95-710 A1/C1 - ECONOMIC ANALYSIS (Remote course)
Fall 2020 – Mini 1

Course packet

Content

- Syllabus (this document, on Canvas)

- Game theory handout (Canvas)

- Oligopoly handout (Canvas)

- Samples of previous homework/quizzes questions (Canvas)

- Readings (Canvas)
    - Facilitating Practices: The Ethyl Case
    - Rapid Price Communication and Coordination: The Airline Tariff Publishing Case
    - Strategic Capacity Preemption: DuPont (Titanium Dioxide)
    - Computers

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CARNEGIE MELLON UNIVERSITY
HEINZ COLLEGE

95-710 A1/C1 - ECONOMIC ANALYSIS
Fall 2020 – Mini 1
Lectures: Monday and Wednesday 9:50AM - 11:10AM, on Zoom (A1)
Lectures: Monday and Wednesday 3:20PM – 4:40PM, on Zoom (C1)
Review sessions: Friday 5:10PM-6:30PM, on Zoom (All modules)

Syllabus

Instructor:

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412-268-9853
Office Hours: On zoom (see information on Canvas). Monday 5:00PM-6:00PM
and by appointment
http://www.heinz.cmu.edu/~acquisti/

TAs:

Nikhil George
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1. TEXTBOOKS

Recommended: Shapiro and Varian, <u>Information Rules</u>
                       Varian, <u>Intermediate Microeconomics</u>
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.

4. GRADING

There are three components of your grade. There will be **three homework** assignments, **three quizzes**, and **short quizzes** at the end of each lecture. 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 they end with short quizzes. Friday review sessions are 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). **Each Homework assignment will be uploaded to Canvas on a Wednesday. Your answers will have to be submitted online (via Canvas) by 5.00pm on Friday the following week, before the start of the Friday review session** (for a Homework to be graded it must be submitted *before* the review session starts). 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 via Canvas 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.

Short Quizzes will be administered via Canvas during each lecture, typically close to the end of a Lecture (excluding Lecture 1, of course). They will be very short, and mainly aimed at making sure that you have been able to follow the material covered during the Lecture. Your worst-performing Short Quiz across all lectures will be eliminated (that is, it will not count towards your grade).

Every year, students are interested in knowing what score is needed "to get an A." This curiosity is entirely understandable (even though the emphasis on final grades is sometimes excessive: to a good extent, grades are more useful to asses how and what you are learning, than in influencing your future career options and choices). 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. REMOTE COURSE

This entire course will be taught remotely, via Zoom. You will find links to the live Zoom-streamed classes on Canvas. We will also use Canvas for the Friday review sessions, for online discussions (via Discussions), for HWs submission, for quizzes and short quizzes, and for grading. We will strive to make the remote-teaching experience as engaging and interactive as possible. Thus, if you can, please keep your camera ON (so that we can see each other during lectures), and be ready to participate in the class discussion by asking, or answering, questions.

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 readu 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

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, however, in 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 on) is good (the chapter numbering listed in the Schedule of classes – below, Section 11 – is based on the 7th edition). While I will often adopt the approach and the arguments that you

can find in that book, in reality you may (at your own judgment) replace Varian's book with any other decent Microeconomic book – such as Frank and Bernanke; Perloff; or Pindyck and Rubinfeld – as long as you will make sure to cover equivalent material to that which we will cover in Varian's book.

Why do we use Varian's book 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:

- 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 recitation 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 – especially under these admittedly crazy times. 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 31)
Topic: Introductions and Market Experiment
Today's Readings: None
Course packet on Canvas

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

Review Session 1 (Friday, September 4)
Math review
(You can use Varian's Mathematical Appendix to prepare)

Monday, September 7
No classes – Labor Day!

Lecture 3 (Wednesday, September 9)
Topics: Firm Costs
Today's Readings: Varian, Chapter 21

Review Session 2 (Friday, September 11)
Assignment due: Homework 1 covering Lectures 1-3

Lecture 4 (Monday, September 14)
Topic: Perfect Competition
Today's Readings: Varian, Chapters 22 and 23

Lecture 5 (Wednesday, September 16)
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 on Canvas

Review Session 3 (Friday, September 20)
Quiz 1 covering Lectures 1-3

Lecture 6 (Monday, September 21)
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 23)
Topic: Game Theory
Today's Readings: Varian, Chapter 28
                      Game theory Handout (*on Canvas*)
Quiz 1 graded

Review Session 4 (Friday, September 25)
Assignment due: Homework 2 covering Lectures 4-7

Lecture 8 (Monday, September 28)
Topic: Oligopoly
Today's Readings: Varian, Chapter 27
                      Oligopoly Handout (*on Canvas*)

Lecture 9 (Wednesday, September 30)
Topic: Collusion
Today's Readings: *Ethyl* and *Rapid Price Communication* (*on Canvas*)
Homework 2 graded
Homework 3 on Canvas

Review Session 5 (Friday, October 2)
Quiz 2 covering Lectures 1-7

Lecture 10 (Monday, October 5)
Topic: Strategic Behavior
Today's Reading: *Dupont* and *Computers* (*on Canvas*)

Lecture 11 (Wednesday, October 7)
Topic: Asymmetric Information
Today's Reading: Varian, Chapter 37
Quiz 2 graded

Lecture 12 (Friday, October 9) **[Note: this will be an actual lecture, not a recitation session]**
Topic: Behavioral Economics
Today's Readings: Varian, Chapter 30

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

Lecture 14 (Wednesday, October 14)
Topic: Externalities
                            Network Effects, Positive Feedback, and Externalities
Today's Reading: Varian, Chapter 35.4-35.7
                            Varian, Chapter 34
                            Shapiro and Varian, Chapters 7, 8, and 9

Review Session 6 (Friday, October 16)
Assignment due: Homework 3 covering Lectures 8-14

Lecture 15 (Monday, October 19)
Topic: R&D

Final exam (*October 20-23, date TBA*)
Quiz 3 covering Lectures 1-14

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