ECO 310 H1F

EMPIRICAL INDUSTRIAL ORGANIZATION

DEPARTMENT OF ECONOMICS. UNIVERSITY OF TORONTO

Fall 2018

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Lectures: Mondays 10am-12pm. Room OI 2214 (at 252 Bloor Street)
Tutorials: Mondays 12pm-1pm.   Room OI 2214
Office Hours: Tuesdays and Thursdays: 2:00-3:00pm. Room: GE 309

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1. COURSE DESCRIPTION

This course is an introduction to Empirical Industrial Organization (IO). IO studies how markets work, how firms compete or collude with each other, and how these interactions determine profits and consumer welfare. IO emphasizes the interdependence in the decisions of firms operating in a market. For instance, when a firm decides to open a new store, it should take into account how other firms' will response by closing their stores or opening new ones, increasing their advertising, or changing their prices. This type of interdependences underlies firms' decisions and market competition.

Over the last two decades, research in IO has become predominantly empirical. IO economists use data on consumers' and firms' decisions to measure consumer demand, firm productivity and profitability, to understand firms' strategies, and to analyze how government regulations affect market competition and ultimately social welfare. Recently, the increasing availability of rich and detailed data on consumers' and firms' choices ("big data") is having an important impact in this field by generating new types of empirical questions that require new models and methods.

Empirical IO emphasizes the importance of combining data, economic models, and appropriate econometric techniques to answer empirical questions. In terms of models and econometric methods, there are four main *workhorses* that concentrate most of the research in this field: (i) production functions and the measurement of firm productivity; (ii) demand models and the estimation of consumer preferences; (iii) models of price and quantity competition; and (iv) models of market entry and innovation, both static and dynamic. This course is organized around these important models.

Econometrics and data analysis are fundamental tools for the modern economist of the 21st century. They are also key tools in this course. We will review and applied some basic econometric models and methods such as the linear regression model, instrumental variables estimation, and discrete choice models. Students will gain practical experience working with economic data, and making use of the STATA Data Analysis and Statistical Software package.

2. COURSE OBJECTIVES

By the end of this course, students will:
- Understand the main features of empirical models of demand, production function, price and quantity competition, and market entry.
- Know how to use market data to estimate the parameters of these empirical models, and interpret the economic implications of these estimations.
- Have enough programming experience using Stata and practical experience using actual data such that they can work in a research project in empirical IO.

Tutorials are a fundamental part of this course. The main purpose of the tutorials is to provide programming experience and practical experience with actual market data. This part of the course is not only fundamental to complete sets of the course, but also for some practical questions in the midterm and final exams. I expect students to attend and participate actively in all the tutorials.

3. COURSE PREREQUISITES

- *Microeconomic Theory:* ECO200Y1, or ECO204Y1, or ECO206Y1, or equivalents.
- *Quantitative Methods:* ECO220Y1, or ECO227Y1, or equivalents.

*** Note: It is the student's responsibility to ensure s\he has met the prerequisites for this course.

4. RECOMMENDED COURSES (but not prerequisites)

- ECO380H: Markets, Competition, and Strategy. This course covers the theory of IO.
- Applied Econometrics: ECO372H, ECO375H, or equivalent.

5. CLASS MEETINGS

- **_Lectures._** We will be meeting once a week on Mondays from 10am to 12pm in room OI 2214. The lecture slides will be posted on the course website/Quercus ahead of class.

- **_Tutorials._** Periodically, there will be one-hour tutorial sessions on Mondays from 12pam to 1pm in room OI 2214. Tutorials will be used to go over examples from the lectures, for exam review sessions, and for instruction on the use of STATA. Tutorial materials will be posted on the course website as we proceed.

6. EVALUATION

- Your final grade will be based on the evaluation of two problem sets, a midterm exam, and a final exam according to the following weighting:

  Problem sets (2 sets):   30%;
  Midterm Exam: 30%
  Final Exam: 40%

- ***Problem sets.*** There will be two problem sets, each worth 15%. In both problem sets you will have to use the STATA software package.
  - Problem set 1 will be handed out on Monday, October 1st (it will be posted at the course website) and it is **due on Monday, October 15th**.
  - Problem set 2 will be handed out on Monday, November 26 (it will be posted at the course website) and it is **due on Thursday, December 6th**.
  - Your answers to the problem sets should be typed and in electronic version, preferably in PDF format.
  - Late assignments will not be accepted and will receive a grade of zero.

- ***Midterm exam.*** The midterm test is worth 30% of the course grade.
  - It will take place on **Monday, October 29** during the Tutorial Class.
  - The test will be 60 minutes in duration.
  - All the exams are closed-book.
  - Missing the midterm exam implies a zero grade in the exam.

