CARNEGIE MELLON UNIVERSITY
HEINZ COLLEGE

95-710 - ECONOMIC ANALYSIS

Course packet

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95-710 - ECONOMIC ANALYSIS

Fall 2022 – Mini 1

Lectures: Monday and Wednesday
A1: 10:10AM-11:30AM, HBH 1204
C1: 1:25PM-2:45PM, HBH 1202
E1: 3:05PM-4:25PM, HBH 1005

Review ("Recitation") sessions: Friday
4:40PM-6:00PM, HBH A301

Syllabus

Instructor:

Alessandro Acquisti
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http://www.heinz.cmu.edu/~acquisti/
412-268-9853

Office Hours: Zoom (https://cmu.zoom.us/j/2809093530)
Monday 4:30PM-5:30PM
In addition, other slots are available by appointment (please email: acquisti@andrew.cmu.edu)

TAs:

Naveen Thotadamane Basavaraj
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1. TEXTBOOKS

Recommended: Shapiro and Varian, Information Rules
Varian, Intermediate Microeconomics[1]
Course Packet: Readings and Handouts available on Canvas

2. COURSE DESCRIPTION

This is a course in microeconomics and its implications for management and strategy – particularly (but not exclusively) in the context of information technology firms.

Microeconomics, as discussed in this course, focuses on the models and methods by which managers can analyze their market and organizational environment to make optimal decisions. The key to such optimal decision-making is an understanding of the trade-offs in allocating scarce resources. The core models of microeconomics are fundamental to more applied areas of management such as strategy, marketing, production, and finance.

The course will begin with an examination of the underlying structure and models of competitive markets, and the efficiency and welfare implications of those models. We will then examine economic models that describe firm output, pricing and entry/exit decisions. These models will then be applied to a variety of market contexts, including monopoly, oligopoly, and monopolistic competition. As we go through this analysis, we will seek to understand the implications of the theory for information technology firms and for consumers. We will also examine interesting dynamics between information, agents, and economic outcomes in the context of game theory. Most of our discussions of the economic models will be accompanied by explorations of the ideas and examples presented in the Shapiro and Varian text and in the readings.

3. OBJECTIVES

The main objective of this course is to provide a level of economic "literacy" adequate to understand and apply crucial economic concepts to areas as diverse as management decision making and finance; marketing and strategy; policy making and social analysis.

A second, related objective of this course is to discuss the particular economic characteristics of the IT industry, and to offer tools to understand its processes and mechanisms.

[1] Important: Any edition of this textbook from 5th onwards will work. I recommend **renting or buying a used version** of this book online, rather than purchasing a brand-new copy. See Section 9 of this Syllabus.

4. GRADING

There are three components of your grade. There will be **three homework** assignments, **three quizzes**, and in-class **short quizzes**. The weighting of these components is:

- **3 Homeworks 35%**
- **3 Quizzes 55%**
- **Short Quizzes 10%**

Monday and Wednesday classes are used for actual lectures, and include Short Quizzes. Friday review sessions are, in general, used for Homework submission and discussion, as well as for Quizzes.

Homework assignments will consist of numerical problems and open-ended questions (e.g. short essays or analysis questions). Students are permitted to collaborate on the homework in groups of up to **three students** (see Section 8). **Each Homework assignment will be submitted online via Gradescope (Gradescope is accessible through Canvas; detailed instructions will be provided with the Homework). Your answers will have to be submitted before the start of the Friday review session in which Homework solutions will be discussed with the class** (see Schedule in Section 12, below). To minimize the possibility of confusion, please type your Homework's answers (you can use hand-writing for figures and graphs). Alternatively, you can hand-write your answers, scan the paper, and submit the digital scanned version of it – but if you do so, please make sure that your handwriting is legible and that all figures/equations are clear.

Quizzes will be administered, in person, during the Friday review sessions, and will last 1 hour and 20 minutes. Thus, review sessions are mandatory on the days when quizzes are given. Quizzes will consist of true/false questions, numerical problems, and open-ended questions. Quizzes are closed-book. **Calculators can be used during the quiz** (note: if you use a calculator app *on a smartphone*, you cannot use any other applications apart from the calculator). No collaboration (including no discussion among students) is allowed during the quiz.

