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ECON 4G03/6G03: ECONOMETRICS II

Fall 2020

Instructor: Arthur Sweetman **Email:** arthur.sweetman@mcmaster.ca

Office : KTH 407 (but not very relevant this year)

Office Hours: During computer lab; or by appointment

Lecture: Online and asynchronous (lectures and related material will be posted online; see Avenue to Learn)

Laboratory: Online synchronous; Tuesdays 9:30-11:20am.
Computer will be online, probably using ZOOM although other technologies may be employed.

TA: tba **Email:** tba

COURSE DESCRIPTION

Development of regression models appropriate to economics. Illustrations from applied micro- and macroeconomics.

PREREQUISITES

4G03: ECON 2G03 or 2X03; and ECON 2H03; and at least B- in ECON 3EE3 (formerly 3WW3) or ECON 3E03 (formerly 3U03) or another course that is approved by a departmental counselor.

6G03: Admission to the McMaster's MAEP program, or permission of the instructor.

COURSE OBJECTIVES

Quantitative analysis is fundamental to the practice of economics and many other academic disciplines, and it is important for many professional careers. This course, therefore, assumes that understanding both econometric theory and practice is crucial for those pursuing careers in economics and similar professions, and as preparation for graduate work/research. Three pedagogical assumptions are made:

- the best way to learn econometrics is to do econometrics and this implies writing computer code appropriate for statistical software,
- it is natural for learn from specific examples/illustrations and then to generalize, and
- students already have a basic knowledge of the material taught in Econ 2B03 and Econ 3EE3, or equivalent.

Material in this course is cumulative, so if you feel like you are getting a little lost, please seek assistance right away. Studying with classmates is usually advantageous, but make sure you understand the material yourself.

Initially we will briefly review selected background material from earlier courses. Chapters 2 and 3 review introductory probability and statistics, as seen in McMaster's Econ 2B03 and

equivalents, and chapters 4 to 9 cover the same material (more or less) as Econometrics I, as seen in McMaster's Econ 3EE3 and equivalents. This material is foundational and we cannot pursue the more advanced topics in this course without a solid understanding of these basics; hence we undertake a lengthy review, a fair part of which will occur in the computer laboratory. After the review, the majority of the course comprises the application-oriented chapters in the second half of the book (chapters 10-15; omitting chapters 16 and 17) and addresses the theoretical chapters as time permits (chapters 18 and 19).

CLASS FORMAT

Given COVID-19, during the fall of 2020 this class will be delivered online. I suspect that this will be a challenge for all of us and will require somewhat more self-discipline (for both the students and the instructor) than is necessary for an in-class course. We may also face some unexpected challenges with this new format and may need to adapt. I plan on covering the same material as has been historically part of the course. For comparison, historically the course has been 3 hours per week of lecture and 2 hours per week of computer laboratory; I normally teach all 5 hours. (Of course, McMaster classes end 10 minutes before the hour or half hour, as appropriate, so I am rounding these numbers.) For this year, I doubt that the online lectures will last exactly 3 hours each week. Also, since the lectures are tied to pdf/PowerPoint presentations you will also likely need time to look over those presentations, which contain technical information – much like time is normally required to go over class notes, and to read the textbook and other material in preparation for a lecture.

- Lectures will be recorded and posted on Avenue together with other material that you should find useful, but undoubtedly you will rely on the textbook more than usual. You will study the lecture material asynchronously. That is, you will look at each lecture on your own (or, perhaps, in small groups using zoom or some such technology). I encourage you to work with classmates (at a safe distance of course).
- I am redoing the computer laboratory part of the course to (hopefully) make it more suitable for online study. The laboratory will be online but synchronous (i.e., we will all be online at the same time) – probably using ZOOM.
 - o During the laboratories I will outline the data analysis assignment for the week and provide background relevant to the assignment.
 - o Also, the laboratories serve as a type of question and answer period, where we can have discussions regarding the material.

Since the lectures and laboratories move together, this forces us to all work through the lectures at the same pace, that is, to cover the same material during the same weeks. It is expected that you will view the lectures for each week in advance of the relevant laboratory. It will be difficult to do each lab without understanding the related lecture material.

