ECO375: APPLIED ECONOMETRICS, FALL 2021
DEPT. OF ECONOMICS, UNIVERSITY OF TORONTO
C. J. WARD, PHD

1. COURSE LOGISTICS:

Course website: https://q.utoronto.ca/courses/235387

Course email: eco375.ward@utoronto.ca

Course schedule: There are two sections of ECO375 with scheduled meeting times of Thursdays 10am-12pm (section L0101) and Thursdays 1pm-3pm (section L0201). We have a common meeting time on Fridays 11am-1pm. We assume students are available at the times given for their section in the university timetable. For a full description of the weekly schedule, please see the section on Course Meetings.

Communication: Most points of communication for the course (tutorials, office hours, help desk, Piazza) go through the course website. Please see the section on course communication below for details on how to communicate with me, your fellow students, and the course staff.

Prerequisites: The Department checks whether students have the correct course prerequisites, and students will be removed otherwise. Please note that I cannot waive prerequisites. The prerequisites for ECO375 are here: https://artsci.calendar.utoronto.ca/course/eco375h1

2. COURSE DESCRIPTION

Overview: This course is an introduction to the statistical analysis of economic relationships. Students are expected to be familiar with calculus and statistics. The course has a dual focus on theoretical foundations and the application of empirical techniques to "real world" data. Econometric methods will be illustrated using the application of regressions to a wide variety of economic questions and data sources, including the use of statistical software. Some advanced topics in causal inference will also be discussed. By the conclusion of the course, you should have a solid theoretical and practical foundation for the interpretation and investigation of empirical evidence in economics.

Textbook: Introductory Econometrics: A Modern Approach, 7th Edition by Jeffrey M. Wooldridge. The textbook is available at the campus bookstore or from Cengage directly: https://www.cengage.ca/c/introductory-econometrics-a-modern-approach-44-7th-edition-7e-wooldridge/9781337558860/. Cengage is offering a 10% off coupon valid until October 31st, 2021. Coupon code: **DIGITALB2S1860**.

Software: The course involves a considerable amount of computing, and students must learn and use a sophisticated statistical software package. Stata is recommended and is the package supported by the instructor and TA's throughout the course. Stata is available to you on campus at the computer lab, with a second option to access it remotely (the instructions to do so are given here: https://mdl.library.utoronto.ca/using-mdl-lab-computers-remote-desktop). Aside from library access, Stata is (as always) available at reduced rates through the gradplan program, which allows U of T members to buy Stata software and manuals at low prices from StataCorp directly.

The 6-month subscription to Stata/IC is sufficient for our needs in this course: https://onesearch.library.utoronto.ca/ic/stata-gradplan-u-t.

3. WEEKLY SCHEDULE

Keeping up a weekly practice: Let's stick together and keep up with course components on a weekly basis. The easiest way for you to do this is to complete each component on pace with the course, and to rely on the rest of the Eco375 community (me, our TA staff, our classmates) to help you along the way (through lecture activities, tutorials, help desk hours, Stata workshops or piazza discussion).

Keeping up this weekly practice is particularly important in Econometrics as the content builds on itself, and your mastery of it depends heavily on spaced repetition (kind of like going to the gym to build those muscles). To this end, our econometric training schedule will involve a weekly practice of study, application and reflection, which we then use as the basis for the next week's training. There is a cadence here, where each week adds to last week's progress, and we build our understanding by using our weekly training regime: study, apply, reflect. Just as you would not expect to run a successful marathon by leaving all training to the night before the race, you cannot expect success in this course by leaving all course work to the night before due dates.

Meeting participation: Weekly meetings specifically (i.e., lectures, tutorials, workshops) are course components that provide significant context for the material and are also productive to completing the course assessments. The tutorials, specifically, are skills based and the practice here readies you for the writing assignments and tests. Do not get in the habit of missing weekly meetings.