Short Quizzes will be administered via Canvas during our classes (excluding Lecture 1, of course). They will be very short, and mainly aimed at making sure that you have paid attention to the material covered in the lecture slides and discussed during the lecture. Your **two worst-performing Short Quizzes across all lectures will be eliminated** (that is, they will not count towards your grade). No collaboration (including no discussion among students) is allowed during the Short Quizzes.

Every year, students are interested in knowing what score is needed "to get an A." This curiosity is entirely understandable (even though preoccupation over final grades is unwarranted: grades are more useful in assessing how and what you are learning, than in influencing your future career options). While,

historically, a score of 90.00% or above has **often** been a threshold for an "A" grade, **there is no pre-fixed grading scale for this course**, because every class and every year are different from other classes/other years of the same course.

The best advice regarding grading I can give (in addition to those under Section 10 of this Syllabus) is to please check carefully the schedule of Homeworks and Quizzes in the latter part of this document, and avoid scheduling meetings (e.g., job interviews) that conflict with your Homework and Quiz sessions, because anticipating or postponing Homeworks or Quizzes will unfortunately not be allowed, nor taking extra Homeworks or extra Quizzes to make up for lost ones. While I understand that many of you may have job interviews to do during this Mini, allowing students to take Quizzes at a different time than the rest of their classmates creates unfair advantages. So, please plan ahead.

5. LOGISTICS

Classes and Review sessions will be **in person on CMU campus**. However, we will follow CMU safety regulations concerning COVID 19. We will use Canvas (or some of Canvas add-ons, such as Gradescope) for online discussions, for HWs submission, for short quizzes, and for grading. Note: **short quizzes will take place during lectures – so please be ready to use a laptop or a mobile device (smart phone or tablet) to access Canvas during class**.

6. CLASSES, LECTURE SLIDES, HOMEWORK, AND QUIZZES

Some important notes about classes, lectures slides, homework, and quizzes.

First, **the relation between: a) the models and exercises discussed in class, and b) the homework and the quizzes** is the following:

- Each homework is designed to make you exercise on and **think critically** about the models and topics discussed in class. Hence, each homework will **challenge** you to reflect on a number of different topics and models discussed in class and **expand on the problems** we will solve together in class, **by combining them and critically applying them to a variety of different scenarios** with different complexities. In other words, be ready for the fact that **each homework will extend the material and the exercises discussed in class**. Some of the homework scenarios are numerical exercises. Some are open-ended questions that have **more than just one "right" answer**. In general, the homework will make you think – they will not simply ask you to "plug in" a formula and find a value.
- Quizzes will be similar to the homework but **shorter**, with fewer exercises and fewer calculations involved. **You can find samples of previous quizzes in the course packet**.
- Short quizzes, as mentioned, will be simple and relatively straightforward questions about class material asked at the end of each lecture.

Second, **the relation between: a) the lecture slides and b) the textbooks and readings** is the following:

- The **lecture slides I will provide cover all the topics that will be part of homework and quizzes, but not all the details**. They can be used as a summary of the relevant topics, but they are **not meant to substitute the books** and the more detailed explanations that the textbooks and the readings contain. Please also see Section 9, below, for more information about the textbooks.

7. THEORY VS. APPLICATIONS IN THIS CLASS

Some of our lectures will be about formal models of economic behavior and will apply (simple) mathematics to represent those models and describe that behavior. Some others of our lectures will be about applications, and may be more discursive. Different lectures may be challenging and luckily interesting in different ways.

More precisely, the first three weeks of this course will focus on formal models a little more than the remaining weeks of the course. Formal models will give us the theoretical foundations to understand the rest of the topics. So, don't get discouraged if you have never taken economic courses before, or if the first two weeks will appear a bit "theoretical:" the level of mathematics necessary to do well in this class is actually quite basic, and **the theoretical tools that we will learn in the first weeks will turn useful as we will discuss more practical applications and study concrete market examples in the second part of this course**.

8. COLLABORATION AND INTEGRITY

Students are permitted to collaborate on the homework in groups of up to **three students**, whose names must be clearly indicated in the submitted homework (however, trust me: you will learn much more if you *first* try and do the homework by yourself, and *then* collaborate).

