Dynamic Economics: Quantitative Methods and Applications

Course Overview

Goal
The purpose of this course is to take the tools you have learned in theory and econometrics and use them to study applied problems. Thus the course will rely on your understanding of optimization methods, equilibrium analysis, statistics and econometrics. We start from this core material and begin to explore how models are taken to data.

Requirements
You will be required to complete two projects over the two blocks. Each project will count equally in the determination of the final grade. The due dates for the projects are indicated in the course schedule. More details on the projects will be provided later.

Reading List
The reading list is provided below. It may be updated and reposted on the web from time to time. Entries with a * will be the basis of class lecture

Meeting Schedule
Our official meeting times are:
- Advanced Block I: March 1- April 4, Wednesday, Friday: 8:45-11
- Advanced Block II: April 19- June 4, Tuesday, Friday: 8:45-11

Outline and Readings

I. Tools: Dynamic Programming and Numerical Analysis

A. Basic Theory: [Cooper: March 3,5]

B. Numerical Analysis [Cooper: March 3,5]
Exercise 1

- Write Matlab (Fortan, C++, R, Scilab etc.) code for the stochastic asset pricing model discussed in class.
  - Using your code, answer the following questions
    - how does the (state contingent) asset value depend on the:
      - risk aversion of the agent?
      - the persistence of the dividend process?
      - the variability of dividends?
    - write up your answers in 3 pages.
    - show some figures from your code
    - discuss the economic intuition in your results
    - include your code
  - work alone

C. Growth Model [Cooper: March 3,5]

- AC, Chpt. 5

D. Econometrics: [Adda, March 10,12]

- AC, Chpt. 4

II. Household Behavior

A. Non-durable Consumption [Cooper, March 17,19]

- AC, Chpt. 6
- Hansen, L. and K. Singleton, "Generalized Instrumental Variables Estimation of Nonlinear Rational...


### B. Durable Goods [Cooper, March 17,19]

* AC, Chpt. 7


### C. Labor Supply and Health [Adda, March 24, 26, 31]

#### 1. Labor Supply


* Killingsworth, M. Labor Supply, Chapter 4.


#### 2. Health and Longevity


#### 3. Demand for Health


- Almond (2006)“Is the 1918Influenza Pandemic Over? Long-Term Effects of In Utero Influenza Exposure in the Post-1940 U.S. Population.” *JPE*.


Behavior”, ReStud.

### III. Firm Behavior

#### A. Production Functions [Adda, April 7,9]


#### B. Dynamic Factor Demand

1. **Capital** [Cooper, April 20,23]

- *AC, Chpt. 8
  - Cooper, R., J. Haltiwanger and L. Power, "Machine Replacement and the Business Cycle: Lumps and

Project I: Due April 16

2. Labor [Cooper, April 27]
* AC, Chpt. 9

C. Discrete Choice Models: [Adda, April 30, May 4]

III. Equilibrium Analysis

A. Dynamic Competitive Equilibrium [Cooper, May 7]
Published in *Journal of Political Economy* 110, no. 3 (2002): 508-534.

**B. Entry and Competition** [Cooper, May 11, 14]


**3. Search** [Adda May 18, 21]

- AC, Chpt. 10

**Project II: Due June 4**