Computer Laboratory

Many of the assignments and laboratory periods will involve using the statistical software Stata to do simulation or applied analyses; receiving some instruction and asking questions can make getting to know the software much easier and students more productive. Therefore, in addition to lectures, this course has a mandatory computer laboratory period. Some laboratory periods

will be used for lecture/demonstrations as well as for students to start work on their assignments. Many of the generic coding skills addressed are transferable to other statistical software.

COURSE MATERIALS AND TEXTS

- REQUIRED TEXT: *Introduction to Econometrics, 4th ed.* by James H. Stock and Mark W. Watson (Published by Pearson Addison Wesley).

Available at the McMaster bookstore and elsewhere.

I suggest reviewing the “Key Concepts” for chapters 1 thru 9 that are listed on the pages after the full tables of contents in preparation for the course.

- Website for the 4th edition (this is free and an excellent resource): https://www.princeton.edu/~mwatson/Stock-Watson_4E/Stock-Watson-Resources-4e.html. The 4th edition is new and at the time of writing this website is not “pretty”, but I think all the material is there.
- Website for updated 3rd edition of the textbook (this is also free and an excellent resource): https://wps.pearsoned.com/aw_stock_ie_3/178/45691/11696965.cw/index.html

Among other features, both textbook websites contain datasets, practice questions (with solutions), solutions to selected end-of-chapter questions, and tutorials for econometric software including Stata, which we will use in class.

- Econometric Software
There are a number of data management and/or statistical/econometric software packages that are available. For my classroom demonstrations I will use Stata (www.stata.com) and the assignments require Stata to be used; it is one of the packages commonly used by economists. Although purchasing Stata is not required for this course since Stata is available *remotely* in the student computer labs, student pricing for annual and perpetual licenses can be found at: <http://www.stata.com/order/new/edu/gradplans/campus-gradplan/>. Stata has “flavours”: IC, SE, MP. Any of them will be able to do all of the work for the course and there is no need for anything beyond the smallest – indeed, there is no need to buy anything at all if you use McMaster’s remote access option.

Stata also has a YouTube channel and various free online/computer based tutorials/webinars that students may want to consult, if not for this course then for their future econometric work (www.stata.com & <https://www.youtube.com/user/StataCorp>). In fact, students are likely to find some of these videos very helpful, but be aware that there are many videos on a range of topics not relevant to this course (& some are pretty slow moving). A number of universities have excellent support material for Stata, such as that at UCLA: <https://stats.idre.ucla.edu/stata/>. The first two chapters of the *Microeconometrics Using Stata* textbook mentioned below also provide an excellent introduction to this software. Learning new software is time consuming and sometimes frustrating. You need to give yourself sufficient time to learn this econometric tool.

The most recent version of Stata is version 16 (so if you buy/rent you will receive version 16). However, the version installed in the McMaster computer labs that you can access remotely is version 13. For our purposes, the econometric differences between version 13 and 16 are unimportant, but there are some differences in terms of the interface. The full set of Stata V16 documentation is (i.e., the manuals are) available (for free) online: <http://www.stata-press.com/manuals/documentation-set/>. PDFs of manuals for the version in the student labs can be found through the Stata software installed and those labs.

Beyond the “base” software sold by “Stata Inc.,” many users contribute open source code that is available on the web. (Indeed, much of the base Stata package is open source). One location for code for Stata and other econometrics/statistical programs is: <https://ideas.repec.org/i/c.html>. Of particular relevance for Stata is: <https://ideas.repec.org/s/boc/bocode.html>.

- If you have never used Stata, and maybe even if you have, you may find the following books useful; they also address many issues in econometrics. All are in the library—though I’m not sure how much value that will be this year period.

1) *A gentle introduction to Stata 4th ed.* (2014) by Alan C Acock (HA 32 .A26 2014).

A more advanced book that students have found helpful in the past, especially the first two chapters for an introduction to Stata, is:

2) *Microeconometrics Using Stata* by A. Colin Cameron and Pravin K. Trivedi (HB 139 .C36 2010). There is the original and a “revised” edition of this book. For our purposes the two are almost identical.