Typical weekly schedule: The early part of the week (**Monday-Wednesday**) is a great time to review the upcoming lecture readings, familiarize yourself with the lecture support materials, and get started on the weekly assigned problems. Later in the course, it will be a good time to work on the course writing assignments. A good strategy here is to define a specific time each week to review these materials and carry through with that schedule for the rest of the semester. **Thursday** is our lecture day, which provides an opportunity to deepen our understanding of the material and address questions coming out of the week's material. **Friday** is our tutorial day where we apply the weekly econometric concepts to particular econometric problems. Friday will also offer opportunities for informal help from the course "help desk."

Note that the above provides an example of a *typical* week, which will occur with modification around the scheduling of terms test due dates, writing assignments, and unforeseen events.

3.2 LECTURES AND TUTORIALS

Thursday lectures: the lectures are in-person.

Let's take a moment.

The lectures are IN-PERSON!

How should you prepare? You should start by reviewing the week's lecture material, and then come join us ready to engage with the rest of your Eco375 community. During the lecture period, you will want to ensure you have some way to access the course Quercus site for course materials (via a laptop, smartphone, or tablet, etc.), and you will also need some way to take notes (paper,

pencil, or alternative). Taking notes will be particularly important since not all information is contained on the posted lecture slides. You can take notes any way you prefer, e.g., you can do it on physical paper referencing slide numbers …or you can do it electronically directly on posted lecture slides, etc. You get the idea here: taking notes is important, and you need to find a way to do it.

Access to the Stata application during lectures is not necessary, but some find it useful. We will also provide a backchannel Q&A option to reproduce the convenience of "chat" in online meetings to our in-person lecture. This feature will require access to a web browser (via laptop, smartphone, or tablet, etc) during the class period.

Friday tutorials: Tutorials will take place in-person on Fridays in two 50-minute time slots. Section L0101 will meet at 11:10 to 12:00 and Section L0201 will meet at 12:10 to 1:00. Details on the location will be posted on our Quercus site.

You should prepare for the tutorial ahead of time by solving the weekly assigned problems. Similar to the lecture, you will need a way to take notes, and you will need access to the course Quercus site (via wifi on a laptop, smartphone, or tablet, etc.). The tutorial will include polling questions, which you will normally access through a web browser, so again, it's important (and fun, dare I say) to bring a laptop or other device in order to try your hand and poll questions.

Some students find it useful to have access to Stata during the tutorials, but preferences may differ on this. An alternative to having direct access to Stata during the tutorial is to take notes on process, and then replicate the exercises in Stata later at home or in the computer lab (remember also from Section 2 that remote lab access is also possible).

You are expected to regularly attend tutorials with your section and to participate. Is there an incentive to go to tutorials? Yes, my friends, because this is where you will find solutions to tutorial problems. In other words, we will not be posting solutions to tutorial problems or answers to polling questions online.[1] The aim is that you challenge yourself to complete the weekly problems and then take up the questions together with your tutorial group. If you need help outside this, at any time, follow up with us on Piazza or come to the course help desk (described next).

Friday's "other hour": During the "other hour" in our Friday time slot (i.e., the hour when you are not meeting with your tutorial group), we will be running an Eco375 help desk. The help desk is staffed by one of the Eco375 team on most weeks throughout the semester. We are working on booking one of our course-assigned rooms for our exclusive use during F11-1, which will provide you a dedicated place on campus to work quietly on Eco375 material with help from our course staff if you need it. Attendance is optional.

In some weeks (e.g., those leading up to our writing assignment due dates), we will be using the "other hour" to invite our Stata TA to run Stata Workshops. These workshops will help you with the computing end of your writing assignments. Attendance is highly recommended. Details on the location the help desk and workshop will be posted on our Quercus site.

4. CHECKLIST OF REQUIREMENTS FOR COURSE DELIVERY

[1] Note: the exception here is accommodations for delayed access to campus. Please see the Accommodations: Sept 9-23 section on Quercus where tutorial content for September 17th will be posted.