There is **no collaboration** in Quizzes and Short Quizzes. That includes no discussion among students in any form during Quizzes and Short Quizzes.

Plagiarism from online sources (e.g., using answers found online) and/or copying of another group's homework or another student's quiz, or from previous years' homework and quizzes are university offenses. Just *don't* do it. Please. It's not worth it.

These rules and the academic integrity standards outlined in your student handbook will be strictly enforced. Violations of these rules or standards are considered a fundamental breach of trust and may result in failure of the course**.**

9. ABOUT THE TEXTBOOKS

I will use examples from Varian's Intermediate Microeconomics for the modeling portions of our classes. Any recent edition (from 5th onwards) is acceptable (**note: the chapter numbering listed in the Schedule of classes presented below in Section 12 is based on the 7th edition**). In recent years, new copies of this textbook have become increasingly scarce and therefore pricey. I strongly recommend *not* trying to find a new version of the book, but rather purchasing or renting one of many used versions of this book available from numerous online sellers (including Amazon, which also offers a semester *rental* option) at much more reasonable prices.[2]

While I will often adopt the approach and the arguments that you can find in Varian's textbook, in reality you may (at your own judgment) replace Varian's book with any other decent Microeconomic book, as long as you make sure to cover equivalent material to what we will cover in Varian's book. Two textbooks that I also like, and which you are free to choose as replacement for Varian's Intermediate Microeconomics, are:

- Frank and Bernanke, Principles of Microeconomics
- Cabral, Introduction to Industrial Organization

Why do we use Varian's textbook instead of those others? Because – among other reasons - it offers a sound yet simple mathematical approach that will turn useful for other courses you will take at the Heinz College, and hopefully for your future career as well.

We will use Shapiro and Varian's Information Rules for applications of economic theory to information technology and information systems. Although it was first published in 1998 (that is, in the *very* early days of the ecommerce revolution), it remains one of the best guides to understanding the economics of information technology.

Finally, we will use a number of additional readings (which I uploaded to the Canvas) to discuss specific topics such as collusion, predatory pricing, and so forth.

10. HOW TO DO WELL IN THIS CLASS

Here are some tips that I (as the instructor) and previous students of this class have learnt about how to perform well in this class:

[2] See, for instance, https://www.amazon.com/Intermediate-Microeconomics-Calculus-Modern-Approach/dp/0393123987/ref=sr_1_1?dchild=1&keywords=hal+varian+intermediate+microeconomics&qid=1629409770&sr=8-1

- Even if you collaborate on the homework with other students, try first to solve the exercises by yourself, alone. You will learn *much* more this way. **Absolutely do not "split" the questions among the members of your team** – during the quiz you will be alone in answering similar questions, and you will not have anybody to split questions with.
- Study the readings *before* the lecture – this way the topic of the lecture will not be completely novel to you, and you will find it easier to follow the lecture.
- Study the readings and the book chapters once again *after* the lecture – the **lecture slides I will provide cover all the topics that will be part of homework and quizzes, but not in *complete* detail**. As I mention above, the lecture slides can be used as a summary of the relevant topics, but they are **not meant to substitute the books** and the more detailed explanations that the books contain.
- Check back on Canvas the version of your homework graded and corrected by the TAs. The TAs will note errors and solutions in the graded homework. And since quizzes are similar (although not identical) to the homework, you should try and learn as much as you can from the graded, corrected homework in order to do well in the quizzes.
- In addition: do attend the Friday review sessions when homeworks are discussed and solved in front of the class.
- Be ready to not just plug in formulas, but *think* about the economic problems we discussed in class in order to complete the homework.
- From time to time, get some sleep (but *not* in class). No, seriously: sleeping enough, eating well, taking care of yourself are **very** important things. See Section 11, below.
- Use the Force.

