

ECO1400F1H (L0101): Econometrics (MA)

Department of Economics, University of Toronto

Fall 2023

Lectures:	Monday 11 am – 1 pm, WB 130 Wednesday 11 am – 12 pm, SU B120
Tutorials:	Wednesday 12 pm – 1 pm, SU B120
Instructor:	Prof. Martin Burda
Contact:	martin.burda@utoronto.ca
Office hours:	Thursdays 12 pm – 2 pm, online synchronous (Zoom link on Quercus)
TA:	Quinlan Lee, qt.lee@mail.utoronto.ca
Office hours:	Tuesdays 3 pm – 5 pm, in GE 74
Software TA:	Frederik Dufour, frederik.dufour@mail.utoronto.ca
Office hours:	contact for appointment

Course Description

Econometrics combines elements of economic theory, statistics, probability theory, and mathematics. The primary objective of the course is to provide students with a solid theoretical and practical foundation for the interpretation of empirical evidence in economics. As such there is a dual focus on econometric theory and “hands-on” experience working with economic data. The centerpiece of the course is an empirical term paper on a topic of the student’s choice. At the end of the course, students should be able to conduct their own empirical investigations, and critically evaluate econometric and other statistical evidence.

Prerequisites

Students are expected to have taken ECO1010 or ECO2010 before taking this course.

References

Textbooks:

- Verbeek, M., *A Guide to Modern Econometrics*, 2017, Wiley.
- Koenker, R., *Quantile Regression*, 2010, Cambridge University Press.
Available [online](#) with UofT library login.

Reference text:

- Greene, W. H., *Econometric Analysis*, 8th ed, 2018, Pearson.

References in lecture slides

Software

For empirical exercises and the Term Paper students can choose any software package. The [R language](#) for empirical implementation and [Overleaf](#) for typesetting are recommended.

Course Website

We will be using [Quercus](#) for class communications, problem sets, the accompanying data, outlines of the lectures, etc. It is important that you regularly check the announcements posted there.

Evaluation

The final grade is based on the following:

Task	Weight	(Due) Date
Midterm exam	30%	October 25, 2023
Term Paper	30%	December 7, 2023
Final Exam	30%	Final Exam Period
Problem Sets	10%	As assigned during the semester

The **midterm exam** will take 2 hours, short-answer format. Students who miss the midterm exam and wish to request a make-up midterm must complete the Absence Declaration on Acorn and must email the instructor with their request within 24 hours of the missed midterm. Consistent with university policy, there is no “make-up” exam for a make-up exam and grade of zero will be applied if the make-up exam is requested but missed. If students wish to appeal a grade, they must provide a written explanation of why they believe their grade is mistaken and submit it to the instructor within one week of the exam being returned to the class.

The **final exam** will take 2 hours, short answer format. The applicable rules and regulations of the School of Graduate Studies and the Department of Economics govern its conduct.

Problem sets will be distributed throughout the semester and form the basis of the tutorials. They will consist of both theoretical and software-based problems.

Term Paper will be assigned with detailed guidelines during the semester. It will entail an empirical investigation of a question in economics and a critical reading of relevant articles related to the question. It must be no longer than 15 pages in length (1.5 spacing). Students can work in pairs or alone. The maximum group-size is two.

Disclaimer concerning plagiarism detection tool:

Normally, students will be required to submit their Term Paper to the University’s plagiarism detection tool for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their Term Papers to be included as source documents in the tool’s reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University’s use of this tool are described on the Centre for Teaching Support & Innovation [website](#). Students may not copy or paraphrase from any generative artificial intelligence applications, including ChatGPT and other AI writing and coding assistants, for the purpose of completing the Term Paper in this course.

Accessibility Needs: If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom or course materials, please contact Accessibility Services as soon as possible: disability.services@utoronto.ca or visit their [website](#).

Schedule

Week	Day	Date	Lec/Tut*	Topic
1	Mon	Sep 11	L	1a. Multiple Regression and IV
	Wed	Sep 13	L	1b. Applications; <i>Term Paper discussion</i>
			T	R: 1. Multiple Regression and IV Overleaf TeX tutorial R: 0a. Introduction to R
2	Mon	Sep 18	L	2a. Machine Learning and Neural Networks
	Wed	Sep 20	L	2b. Applications
			T	R: 2. Neural Networks R: 0b. R objects Problem Set 1
3	Mon	Sep 25	L	3a. Regression Trees and Ensemble Methods
	Wed	Sep 27	L	3b. Applications
			T	R: 3. Regression Trees and Ensembles R: 0c. Graphics in R using ggplot Problem Set 2
4	Mon	Oct 2	L	4a. Quantile Regression; 5a. Quantile IV and ANN
	Wed	Oct 4	L	4b. Applications
			T	R: 4. Quantile Regression Problem Set 3
5	Mon	Oct 9		<i>Thanksgiving Day - University Closed</i>
	Wed	Oct 11	L	R: 5. Quantile IV - continuous regressors R: 5. Quantile IV - binary regressors R: 5. Quantile Regression Neural Network
			T	Problem Set 4
6	Mon	Oct 16	L	6a. GMM, MLE
	Wed	Oct 18	L	6b. Applications
			T	R: 6. GMM R: 6. MLE TA Q & A
7	Mon	Oct 23	L	Q & A
	Wed	Oct 25		Midterm Exam
8	Mon	Oct 30	L	7a. Panel Data 1 (FE, DiD, RE)
	Wed	Nov 1	L	7b. Applications
			T	R: 7. Panel Data 1 - FE, RE Problem Set 5
<i>Reading week</i>				

Week	Day	Date	Lec/Tut*	Topic
9	Mon	Nov 13	L	8a. Panel Data 2 (CRE, PIV, PP, PQ)
				8b. Applications
	Wed	Nov 15	L	R: 8. Panel Data 2 - CRE, HT, AM, BMS R: 8. Panel Data 2 - Quantiles
			T	Problem Set 6
10	Mon	Nov 20	L	9a. Dynamic Panel Data
				9b. Applications
	Wed	Nov 22	L	R: 9. Dynamic Panel Data
			T	Problem Set 7
11	Mon	Nov 27	L	10a. ARMA, Neural Network Autoregression R: 10a. sim AR1 R: 10a. sim MA1
				10b. Applications
	Wed	Nov 29	L	R: 10b. ARMA R: 10b. NNAR R: 10b. macro data Canada R: 10b. macro data US
			T	Problem Set 8
	Mon	Dec 4	L	11a. VAR, Cointegration, VEC
	Wed	Dec 6	L	11b. Applications R: 11b. VAR VEC
		T	TA Q & A	
Final exam period				Final exam

*L = Lecture, T = Tutorial