- Paper and a pencil (and probably an eraser, unless you're the kind of person that never makes mistakes)
- During lecture and tutorial time slots, access to a reliable laptop, smartphone or tablet with wifi capabilities and ability to access a web browser and our Quercus materials.
- The course textbook and Stata (or alternative statistical software). See Course Description section for details.
- A current installation of Office 365, available at no cost to current U of T students, via the page Office 365 ProPlus: https://onesearch.library.utoronto.ca/ic-faq-categories/microsoft-365-proplus
- Your TCard (your U of T Student ID card) ready
- To be proactive to avoid technical and other difficulties, which includes submitting well before dead-lines, maintaining your devices, keeping software up to date, minimizing the strains on your internet bandwidth, learning how to scan efficiently, carefully reading all assessment instructions, and contacting your instructor/TAs immediately with any problems
    - Regularly follow our Quercus site for detailed guidance, updated as our situation evolves.
- Contingencies: in the event that there are changes in our ability to meet in-person, you will need:
    - Regular access to a reliable laptop and/or desktop with a working microphone and webcam and a Zoom account under your U of T credentials (personal Zoom accounts are blocked from accessing U of T zoom sessions).
    - Regular access to reliable high-speed internet and reliable electricity
    - The hardware, software, and knowledge to scan your work to be uploaded. Most phones can scan (a separate scanner is unnecessary) to create PDF, JPG, or PNG files.

5. COURSE COVERAGE

Week*	Topic	Reference
Week 1:	Overview of Econometrics	Chapter 1
Week 2:	Probability	Appendix A, B
Week 3:	Mathematical Statistics	Appendix C
Week 4:	Simple Regression (preview Asymptotics & Heteroscedasticity)	Chapter 2 (Chapter 5 & 8)
Week 5:	Multiple Regression: Estimation	Chapter 3, 6
Week 6:	Multiple Regression: Inference	Chapter 4-5
Week 7:	Multiple Regression: Further Issues	Chapter 5-6
Week 8:	Multiple Regression Further Issues II	Chapter 7-9

Week 9:	Instrumental Variable and 2SLS	Chapter 15
	Reading Week	
Week 10:	Simple Panel Data Models	Chapter 13
Week 11:	Advanced Panel Data Models	Chapter 14
Week 12:	Conclude and Recap Remaining Topics	

*Note: timing of the topics is approximate and depends on our pace as we move through the course

6. EVALUATION

The overall course grade in ECO375 will be determined as follows:

Assessment	Weight	Due Date	Collaboration
Writing Assignment 1	16	October 14th	Limited*
Midterm	30	October 22nd †	None
Writing Assignment 2	22	December 3rd	Limited*
Final Exam	32	TBA	None

* Limited discussion/interaction regarding assignments allowed (within the narrow parameters described below).
† The midterm is scheduled to take place **in-person during class time on October 22nd using our Friday course times slot**.

6.1. COLLABORATION

Tests: This may seem obvious, but warrants saying anyway: there is absolutely no collaboration allowed on the midterm and final. Your submissions must be entirely your own work, and any collaboration (with ANYONE) for any portion is a serious infraction. Note that this means you may not post any material directly related to the tests, discuss any of the test content, or share any files related to the tests **before or during the test window**. After the testing date, discussion of test materials within the context of the course is permissible (and welcome, even), but note that test materials are protected by copyright and cannot be shared or posted outside the context of our course environment (i.e., our course environment is the Quercus page, course meetings, help desk, and office hours). To be clear, this means you DO NOT have permission to share these materials outside the course environment. Because copyright infringement has been an issue in the past, do not expect detailed test questions and solutions to be posted after the fact in an easily sharable form. Instead, expect practice test questions, a mapping of test questions to course concepts, and actual test questions to be discussed as a group in class time (the latter of which you can relate back to personalized feedback on your test paper itself).

