Economics of Energy Markets - Econ 3300

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Course Time: TTh 3.05-4.25pm
Course website on T-Square
Office Hours: Monday 3-4pm
Thursday 9.30-10.30am

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Office Hour: Tuesday 2-3pm; Old CE 205

Course Overview: Why are we here?
Energy is the backbone of industrial economies. However, energy production and consumption has extensive externalities associated with it, from the emission of carbon dioxide and other airborne pollutants to national security implications due to the uneven distribution of fossil fuel resources around the globe. Balancing the benefits and costs of energy use is one of most important challenges facing the world today and into the foreseeable future. This course is designed to give you an understanding of how primary energy markets operate. We will also study the ancillary energy markets that have developed and are intertwined with the primary energy markets. We will examine the economic determinants of industry structure, the associated public policy challenges associated with these structures, and appropriate forms of government intervention in a market.

The course is divided into three roughly equal sections divided by exams. The first section of the course will develop the basics of your economic toolbox to analyze energy markets. We will include a brief review of basic economic analysis and then spend a substantive amount of time discussing the economic concepts that are most relevant to energy industries. The second section will delve into the economics of specific sections of the energy sector and the regulatory regimes for each. The final section of the course will study the specific externalities associated with energy production and consumption and possible different approaches to mediate the inefficiencies created by these externalities.

Learning Objectives
In this course you will:

- Describe economic structures and regulation schemes that are common in energy markets.
- Describe financial and product markets for energy and how fluctuations in these markets affect economic decisions of both domestic and international energy producers.
- Discuss when and how governments have economic rationale to intervene in markets and what particular forms of market structure and market failure can tell us about how to design and implement effective policy.
- Analyze the economic merits of policy proposals to intervene in energy markets.

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1This is the preliminary version of the syllabus and may be changed during the semester to accommodate changes in the course.
Readings
We will be drawing on many different resources for this class including journal articles, newspaper articles, and textbooks. There will be one textbook you will need to purchase for this class: Microeconomics by Jeffrey Perloff. (Do not purchase Microeconomics: Theory and Applications with Calculus.) There are currently seven editions of this book. I do not have a preference as to which edition you use.

We will also use Economics of Regulation and Antitrust by Viscusi, Harrington, and Vernon. There are a number of e-copies of this book available through the library website at:

http://portal.library.gatech.edu/vufind/Record/1166028

Since there are a limited number of e-copies available, sometimes when you want to view the e-book will be unavailable. For this reason, I have had students in the past suggest that it would have beneficial to rent or buy this book. Therefore, this is an option you may want to consider.

All other materials for the course will be available either through the library (marked with a [ER] for electronic reserves) or the T-Square course website under the Resources page (marked with a [TS]).

All materials available through course reserves can be accessed through:

https://ereserves.library.gatech.edu/ares/

Click on “Search Reserves” and then enter your GT username and password where prompted. You should then be able to click on our course and access the materials.

Assignments

Problem Sets: Problem Sets: The purpose of these problem sets is to help cement the theoretical economic foundations underlying the models we will discuss in class. You are welcome to work on problem sets with your classmates, but I expect everyone to write up their own set of solutions to each assignment. Writing up your own solution set will help ensure that you understand the concepts. If you work with classmates on assignments, please make a note of who you worked with at the top of your assignment.

Current Issues Analysis: Topics that are related to energy are almost constantly in the news. Since one of the goals of this class is to encourage you to think about current events as an economist would, four times during the semester you will need to find a recent newspaper article that relates to energy markets. After you read the article, write a one page analysis of the article including a brief summary (1 paragraph) of the article and then discuss how the concepts covered in this course inform your analysis of the news article.

You should use articles from mainstream newspapers (New York Times, Wall Street Journal, Financial Times, The Economist, Atlanta Journal Constitution, Los Angeles Times, etc.). All of these papers should be available in the library if the website is behind a pay wall. You should clearly state the title of the article and the publication in which you found it in your analysis. Please also provide a link to the article you are discussing or a paper copy of the article.
**OPEC Game:** It is crucial to understand the operation of markets in order to appreciate the forces that determine prices and production levels in energy markets. We will simulate the world market for oil using an interactive strategy game developed by Severin Borenstein and James Bushnell (2004). More information about this game will be given out during class.