- ***Final exam.*** The final exam is worth 40% of the course grade.
  - It will take place on ***December TBA*** during the Final Exam Period.
  - All the exams are closed-book.
  - The final exam is cumulative.
  - Missing the final exam implies a zero grade in the exam.

7. MISSED EXAMINATION

- Make-up for missed examinations will only be permitted under very special health circumstances.
- If you miss an exam due to illness or injury, you must send me an email from your UofT email account within 24 hours of the missed test, concisely explaining why you missed the test. You must then provide me with an official **University of Toronto Student Medical Certificate**, available from the Registrar's Office, the Faculty of Arts and Sciences (Sidney Smith Room 1006) and the Health Services. Proper documentation must be presented to the instructor within five consecutive days of the missed test. Once the appropriate documentation is submitted and verified, you will have to write a make-up test within one week of the missed test, at a time and date chosen by the instructor, and with as little as one day's notice.

8. ACADEMIC CONDUCT

- Academic integrity is fundamental to learning and scholarship at the University of Toronto. Participating honestly, respectfully, responsibly, and fairly in this academic community ensures that the U of T degree that you earn will be valued as a true indication of your individual academic achievement, and will continue to receive the respect and recognition it deserves.
- It is the responsibility of the students to know and understand the provisions of the University of Toronto's *Code of Behaviour on Academic Matters.*
  http://www.governingcouncil.utoronto.ca/Assets/Governing+Council+Digital+Assets/Policies/PDF/ppjun011995.pdf
  It is the rule book for academic behaviour at the U of T, and you are expected to know the rules.
- All cases of suspected academic misconduct will be referred to the Dean's office.

9. ACCESSIBILITY

- Students with diverse learning styles and needs are welcome in this course. If you require accommodation for a disability please register with Accessibility Services (at 416-978-8060 or accessibility.utoronto.ca) as soon as possible so that we can assist you in reaching your academic goals in this course.

10. E-MAIL POLICY

- Use e-mails for appointments, administrative matters or urgent issues. Questions about the course material, lectures, and tutorials are more appropriate for office hours. I will normally reply to e-mails within 24 hours. You must use your UofT e-mail address, and include the course number "ECO 310" in the subject line, otherwise your e-mail may be automatically quarantined as "junk e-mail".

11. TEST SCORE APPEALS

- Please write a short paragraph explaining why you should obtain additional points. Turn in a hard copy of this by the end of the week following the week in which exams are first handed back. Your entire exam will then be re-graded, **and your score may go up or down**.

12. COURSE WEBSITE

- The course web-site is accessible through the University of Toronto *Quercus*. I will use the course web-site as a means of communication with the class, so I recommend you check the announcements regularly. In addition, I will periodically post the lecture slides online.

13. COURSE MATERIAL

- There is no text book. The course is organized around a Book Project, four survey papers in Empirical IO and Structural Econometrics (see Main References below), and published articles on empirical applications. The lecture notes and the surveys are key references for this course.
- You are required to have access to the STATA software package. You can get the student version inexpensively from the software licensing office in Robarts library:
  https://www.stata.com/order/new/edu/gradplans/student-pricing/
  The six month license of STATA/IC is sufficient for this course.
- In addition, a useful supplemental econometrics reference is: Jeffrey M. Wooldridge (2008). Introductory Econometrics: A Modern Approach, 4th Edition. South-Western College Publishers. Although it is not required, this textbook is available for purchase at the U of T Bookstore, and has also been put on the U of T Library course reserves.

14. MAIN REFERENCES
- PDF copies of these references are available online in the course werbsite.

- [ABBP] Ackerberg, D., L. Benkard, S. Berry, and A. Pakes (2006): "Econometric Tools for Analyzing Market Outcomes," *Handbook of Econometrics*, volume 6.
- [AG] Aguirregabiria, V. (2018): Book Project: "Empirical Industrial Organization: Models, Methods and Applications." Available at the course website.
- [ASL] Aguirregabiria, V., and M. Slade (2017): "Empirical Models of Firms and Industries," *Canadian Journal of Economics*, 50(5), 1445-1466.
- [ASU] Aguirregabiria, V. and J. Suzuki (2016): "Empirical Games of Market Entry and Spatial Competition in Retail Industries," *Handbook on the Economics of Retail and Distribution*, Chapter 9, pp 201-233. Emek Basker (editor). Edward Elgar Publishing.
- [BR] Berry, S., & Reiss, P. (2007): "Empirical Models of Entry and Market Structure," in *Handbook of Industrial Organization*, Volume 3, pp. 1845-1886.
- [NE] Nevo, A. (2011): "Empirical Models of Consumer Behavior," *Annual Review of Economics*, 3, 51-75.
- [RW] Reiss, P., and Wolak, F. (2007): "Structural Econometric Modeling: Rationales and Examples from Industrial Organization," in *Handbook of Econometrics*, Volume 6, pp. 4277-4415.