Writing assignments: You may engage in reasonable discussion with your classmates about how you are approaching your assignment. These discussions should take place through course infrastructure: e.g., on piazza, during tutorials, Stata workshops, help desk hours or Thursday lecture time. Other collaboration outside the course (such as sharing files, copying text or code, submitting text or code that is not your own) is prohibited. Submission of your assignments within Quercus, will engage the University's plagiarism detection tool. Normally, students will be required to submit their course essays 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 essays 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 web site (https://uoft.me/pdt-faq).

6.2. EXPECTATIONS FOR DELIVERABLES

Writing Assignments: The writing assignments allow substantial revision beyond what is possible during timed assessments, and it gives you an opportunity to test your skills in programming, data manipulation, statistical analysis, and interpretation of results. Detailed instructions and expectations will be posted on Quercus with each assignment. You will submit completed work online according to the instructions on Quercus. You must manage your time: you assume all risk of working on these in the final days before the deadline. There is a short grace period of 1 hour after the deadline but beyond that we do not accept late submissions (no exceptions). There are no make-ups and no extensions for ANY reason.

Remark Requests: Remark requests must: (1) Be submitted to Remark Request, which is an MS Form, (2) Explain WHY more points are justified, (3) Be submitted within TWO WEEKS of the work's return to the class. The entire submission may be remarked: your mark can go up, down, or remain unchanged. ALL submitted requests are reviewed together after the two-week deadline, not immediately. We will not consider any remark requests after the deadline.

Missed Tests: In general, there is a strict policy concerning missed assessments, and any missed work earns an automatic mark of zero. For any issues that extend beyond our course, or last more than a week, you MUST contact your College Registrar immediately.

A missed midterm will receive a grade of a zero. In exceptional circumstances, we may grant an exemption for one entirely missed test given that it is the only missed deliverable in the course. In this case, we determine whether an exemption will be granted; you need to complete ALL of the following steps to be considered.

1. Complete "Missed Test," which is an MS Form. It must be submitted AT LEAST ONE HOUR BEFORE THE START TIME for the missed test. For example, if the start time is 11am on Friday, the LATEST you can request an accommodation is the morning of that same Friday: 10 am. It is unacceptable to fail to show up for an important engagement without advance notice. We do NOT wish to see any document completed by a doctor or other professional. All questions in the MS form are required.
2. Check your U of T e-mail. If an immediate resolution is possible, we may e-mail you quickly. Otherwise, within one week of the missed work you should receive an e-mail from us. Follow any instructions in it. Not seeing an e-mail from us is not an acceptable excuse for your failure to follow any time-sensitive or other instructions.
3. Complete all other course assessments including the final exam. A cumulative make-up test will be scheduled by us. The style and timing of the make-up is at our discretion, e.g., it may be an individual oral test scheduled one-on-one with me or course staff, a written test scheduled in a joint session with other students, or a combination of both. Note that these will be held in-person unless policy dictates otherwise. Your performance on both the make-up and other graded course work, as well your MS Form submission and correspondence, will be taken under advisement in determining your final course grade. We do not report marks for

make-ups. However, after all regular course work is complete and returned, we will report the mark assigned for the original missed assessment.

Failing to complete all three steps above, regardless of the reason, results in a mark of zero on the original missed test. We do not accept late submissions and there are no make-ups for the make-up and no extensions for any reason. Accommodations for missing more work than addressed above are extremely limited: (1) an ongoing and substantial injury, illness, or personal/family problem seriously affecting the student's ability to complete term work across all courses over an extended period of time where the student's College Registrar writes to me after meeting with the student and formally requests an accommodation on the student's behalf or (2) more than one conflict not related to injury, illness or personal/family problems where I am contacted by the student very far in advance. In these limited situations, I will consider whether accommodations can still meet all course requirements or whether the student must be advised to drop the course and retake it when able to complete the required work. Any such extraordinary accommodations are at my discretion and may involve completing work at an alternate time, an oral and/or other assessment, re-weighting, and/or may be contingent on performance on other work.