**Grading**

Your course grade will be based on these components:

- Problem Sets 15%
- Current Issues Analysis 10%
- OPEC Game 15%
- Exam 1 16%
- Exam 2 19%
- Final Exam 20%
- Class Participation 5%

All assignments that are submitted after the due date will be penalized one grade per day (A to B, etc.).

Course grading will be based strictly on the number of points you receive on each assignment. Scores of 90% or more will be As, 80% - 89% will be Bs, 70% - 79% will be Cs, 60% - 69% will be Ds, and below 60% will be Fs.

**Attendance and Participation**

You are expected to attend all class sessions and be prepared to discuss the readings that have been assigned for that day. Class will be much more interesting and engaging if everyone has done the readings. Moreover, since a portion of the class is discussion-based, you will be a detriment to other students in the class if you have not completed the readings.

**Exams**

There will be three exams (including the final) spaced at roughly equal intervals throughout the semester. Exams will consist of analytical problems, short answer questions, and essay questions. The exams will cover all of the assigned material. The final exam will cover material from the entire semester but will focus more heavily on the material covered since the first exam.

In order to give you some extra room for improvement, the highest of your two grades from the first two exams will receive a 19% weight and the other will receive a 16% weight. This does not apply to the final exam. Everyones final exam will be given 20% weight.

Make-up exams will not be given except with the approval of the Dean of Students. If you have an emergency, please let me know immediately to make alternative arrangements.

If the class mean on a particular test falls below 76%, I will add a curve to that test to bring it up to 76%. For example, if the class mean on the second exam is 73%, I will add a 3% curve to that exam. This protects you from tests that may be somewhat more difficult than others. If there is a curve, I will make a specific announcement about it. Only individual tests are curved if necessary. There is no additional curve for the class at the end of the semester.
Honor Code and Plagiarism
You are expected to follow the Georgia Institute of Technology Honor Code at all times. As mentioned above, you are allowed to collaborate with your fellow classmates on the homework and studying for exams. However, exams are an individual endeavor and you may not consult any outside information sources (other students, textbooks, notes, etc.) except as noted on the exam. For any questions involving these or any other Academic Honor Code issues, please consult me or http://www.honor.gatech.edu.

Email Policy
Substantiative questions are best asked in person during my office hours and will typically not be answered over email. However, you should feel free to email about clarifications and minor questions. I will do my best to answer your email within 48 hours (and hopefully sooner). It is your responsibility to ensure that you are regularly checking your email for class announcements.

Special Accommodations
If you need any special accommodations due to a physical or learning disability, please let me know during the first week of class. In order to receive the requested accommodations you will need to obtain a form from the Access Disabled Assistance Program for Tech Students (ADAPTS) and give me this form. The ADAPTS Office is located in the Smithgall Student Services Building, Suite 210 and the website is http://www.adapts.gatech.edu.

Also, if you will be missing any classes for religious holidays or other events, let me know as soon as you know you will be missing class. You will still be required to know the material from that class period.

Important Dates
September 18  Exam 1
October 7     Current Issues Analysis I Due
October 28    Current Issues Analysis II Due
November 11   Exam 2
November 18   Current Issues Analysis III Due
December 2    Current Issues Analysis IV Due
December 9    Final Exam

Keys to Success
- Practice all of the analytical problems multiple times and find similar types of problems to help you study for the exam. Simply watching someone else solve the problems or following along is much less helpful.
- Engage with all of the readings before class and come prepared to discuss the readings.
- Spend time carefully considering your strategy for the OPEC game.
- Come talk to me about any problems that you are having in the class or concepts you do not understand. Office hours are for you to use!
Preliminary Class Schedule

Thursday, August 21: Energy Overview

Tuesday, August 26: Review of the Fundamentals
- Perloff Chapter 2 - Supply and Demand
- Perloff Chapter 3 - Applying Supply and Demand