15. LIST OF TOPICS
[1] Introduction to the Course.
[2] Measuring Productivity. Estimation of Production Functions.
[3] Measuring Consumer Preferences. Estimation of Demand of Differentiated Products
[4] Competition in Prices and Quantities.
[5] Empirical Models of Market Entry

16. OUTLINE AND REFERENCES

[1] Introduction to the Course
1.1.   Measuring and explaining market power
1.2.   Data in Empirical IO
1.3.   Structural models in Empirical Industrial Organization: An Example
1.4.   An overview of the rest of the course

Readings:
- [AG] Chapter 1.
- [RW] Sections 1 to 5.

[2] Measuring Productivity. Estimation of Production Functions
2.1   Introduction
2.2.   Simultaneity Problem
2.3   Dynamic Panel Data Methods
2.4.   Control function methods
2.5.   Application.

Readings:
- [AG] Chapter 2.
- [ASL] Section 3.
- [ABBP] Section 2.
- Olley, G., and Pakes, A. (1996). "The Dynamics of Productivity in the Telecommunications Equipment Industry". *Econometrica*, 64 (6), 1263--1298.
- Griliches, Z., and J. Mairesse (1998): "Production Functions: The Search for Identification," in Econometrics and Economic Theory in the Twentieth Century: The Ragnar Frisch Centennial Symposium. S. Strøm (editor). Cambridge University Press.

[3] Measuring Consumer Preferences. Estimation of Demand of Differentiated Products
3.1.   Introduction
3.2.   Demand systems in product space
3.3   Demand systems in characteristics space
3.4.   Application

Readings:
- [AG] Chapter 3.
- [ASL] Section 4.
- [ABBP] Section 1.
- [NE] whole paper.
- [RW] Section 7.
- Berry, S. (1994). "Estimating Discrete-Choice Models of Product Differentiation," *RAND Journal of Economics*, 25(2), 242-262.

- Berry, S., Levinsohn, J., and Pakes A. (1995). "Automobile Prices in Market Equilibrium," *Econometrica*, 63(4), 841-890.

[4] Competition in Prices and Quantities

4.1.   The Conjectural Variation Approach
4.2.   Testing static oligopoly models (Genesove and Mullin: RAND 1998)
4.3.   Nevo on Cereals (Nevo, 2001)

Readings:
- [AG] Chapter 4.
- [ASL] Section 3.
- [RW] Section 6.
- Genesove, D., and Mullin, W. (1998). "Testing static oligopoly models: Conduct and Cost in the Sugar Industry," RAND Journal of Economics, Vol. 29(2), pp. 355-377.
- Nevo, A. (2001): "Measuring Market Power in the Ready-to-Eat Cereal Industry," *Econometrica*, 69(2), 307-342.

[5] Empirical Models of Market Entry

5.1.   Some general ideas
5.2.   Bresnahan and Reiss (JPE, 1991)
5.3.   Empirical Models of Market Entry with Heterogeneous firms

Readings:
- [AG] Chapter 5.
- [BR] All sections.
- [RW] Section 10
- [ASU] All sections.
- Bresnahan, T. and P. Reiss (1990): "Entry into Monopoly Markets," *Review of Economic Studies*, 57, 531-553.
- Bresnahan, T. and P. Reiss (1991): "Entry and Competition in Concentrated Markets," *Journal of Political Economy*, 95, 977-1009.

17. OUTLINE OF LECTURES & IMPORTANT DAYS

- Lecture 1. Mon, Sep. 10.   Introduction to the course
- Lecture 2. Mon, Sep. 17.   Measuring Firm Productivity
- Lecture 3. Mon, Sep. 24.   Measuring Firm Productivity
- Lecture 4. Mon, Oct. 1st.   Measuring Firm Productivity   *** PS 1 is handed out**

o **No classes:** Mon, Oct. 8.   Thanksgiving holiday. University closed.

- Lecture 5. Mon, Oct. 15.   Consumer Demand   *** PS 1 is due**
- Lecture 6. Mon, Oct. 22.   Consumer Demand
- Lecture 7. Mon, Oct. 29.   Consumer Demand

o **Monday, October 29.**   **Midterm Exam – During Tutorial Class.**

o **No classes:** Mon, Nov. 5.   Reading week

- Lecture 8. Mon, Nov. 12.   Price & Quantity Competition
- Lecture 9. Mon, Nov. 19.   Price & Quantity Competition
- Lecture 10. Mon, Nov. 26.   Price & Quantity Competition   *** PS 2 is handed out**

- Lecture 11. Mon, Dec. 3.   Market Entry
- Lecture 12. Thu, Dec. 6.   Market Entry   *** PS 2 is due**

o **December *TBA*.**   **Final Exam – During the University Final Exams Period.**