Finally, a good primer on time series is:

3) *Introduction to Time Series Using Stata* by Sean Beckett (QA 280 .B42 2013).

AVENUE TO LEARN

This web-based software will be a key communications tool for the course and will be used to disseminate information, assignments and the like. Please see <http://avenue.mcmaster.ca/>.

Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

COURSE EVALUATION – OVERVIEW

1. 8 lab-based assignments using Stata worth 3% each
2. 4 theory assignments worth 5% each
3. 1 Midterm test worth 15% (tentatively asynchronous and synchronous parts)
4. Final Exam worth 41% (tentatively asynchronous and synchronous parts)

COURSE EVALUATION – DETAILS

Submission of Assignments

Assignments are to be submitted through Avenue by the date on each. They must be well formatted and identified with the student's name and student number.

Midterm and Final Exam Information

The tests are open book in the sense that all information available in any notes, books, or online material that students wish to use are permissible aids. The only restriction is that students are not permitted to communicate with other people by any means during each test/exam period.

Final Exam (41%)

The final examination will cover material from the entire course, but the emphasis is on the later material in the course. It may comprise both multiple choice and short answer questions; some questions may require you to sketch a graph to illustrate your ideas and/or to perform mathematical calculations.

COURSE POLICIES

Grades will be based on the McMaster University undergraduate grading scale:

MARK	GRADE
90-100	A+
85-90	A
80-84	A-
77-79	B+
73-76	B
70-72	B-
67-69	C+
63-66	C
60-62	C-
57-59	D+
53-56	D
50-52	D-
0-49	F

Important note for those registered in Econ 6G03

The passing grades for a Master's or Doctoral course are A+, A, A-, B+, B, and B-.

Absences, Missed Work, and Illness for assignments, midterm tests and the final exam, and the McMaster Student Absence Form (MSAF)

All absences from the midterm test and final exam, and missed assignments, are subject to the appropriate university policies and processes. Unless a large number of absences have occurred, the self-reporting form is normally applicable for midterm tests and assignments.

Should you have an absence and miss any academic work, students should normally see <https://www.mcmaster.ca/msaf/> for information on how to proceed.

Late Assignments

Unless there is a valid (e.g. medical) excuse, late assignments will be given a penalty of 5% per day and assignments will not be accepted more than 4 days late (weekdays or weekends); missed assignments will be given a grade of zero. Assignments that are late with appropriate justification are due at the earliest subsequent feasible date.

Missed Midterm Test

A missed test is **not** automatically prorated onto the final exam. Students are advised not to miss a test without good/valid reason. A grade of zero will be assigned in the case of a missed midterm absence without an appropriate justification. Students who miss a midterm test for a valid reason are normally expected to write a makeup test as soon as is feasible after the missed test. A common makeup midterm test and date will be set for all relevant individuals (unless there is an ongoing justified excuse); the test will be outside of class time and may be in the day or evening (or if required on a weekend), although efforts will be made to schedule it on a weekday.

Missed Final Exam

I am not yet certain how final exams will be managed. Final exams are managed by the Registrar's Office and are not under the control of the instructor. Should you miss the final exam for a valid reason you will need to provide documentation to your Faculty Office in your request for a deferred examination. If approved, the timing of the makeup for the final exam will be set by the Registrar's Office.

Where to Get Help regarding course material

Contact the instructor.

Calculators and iClickers

Only the Casio FX series calculator (McMaster Standard Calculator) may be used for tests and the final exam. No iClickers are used in this class.

UNIVERSITY POLICIES

Academic Integrity Statement

You are expected to exhibit honesty and use ethical behavior in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behavior can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the [Academic Integrity Policy](#).

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one's own or for which credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

Academic Accommodation of Students with Disabilities

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements. Academic accommodations must be arranged before classes or academic work begins, and for each term of study. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca. For further information, consult McMaster University's Policy for [Academic Accommodation of Students with Disabilities](#).

