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Carleton University

ECON 6714 - Advanced Topics in Econometrics

Professor: Lynda Khalaf

Fall 2023

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1 Course Objectives

This course covers special topics in econometrics that are relevant for PhD-level empirical research. The prerequisite to this course is **ECON 6027.** Lectures will involve some (essential) econometric theory, while the focus and methodology will be approached through cases of (broad and timely) empirical interest. **Conformably, the key evaluation component (70%) is a research paper.** In addition and to concretize the usefulness of the topics taught, course work will include simulation studies and simulation-based econometric methods. Computing experience with statistical software such as STATA is assumed, along with some programming skills using *e.g.* R or Matlab. Further training will be provided in parallel to course work.

A balanced focus on methods that are relevant for applied micro and macro/financial econometrics guides the choice of selected topics. These will include: (i) weak-instruments and identification robust econometric methods [non-standard non-regular contexts] and simultaneous inference; (ii) simulation and randomization based estimation and inference [Indirect Inference, matching methods, parametric and non-parametric Bootstraps, randomized tests]; (iii) special topics, to be determined depending on course progression (and revealed preferences of students).

The paper will be submitted in three different stages (detailed below), including a formal proposal that will receive formal written feedback. Two oral presentations are also required and will take the form of a workshop-conference. Students will present their own work, and will also possibly present formal discussions of the work of another team.[1] The first oral presentation will not be graded but will receive feedback; the final presentation will be graded. The final report will be evaluated considering feedback on the proposal and on the oral presentation. Students will chose their research topic, subject to the professor's approval.

2 Textbook and references

Class notes will be available to guide readings. Every lecture will include relevant references to published or papers in circulation, textbooks and when available, recorded lectures by influential

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[1]Formal discussions will be considered depending on the number of registered students, and the preference of students.

researchers on the specific subject matter. The following are recommended reference textbooks in econometrics (for general consultation).

1. Davidson R. and J. MacKinnon (2004). Econometric Theory and Methods. Oxford University Press. http://qed.econ.queensu.ca/ETM/.

2. Gouriéroux, C. and A. Monfort (1995). Statistics and Econometric Models, Volumes 1-2. Cambridge University Press, Cambridge, U.K.

3. Greene W. H. (2018). Econometric Analysis, 8th Edition, Pearson.

 http://people.stern.nyu.edu/wgreene/Text/econometricanalysis.htm.

4. Hansen B. (2020). Econometrics. https://www.ssc.wisc.edu/~bhansen/econometrics/

3   Lectures and Question and Answer (Q&A) sessions

The course will be offered on-line. Unless indicated otherwise, notes and recorded lectures will be posted on Brightspace on or before Wednesday 8h30 of each teaching week. The assigned synchronous teaching time is **Friday 11h35-2h25**. Synchronous on-line attendance and in-person presentation sessions are announced in the schedule below. Otherwise, lectures are either pre-recorded or recorded synchronously then posted on Brightspace.

Notes and recorded material will be posted on Brightspace. Further directives will be posted on Brightspace and regularly updated. **Students need to verify Email and announcements on Brightspace all through the semester.**[2]   Brightspace will be used for the following: all course announcements and email; links to the course material; online submission of the assignment and research paper in pdf form.

Office hours will take the form of on-line Q&A pre-scheduled and/or appointment based periods. Students are encouraged to prepare their formal questions in writing (scanned handwriting is accepted) and sent by Brightspace email or shared during a Q&A session. Unless otherwise indicated, **a ZOOM invitation will be sent via Brightspace email** within half an hour of the scheduled Q&A period. The Q&A sessions are optional, and further formal instructions in this regard will be shared through Brightspace after consultation with the class about student preferences, early September.

For clarity and to facilitate communications, the following describes Email policy for this course.

- Course related queries should be sent via Brightspace Email. Any other Email communication in any form about this course will not receive any response; this is to make sure all questions are properly received.

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[2]Unless an urgent and unanticipated problem emerges, changes to the schedule below will be announced within a week notice.

- Questions on course material will not be answered on continuous basis. Instead, the objective is to establish a fair, transparent and reliable system. From September 6 to December 8[3], all questions received by Wednesday noon [that is between Wednesday pm of the preceding week and Wednesday am of the current week] will receive a response (either in class or by Email) by Friday 2h30.[4]

- Responses that require proofs, derivations and similar queries will normally not be settled by Email exchange. In fact, except for brief and minor clarifications, most questions will be redirected towards the classroom or Q&A online meetings with appointments if needed, in view of the nature of the course.

4   Grading Scheme

1. Research paper: a total of 70%; requirements are detailed below. Group work [groups of up to **two** students **only**] is allowed; each group has to submit a differentiated term paper. Evaluation of all documents presented will reflect, in addition to econometric techniques, writing and presentation and supportive literature review. Requirements are as follows.

   (a) **a written one-page document that briefly formulates the research question** [10%]. *Deadline (upload to Brightspace, in pdf format):* <u>October 9</u>, *5h30 pm.* Failure to submit this document on time will result in a grade of zero out of 10%.

