Macroeconomics 1
ECON 712

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Fall 2019

Course Objectives

This course is an introductory course to macroeconomic analysis for PhD students. It will start with a thorough review of the neoclassical growth model, the workhorse model of modern macroeconomics. We will study two key solution methods for this model, sequence methods and dynamic programming. Both of these are powerful methods for solving dynamic problems such as a firm's investment decision or a household's savings decision. Always building from microfoundations, we will then turn to applications that give an introduction to some of the central issues in modern macroeconomics. Topics to be covered include asset pricing, consumer theory, optimal policy, unemployment, and productivity and technical change. We will address questions such as "What explains the size of the excess return of equity over bonds?", "How can consumers insure against idiosyncratic shocks and what does this imply for macroeconomic variables and for inequality?", "What should the government tax to finance its expenditure?" and others. Although the course is mainly theoretical in nature, the model-based quantitative technique of calibration will also be introduced. We may also undertake a brief introduction to numerical analysis. The course serves as a base for the further study of macroeconomic analysis, and prepares you for Econ 713 (Macroeconomics 2). While we will not cover computational methods (much) in the course, studying them is highly complementary.

Where you can go from here: check this out:
`https://editorialexpress.com/conference/SED2018/program/SED2018.html` or
`https://docs.wixstatic.com/ugd/bf7db2_1b3690fc4dc944c29ce591567ad0b37e.pdf` or
`https://marketswithfrictions.com`.

From these examples and from the course content you can see that methods covered in the course are not just essential for doing and understanding research in macroeconomics, but also very useful for research in many other areas like labour economics, IO or development.

Administrative Issues

3 credits
2 lectures per week, Tue and Thu 1.05-2.25pm in Leacock 424

Contact:
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Requirements: This is the first course in macroeconomics in the program, and therefore only general familiarity with Masters-level macroeconomics and optimization techniques will be assumed. Dynamic programming will be introduced in the course, so it is NOT a prerequisite.

Textbook: There will not be a main textbook, but there are three main sources. In *Dynamic Economics*, MIT Press 2003, Jérôme Adda and Russell Cooper (AC) give an excellent treatment of dynamic programming that also conveys a lot of intuition. They also cover some applications. (ebook available at the library.)

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 2012 (3rd edition. ebook available at the library). (Key material is similar in the older editions; the newer ones contain more applications. You may also find these related notes by Sargent and Stachurski useful: `http://quant-econ.net/_static/pdfs/jl-quant-econ.pdf`)

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. (On reserve at the library.) This text is advisable for PhD students intending to work in macroeconomics or in other fields where dynamic programming is used.

In addition, we will rely on articles for some topics. I will also make some rough notes available.

Grading: Final exam (55%), midterm (35%), problem sets (10%). The midterm will be in class on Oct 22. 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 on or before Oct 24.

In case of absence at the final exam for medical reasons, please refer to the University Regulations Concerning Final Examinations. Note: In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.

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. Tentative due dates are Sep 26, Oct 17, Nov 12 and Nov 28. I will post the problems on *mycourses* about a week before the due date.

mycourses: I will use *mycourses* for posting relevant materials such as readings and problem sets and for making announcements. You should therefore regularly check the course's *mycourses* page.

Academic Integrity: McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the code of student conduct and disciplinary procedures (see `http://www.mcgill.ca/integrity/` for more information). Note: According to Senate regulations, instructors are not permitted to make special arrangements for final exams. Please consult the Calendar, section 4.7.2.1, General University Information and Regulations at `www.mcgill.ca`.

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. The list of readings is not yet complete but the essentials, in particular the textbook chapters, are there. Where they do not stand alone, articles are complementary to the material discussed in the textbooks and in class.