Academic Accommodation for Religious, Indigenous and Spiritual Observances

Students who require academic accommodation due to an Observance must submit a RISO form to their Faculty office, electronically or in person, normally within ten working days from the beginning of each term in which they are anticipating a need for Accommodation. For further information, consult McMaster University's [Policy on Academic Accommodation for Religious, Indigenous and Spiritual Observances](#).

Faculty of Social Sciences E-mail Communication Policy

Effective September 1, 2010, it is the policy of the Faculty of Social Sciences that all e-mail communication sent from students to instructors (including TAs), and from students to staff, must originate from the student's own McMaster University e-mail account. This policy protects confidentiality and confirms the identity of the student. It is the student's responsibility to ensure that communication is sent to the university from a McMaster account. If an instructor becomes aware that a communication has come from an alternate address, the instructor may not reply at his or her discretion.

Course Modification

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check his/her McMaster email and course websites weekly during the term and to note any changes.

WEEKLY COURSE SCHEDULE AND IMPORTANT DATES

In the fall of 2020, classes start Sept. 8 and end Dec. 9: A total of 14 full or partial weeks including the fall reading break.

Warning: The schedule should be viewed as tentative and may be adjusted as the term progresses depending upon class progress. **It is the responsibility of the student to listen for announcements in class and to check his/her McMaster email and Avenue To Learn weekly during the term and to note any changes.** Please give me any feedback that you think will be helpful.

One of the elements of a university education is that students learn how to learn on their own. Selected readings from the text will, therefore, be assigned during the term but not discussed in class. Students are responsible for this material on the assignments, midterm test and final exam.

Week 1

Review

Readings: Part 1 (Probability and Statistics) See Part 1 list of “Key Concepts” immediately following the table of contents; review each key concept and if required the associated material in the text.

Also: The computer lab this week combines an introduction to Stata with a review of basic probability and statistics. Prior to the lab, start learning Stata on your own; esp., see the Stata tutorial at

https://www.princeton.edu/~mwatson/Stock-Watson_4E/Stock-Watson-Resources-4e.html or

https://wps.pearsoned.com/aw_stock_ie_3/178/45691/11696965.cw/index.html

Other Stata material is listed above.

Week 2

Review

Readings: Part 2 (Fundamentals of Ordinary Least Squares Regression) See Part 2 list of “Key Concepts” immediately following the table of contents; review each key concept and if required the associated material in the text.

Week 3

Regression with Panel Data

Readings: Chapter 10 and review material from the previous 2 weeks to ensure integrated comprehension.

Week 4

Regression with Panel Data/ Regression with a Binary Dependent Variable

Readings: Chapter 10/11

Week 5

Regression with a Binary Dependent Variable

Readings: Chapters 11

Week 6

Regression with a Binary Dependent Variable / Instrumental Variables Regression

Readings: Chapters 11/12

Week 7

Reading Week: No Class

Week 8

Instrumental Variables Regression

Readings: Chapter 12

Week 9

Experiments and Quasi-Experiments

Readings: Chapter 13

Week 10

Prediction with Many Regressors and Big Data

Readings: Chapter 14

Week 11

Introduction to Time Series Regression and Forecasting

Readings: Chapters 15

Week 12

Introduction to Time Series Regression and Forecasting

The Theory of Linear Regression with One Regressor (focus on Weighted Least Squares; section 18.5)

Readings: Chapters 15 and 18

Week 13

The Theory of Linear Regression with One Regressor /

The Theory of Multiple Regression (focus on matrix notation/specification and Generalized Least Squares; sections 19.1, start of 19.4 and 19.6)

Readings: Chapters 18/19

Week 14

The Theory of Multiple Regression

Readings: Chapter 19

CONDUCT EXPECTATIONS

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the *Code of Student Rights & Responsibilities* (the “Code”). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online**. It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students’ access to these platforms.

ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University’s *Academic Accommodation of Students with Disabilities* policy.

REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM WORK

McMaster Student Absence Form (MSAF): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar “Requests for Relief for Missed Academic Term Work”.

ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students should submit their request to their Faculty Office **normally within 10 working days** of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

COPYRIGHT AND RECORDING

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

EXTREME CIRCUMSTANCES

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email. Th