   (b) **a written research proposal** [20%]. Ideally, the proposal should: (i) formulate the research question in much more details than the previously submitted one-page document, with reference to available literature; (ii) set the statistical framework; (iii) describe the proposed method for statistical analysis as well as the data to be used, (iv) suggest expected outcomes and outline issues that require further work. Students will receive formal feedback [grade and recommendations] following the submission of the proposal. Evaluation of the final paper will take these comments into consideration [students must demonstrate attempts to integrate the comments in question into their submitted work]. *Deadline (upload to Brightspace, in pdf format):* <u>November 15</u>, *5h30.* Failure to submit this document on time will result in a grade of zero out of 20%.

   (c) **an oral presentation** [10%]**, on December 1.** Oral presentations will take the form of a workshop-conference. Students will present their own work, and will also possibly present formal discussions [to be arranged given the number of registered students, at the discretion of the professor] of the work of another team. Failure to show up for a scheduled presentation will result in a grade of zero out of 10%. Justified absences will result in reporting 10% to the grade on the final report (in which case the final report will count as 40%).

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[3]There will be no Q&A period after the last day of classes for this course. The last day of classes falls on December 8. **Please note that December 8 follows a Monday schedule.**

[4]Questions of an exceptional urgent nature should be identified as such in the message subject matter, and will be managed depending on the nature of the emergency.

(d) **a final report** [30%]. *Deadline (upload to Brightspace, in pdf format):* December 20, *5h30 pm.* Failure to submit this document on time will result in a grade of zero out of 30%. Justified delays will lead to arranging an alternative deadline, following the rules of the Department of Economics.

2. Assignment [30%]. *Deadline (upload to Brightspace, in pdf format):* December 15, *5h30 pm.* Failure to submit the assignment on time will result in a grade of zero out of 30%. Students are allowed to cooperate or consult (with others), but each student has to submit a differentiated assignment. Identical assignments will be treated as a plagiarism case. Note that the policy on the assignment differs from the above policy on the term paper, where a group of two is allowed in which case a joint paper is accepted.

5 Important instructions, regulations and academic support

The following are important: (i) instructions for any submitted material for this course including oral presentations, and (ii) references to official information about plagiarism, Carleton University resources, and academic accommodations. Students who need clarifications about the information below are invited to raise the question either by Email or directly at a Q&A session.

- On the use of Generative Artificial Intelligence tools (e.g. ChatGPT). While you may consult available resources (electronic or not), any *textual and direct* use of generative AI tools to produce any document you submit for this course is considered a violation of academic integrity standards as per the university's statement on Plagiarism (reference provided below). By *textual and direct*, the usual standards on plagiarism apply.

- Student or professor materials created for this course, including presentations and posted notes, assignments and exams, remain the intellectual property of the author(s). They are intended for personal use and may not be reproduced or redistributed without prior written consent of the author(s).

- Re-use of (own) work: (i) previously submitted for credit in another course, (ii) conducted for any previous purpose such as a masters paper or thesis, or (iii) is currently performed and intended for another course or for other purposes (*e.g.* current research, material submitted for work outside the university), is **not** considered plagiarism.[5] But you are required to cite such work and seek my permission **before** using it with proper citation. If the work is current and is intended for another course, the permission of the professor in charge of the other course will be required in writing (by official university Email); this also applies to courses taken at the university of Ottawa.

- You are responsible for reading and knowing the information about plagiarism, Carleton University resources, and academic accommodations found at

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[5]If the work was submitted for work outside the university, it is the responsibility **of the student** to ensure confidentiality rights are respected.

https://carleton.ca/economics/plagiarism-resources-and-accommodations/

6   Tentative schedule

Modifications to this schedule may be needed and will be announced via Brightspace with a week's notice.

1. September 8. General directives and guidance, formulation of research question. Tips for graduate economic research. **Synchronous online session, 11h30-2h30**. Q&A: by appointment.

2. September 15. Weak Identification, preparatory session: review of standard asymptotic frameworks and their potential failure. **Q&A session: 12h30-2h00**.

3. September 22. Weak Identification, weak-instruments and simultaneous inference. **Q&A session: 12h30-2h00**.

4. September 29. Weak Identification, weak instruments (continued). **Q&A session: 12h30-2h00**.

5. October 6. *Consultation session, preceding the deadline for submission of the "statement of research question",* **11h30-2h30,** by appointment.

6. October 13. Simulation-based methods, preparatory session: the need for simulation-based estimation and inference. **Q&A session: 12h30-2h00**.

7. October 20. Simulation-based methods (continued): parametric and non-parametric bootstraps, foundations and methods. **Q&A session: 12h30-2h00**.

   October 27: fall break

8. November 3. Simulation-based methods (continued): indirect inference. **Q&A session: 12h30-2h00**.

9. November 10. **Poster session type presentation of proposal:** your proposal in about three slides. The poster session is not graded, but you will receive feedback. Attendance is required. In person or on-line session, to be arranged, **11h30-2h30**.

10. November 17. Special topic session. **Q&A session: 12h30-2h00**.

11. November 24. Consulation session, *preceding the paper presentation session.* **11h30-2h30,** by appointment.

12. December 1. **Paper presentation.** This presentation is graded. Attendance is required. In person or on-line session, to be arranged, **11h30-2h30.** Q&A: by appointment.