

Macroeconomic Theory I - Fall 2022

ECON 712

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Class Location: LEA 541

Class Time: 8:35-9:55am, M & R

Office Hours: 4-5:00pm/Wed

Course description

This course is the first in a two-course sequence in macroeconomics. As this is a course in macroeconomic theory we will be spending most of our time studying important tools and building blocks behind “modern” macroeconomic models. We will start the course by spending a substantial amount of time covering the theory behind dynamic programming under certainty. Dynamic programming is a powerful method for solving dynamic problems, such as a household’s savings decision or a firm’s investment decision. An important feature behind the macroeconomic models we will study is that we build them up from microeconomic foundations (e.g. consumption-savings behavior of the consumer) which is central to modern macroeconomics.

While a lot of the analysis when we study DP focuses on a single agent (e.g. the Pareto Planner), we will then turn to a thorough treatment of a decentralized economy with complete markets focusing on competitive equilibria. Decentralization can be formalized through either a time-zero trading arrangement or a timing protocol in which markets for one-period ahead claims open sequentially. The resulting competitive equilibria of these two trading arrangements are equivalent.

Next, we will use some of the theory build up to here to highlight some fundamental ideas in asset pricing. The last section of the course dispenses with the idea of complete markets and takes seriously the notion that in reality many insurance markets are absent; in reality individuals must self-insure which is an important driver behind savings behavior. This introduces a whole new class of economic models known as heterogeneous-agent models. This class of models has been and still is widely applied in academic research, especially in conjunction with numerical methods (which we may touch upon).

The last three to four lectures will be devoted to student presentations. The aim is to have you read and present a paper of your choice that makes use, at least to some extent, of the material covered in class.

Textbooks

There will not be a main textbook, but there are three main sources. In *Dynamic Economics*, MIT Press 2003, Jerome Adda and Russell Cooper (AC) give an excellent treatment of dynamic programming that also conveys a lot of intuition. They also cover some applications. The method and a vast array of macroeconomic applications are also covered in *Recursive Macroeconomic Theory* by Lars Ljungqvist and Thomas Sargent (LS), MIT Press 2004 (2nd edition). (There also is a 3rd and 4th edition by now. Any edition is fine; the newer ones contain more applications.) A detailed technical treatment of dynamic programming with a few applications is given in *Recursive Methods in Economic Dynamics* by Nancy Stokey and Robert Lucas with Edward Prescott (SL), Harvard University Press 1989. The latter text is advisable for PhD students. All three books are on reserve in the library.

Grading

Final exam (50%), midterm (25%), presentation (20%), problem sets (5%). The midterm will be in class on Oct 19. Final exam time and location: tba. If you miss the midterm for medical reasons, its weight will be added to that of the final exam, if and only if you provide me with a valid medical note. If you miss your presentation for medical reasons, it will be rescheduled, if and only if you provide me with a valid medical note.

Problem Sets

There will be four problem sets. You are encouraged to work in groups of up to three students. (Hand in one solution per group.) No late problem sets will be accepted. I will post the problems on myCourses about a week or two before the due date.

Presentations

Presentations will take place in the last two weeks of the course. Depending on final enrolment, each student will have around 20-30 minutes to present and discuss a relevant paper from the literature. The deadline for choosing a paper to present is Wednesday Nov 9. Please email me your paper by then and so I can let you know whether your suggested paper is appropriate. You can find presentation guidelines below.

Communication

I will use *myCourses* for posting relevant materials such as notes and problem sets and for making announcements. You should therefore regularly check the course's my-Courses page.

Course Outline

This course outline is ambitious, so we might not be able to cover everything. Therefore, I maintain discretion regarding changes in this outline as well as in the sequence of topics.

1. Dynamic programming (AC Ch.2, 5, LS Ch.3)
 - A standard consumption-savings problem
 - Sequential optimization methods for dynamic problems
 - Introduction to dynamic programming (DP)
 - Using DP for finite-horizon problems
 - Using DP for infinite-horizon problems
 - Formalities of DP
2. Equilibrium with complete markets (LS Ch.8)
 - Competitive equilibrium with time-0 trading in an endowment economy
 - Competitive equilibrium with sequential trading in an endowment economy
 - Modelling uncertainty
 - Time-0 and sequential trading with uncertainty
3. Asset Pricing (LS Ch. 13, Lucas (1978), Mehra & Prescott (1985))
 - Pricing state-contingent assets
 - Partial equilibrium asset pricing
 - The equity premium puzzle
4. Bewley models (AC Ch. 6, LS Ch. 16, 17, Aiyagari (1994), Huggett (1993))
 - Introduction to incomplete markets
 - Precautionary savings

- Idiosyncratic and aggregate risk
- Inequality and welfare

Presentations

Guidelines

1. General points:

- You have 20 minutes for the presentation. That leaves ca. 5 minutes for discussion after the presentation.
- There will be ca. 3 papers per class. Students who are not presenting should read at least the introduction of the papers that are presented. This does wonders.
- Prepare a pdf-file with a presentation. (If you use Powerpoint, still prepare a pdf-file, like this you avoid funny characters appearing on your slides. At some point you may want to learn to use Latex plus e.g. Beamer.) Do not overload your slides.
- Target group: You are presenting to a class of macroeconomists. You know their background.

2. The presentation:

- Explain the context of the paper: What is the question it tries to answer? Why should we care? What is the contribution of the paper? **No lengthy literature review.**
- Explain the approach to the problem (methodology): Explain the ingredients of the model. Point out important assumptions. Use equations where they are helpful. Explain how quantitative results are obtained: data, method.
- Explain the most important results. Explain intuitively how they come about.
- Evaluation: What have we learned? One item of criticism. One idea for improving the paper or for extending it.

3. Papers:

- I encourage you to find a high-quality paper in macroeconomics in a topic that interests you (it should contain methods that you learn in the course, i.e. it should not be a pure data paper).

- Papers at the intersection of macroeconomics and applied microeconomics are also desirable, such as papers in macro-health topics, macro-family economics, macro-labor economics and macro-public-finance topics.
- Use this opportunity to find out what type of research questions you might be interested in and to find out more about the current state of macroeconomics.
- If you don't find anything, or you are unsure of what to do, we can discuss various choices during my office hour.

Academic Integrity

McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism and other academic offenses under the code of student conduct and disciplinary procedures (see <http://www.mcgill.ca/integrity/> for more information).

L'université McGill attache une haute importance à l'honnêteté académique. Il incombe par conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que les conséquences que peuvent avoir de telles actions, selon le Code de conduite de l'étudiant et des procédures disciplinaires (pour de plus amples renseignements, veuillez consulter le site <http://www.mcgill.ca/integrity/>).

References

- Aiyagari, S. R. (1994), 'Uninsured idiosyncratic risk and aggregate saving', *The Quarterly Journal of Economics* **109**(3), 659–684.
- Huggett, M. (1993), 'The risk-free rate in heterogeneous-agent incomplete-insurance economies', *Journal of Economic Dynamics and Control* **17**(5), 953–969.
- Lucas, R. E. (1978), 'Asset prices in an exchange economy', *Econometrica* **46**(6), 1429–445.
- Mehra, R. & Prescott, E. C. (1985), 'The equity premium: A puzzle', *Journal of Monetary Economics* **15**(2), 145–161.