11. HOW TO DO WELL THROUGHOUT YOUR HEINZ PROGRAM, IN GENERAL

Do take care of yourself. Do your best to maintain a healthy lifestyle - eating well, exercising, getting enough sleep, and taking some time to relax. This will help you achieve your goals and cope with stress. Courses at CMU can be intense. If you are stressed out, please know that you are not alone, and that there are many helpful resources available on campus - an important part of the college experience is learning how to ask for help if it is needed. Asking for support sooner rather than later is often helpful. If you, or anyone you know, experiences academic stress, difficult life events, or feelings like anxiety or depression, please seek support: consider reaching out to a friend, faculty or family member you trust. Also, Counseling and Psychological Services (CaPS) is there to help: you can call 412-268-2922 or visit their website at http://www.cmu.edu/counseling/.

12. COURSE SCHEDULE AND TOPICS

Readings listed below must be completed **prior** to the class for which they are listed, since we will discuss them together. Readings other than "Shapiro and Varian" or "Varian" **available on Canvas**. The material for each class should be read by the date indicated below, even if we have not yet finished going through the previous class' Lectures.

Note: for Varian's book, the chapter numbers reported below refer to the 7th edition. If you are using different editions, chapter numbers *may* have changed slightly. Please use the title of the lecture to find the appropriate chapter.

I hope that you will enjoy and learn from this course. (Did I mention that readings should be completed *prior* to the class for which they are listed?)

Lecture 1 (Monday, August 29)
Topic: Introductions and Market Experiment
Today's Readings: None
Course packet on Canvas

Lecture 2 (Wednesday, August 31)
Topics: Markets and Efficiency
Today's Readings: Varian, Chapters 1, 15.1-15.10, and 16.1-16.5
Homework 1 can be found on Canvas

Review Session 1 (Friday, September 2)
Math review
(You can use the Mathematical Appendix in Varian's textbook to prepare)

Monday, September 5
No classes – Labor Day!

Lecture 3 (Wednesday, September 7)
Topics: Firm Costs
Today's Readings: Varian, Chapter 21

Review Session 2 (Friday, September 9)
Assignment due: Homework 1 covering Lectures 1-3

Lecture 4 (Monday, September 12)
Topic: Perfect Competition
Today's Readings: Varian, Chapters 22 and 23

Lecture 5 (Wednesday, September 14)
Topic: Monopoly and Monopolistic Competition
Today's Readings: Monopoly – Varian, Chapter 24
Monopolistic Competition – Varian, Chapter 25.7-25.10
Homework 1 graded
Homework 2 can be found on Canvas

Review Session 3 (Friday, September 16)
Quiz 1 covering Lectures 1-3

Lecture 6 (Monday, September 19)
Topic: Pricing and IT Costs
Today's Readings: Shapiro and Varian, Chapters 1, 2, and 3
Varian, Chapter 25.1-25.6

Lecture 7 (Wednesday, September 21)
Topic: Game Theory
Today's Readings: Varian, Chapter 28
Game theory Handout (*on Canvas*)
Quiz 1 graded

Review Session 4 (Friday, September 23)
Assignment due: Homework 2 covering Lectures 4-7

Lecture 8 (Monday, September 26)
Topic: Oligopoly
Today's Readings: Varian, Chapter 27
Oligopoly Handout (*on Canvas*)

Lecture 9 (Wednesday, September 28)
Topic: Collusion
Today's Readings: *Ethyl* and *Rapid Price Communication* (*on Canvas*)
Homework 2 graded
Homework 3 can be found on Canvas

Review Session 5 (Friday, September 30)
Quiz 2 covering Lectures 1-7 (but focusing on materials from HW2)

Lecture 10 (Monday, October 3)
Topic: Strategic Behavior
Today's Readings: *Dupont* and *Computers* (*on Canvas*)

Lecture 11 (Wednesday, October 5)
Topic: Asymmetric Information
Today's Readings: Varian, Chapter 37
Quiz 2 graded

Review Session 6 (Friday, October 7)
Assignment due: Homework 3 covering Lectures 8-11
Important note: Due to Hamburg Hall scheduling conflicts, this Review session will be held remotely

Lecture 12 (Monday, October 10)
Topic: Behavioral Economics
Today's Readings: Varian, Chapter 30

Lecture 13 (Wednesday, October 12)
Topic: Lock-in and Switching Costs
Today's Reading: Varian, Chapter 35.1-35.3
Shapiro and Varian, Chapters 5 and 6

Final exam (*Date TBA*)
Quiz 3 covering Lectures 1-14 (but focusing on materials from HW3)

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