
    a. Oil and gas lease negotiations
    b. Demand for durable and non-durable energy products (gasoline, cars, etc.)