Thursday, August 28: Review of the Fundamentals II
- Kolstad Chapter 4 - Efficiency and Markets [ER]

Tuesday, September 2: Economics of Production
- Pindyck and Rubinfeld Chapter 7 - Cost of Production [ER]

Thursday, September 4: When Do Markets Fail
Homework 1 due in class
- Keohane and Olmstead Chapter 5 - Market Failures in the Environmental Realm [ER]
- Perloff Chapter 18 - Externalities, Commons, and Public Goods

Tuesday, September 9: Imperfect Competition and Market Power
- Perloff Chapter 11 - Monopoly

Thursday, September 11: Intertemporal Decision Making
- Berck and Helfand Chapter 14 - The Time Factor: Discounting [ER]

Tuesday, September 16: Pricing and Extraction of Natural Resources
Homework 2 due in class
- Keohane and Olmstead Chapter 6 - Managing Stocks: Natural Resources as Capital Assets [ER]

Thursday, September 18: EXAM 1

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2This is a preliminary schedule and is subject to change.
Tuesday, September 23: Collusion

- Perloff Chapter 13 - Oligopoly
- Viscusi, Harrington, Vernon Chapter 5 pp. 116-147 [L]

Thursday, September 25: OPEC Game Instructions and Meeting

- OPEC Game Instructions

Tuesday, September 30: The Theory of the Second Best

First OPEC meeting


Thursday, October 2: Economic Regulation of Natural Monopoly Markets

OPEC production period 1 results announced

- Viscusi, Harrington, Vernon Chapter 11, pp. 401-423. [L]
- Viscusi, Harrington, Vernon Chapter 12, pp. 429-436. [L]

Tuesday, October 7: Commodity and Futures Exchanges

CIA I due in class

OPEC production period 2 results announced

OPEC meeting

- Planet Money Podcast - The Eddie Murphy Rule [TS]

Thursday, October 9: Oil and Natural Gas Markets

Homework 3 due in class

OPEC production period 3 results announced

- Viscusi, Harrington, Vernon Chapter 18 pp 641-688 [L]
- Supermajor Daemmerung. (2013, August). The Economist, 17. [TS]

This is much more in-depth than we will cover. This is intended as extra reading for those with a particular interest in this topic.

Tuesday, October 14 - FALL BREAK
OPEC production period 4 results announced

Thursday, October 16: Introduction to the Gasoline Industry
OPEC production period 5 results announced
OPEC meeting

Tuesday, October 21: Regulation Game
OPEC production period 6 results announced

Thursday, October 23: Introduction to the Electricity Industry
OPEC production period 7 results announced
• Gearino, D. (2013, April 24). With natural gas costly, AEP burning more coal. The Columbus Dispatch, pp. 3-4. [TS]

Tuesday, October 28: Pricing and Electricity
CIA II due in class
OPEC production period 8 results announced
OPEC meeting
• Borenstein, S., & Bushnell, J. (2002). Electricity Restructuring: Deregulation or Reregulation? Regulation, 23(2), 46-52. [ER]
Thursday, October 30: Incentive Based Regulation and Nuclear Power

*OPEC production period 9 results announced*


Tuesday, November 4: Renewables

*Homework 4 due in class*

*OPEC production period 10 results announced*


Thursday, November 6: OPEC Game Debriefing

Tuesday, November 11: EXAM 2

Thursday, November 13: Energy Externalities

- Viscusi, Harrington, Vernon Chapter 21 pp 745-786 [L]

Tuesday, November 18: Energy Efficiency and Technology Forcing Regulations

*CIA III due in class*

Thursday, November 20: Prices vs. Quantities

- Portney, P. R. (2003). Market-Based Approaches to Environmental Policy. Resources, Summer, 15-18. [ER]

Tuesday, November 25: Permit Trading Game

Homework 5 due in class

Thursday, November 27: Thanksgiving Break

Tuesday, December 2: Public Goods, Energy R&D, and Information Problems

CIA IV due in class


Thursday, December 4: Energy Security


Thursday, December 9 - FINAL EXAM

Exam time: 11.30am - 2.20pm