1. Introduction (Lucas 1976)
2. Solving dynamic problems: Sequence Approach and Dynamic Programming (AC Ch. 2, 5, LS Ch. 3)
   (a) examples
   (b) theory
   (c) application to the neoclassical growth model
3. Asset Pricing (LS Ch. 13, Lucas (1978), Mehra and Prescott (1985))
   (a) theory
   (b) the equity premium puzzle
   (c) calibration
4. Introduction to Business Cycle analysis (Kydland and Prescott 1982, Prescott 1986, Plosser 1989, Mankiw 1989, Campbell 1994)
5. Consumption (AC Ch. 6, LS Ch. 16, 17, Aiyagari (1994), Huggett (1993))
   (a) precautionary savings
   (b) introduction to incomplete markets
   (c) inequality
6. Optimal Policy (LS Ch. 15, 20, Kydland and Prescott (1977), Chamley (1986))
   (a) taxes
   (b) time (in)consistency
   (c) the value of commitment
7. Unemployment (LS Ch. 6, Mortensen and Pissarides (1994), Shimer (2010))

(a) frictions in search and matching in the labor market

(b) unemployment over the business cycle

8. Productivity and technical change

   (a) embodied technical change (Greenwood, Hercowitz and Krusell (1997))

   (b) vintage capital (*tba*)

   (c) the productivity slowdown and subsequent acceleration (Greenwood and Yorukoglu (1997), Jovanovic (1997))

Some special dates

The dates for the problem sets are estimates and therefore subject to change.

Sep 17 PS1 posted
Sep 26 PS1 due
Oct 8 PS2 posted
Oct 17 PS2 due
Oct 22 midterm exam
Oct 31 PS3 posted
Nov 12 PS3 due
Nov 19 PS4 posted
Dec 28 PS4 due

References

Aiyagari, S. R. (1994), 'Uninsured Idiosyncratic Risk and Aggregate Saving', *The Quarterly Journal of Economics* **109**(3), 659–684.

Campbell, J. Y. (1994), 'Inspecting the mechanism: An analytical approach to the stochastic growth model', *Journal of Monetary Economics* **33**, 463–506.

Chamley, C. (1986), 'Optimal Taxation of Capital Income in General Equilibrium with Infinite Lives', *Econometrica* **54**(3), 607–622.

Greenwood, J., Hercowitz, Z. and Krusell, P. (1997), 'Long-Run Implications of Investment-Specific Technological Change', *The American Economic Review* **87**(3), 342–362.

Greenwood, J. and Yorukoglu, M. (1997), '1974', *Carnegie-Rochester Confer. Series on Public Policy* **46**, 49–95.

Huggett, M. (1993), 'The Risk-Free Rate in Heterogeneous-Agent Incomplete-Insurance Economies', *Journal of Economic Dynamics and Control* **17**(5/6), 953–970.

Jovanovic, B. (1997), 'Learning and growth', *Advances in Economics and Econometrics: Theory and Applications: Seventh World Congress* .

Kydland, F. E. and Prescott, E. C. (1977), 'Rules Rather than Discretion: The Inconsistency of Optimal Plans', *The Journal of Political Economy* **85**(3), 473–492.

Kydland, F. and Prescott, E. (1982), 'Time to build and aggregate fluctuations', *Econometrica* **50**(6), 1345–1370.

Lucas, R. E. (1978), 'Asset Prices in an Exchange Economy', *Econometrica* **46**(6), 1429–1445.

Lucas, R. E. J. (1976), 'Econometric policy evaluation: a critique', *Carnegie-Rochester conference series on public policy* **1**(2), 19–46.

Mankiw, N. G. (1989), 'Real business cycles: A new keynesian perspective', *Journal of Economic Perspectives* **3**(3), 79–90.

Mehra, R. and Prescott, E. (1985), 'The Equity Risk Premium: A Puzzle', *Journal of Monetary Economics* **15**(2), 145–61.

Mortensen, D. T. and Pissarides, C. A. (1994), 'Job Creation and Job Destruction in the Theory of Unemployment', *The Review of Economic Studies* **61**(3), 397–415.

Plosser, C. (1989), 'Understanding real business cycles', *Journal of Economic Perspectives* **3**(3), 51–77.

Prescott, E. C. (1986), 'Theory ahead of business cycle measurement', *Federal Reserve Bank of Minneapolis Quarterly Review* pp. 9–22.

Shimer, R. (2010), *Labor Markets and Business Cycles*, Princeton University Press.