7. COURSE COMMUNICATION

This is a challenging course, and you will likely have many questions throughout. We welcome these questions. In fact, we are banking on it.

We have designed our course with communication in mind. To facilitate our collective discourse, we have organized the following as part of our semester: weekly tutorials, weekly help desk hours, consultation time with the Stata TA, Piazza to facilitate class discussion throughout the week, and lecture time with the option of backchannel Q&A. Your Eco 375 community is here for you: each week, all semester.

Maybe you want to try to by-pass the course infrastructure altogether and email us. Please note, however, that asking questions via e-mail is almost never the best way to get an answer. It leaves others out of valuable discussions and, more generally, requires a lot of repetitive effort for us; effort better put towards course improvement (pareto improvement, even). Instead, consider the avenues of communication listed below, and choose one that best fits your inquiry. If you somehow missed this section of the syllabus the first time around and email me about something of general interest to others or something that has a structured process already attached to it, please do not take offence if you receive a canned reply directing you back here.

1. Questions on course content (including the material covered in course assessments): The primary way to address questions on course content is to bring them to the Thursday lecture, Friday tutorial or Friday help desk. These meetings are designed to be interactive, and we welcome questions here! You can ask directly or through the Q&A backchannel.

2. If your question isn't fully addressed during our meeting time or you feel it's out of direct context for what is being discussed that week in lectures or tutorials, I encourage you to post your questions on Piazza. The Piazza system is highly catered to getting you help fast and efficiently and, importantly, it builds an online community here in ECO375. Piazza facilitates discussion primarily between you and your peers (there's more of you to populate the site), but our course TAs also check-in weekly (usually on Fridays) to address any unresolved areas of confusion. They will also flag questions for me or the Stata TA where cases warrant. If you

have any problems/feedback, email team@piazza.com. Find our class signup link at: https://piazza.com/utoronto.ca/fall2021/eco375h1flec0101

3. Questions about Stata specifically:
    - Some questions about Stata may not be sufficiently addressed in weekly tutorials or Friday discussion. In this case, post the question to Piazza or go to the Stata TA's office hours. Remember, we also have Stata workshops scheduled throughout the semester to walk you through the basic mechanics of Stata.
4. Technological issues:
    - If you are having an issue with your technology, try posting to Piazza first as some others may share your issue and still more may have a potential solve for it. This also allows the course staff to become aware of it at the same time. Remember from Section 4 above; you should be proactive about avoiding technical and other difficulties, which includes learning to use the technology laid out in Section 4 ahead of "crunch" time.
5. For remark requests on course assessments OR inquiries regarding a missed term test:
    - Please use the MS forms links on Quercus.

Most questions can be handled through points 1-4 above, but for those of a private nature, please reach out to me directly through email or office hours (e.g. for concerns about accessibility accommodations, TA issues, typos or broken links on the website). The course email is eco375.ward@utoronto.ca. If you need to send an e-mail, please (1) email from your UofT email address (it will be ignored as spam otherwise), and (2) include your student number in your signature.

Use only the course email: eco375.ward@utoronto.ca to get in contact with us, i.e., DO NOT try to email us through Quercus or at another address (it will be missed or ignored). If we can answer briefly, we will reply within three business days. If you receive no reply please check the syllabus, review Quercus announcements, post to Piazza, see your TA in tutorials, or see me during office hours. My office hours are via Zoom on Fridays 2-4pm.

Lastly, please note that we will make important announcements through Quercus, which means you need to check in here regularly. You may also wish to customize your Quercus notification preferences to receive immediate notification of course messages.

8. Academic Integrity

Please read/refamiliarize yourself with the Faculty Arts & Science's Statement on Academic Integrity at the start of our course: https://www.artsci.utoronto.ca/current/academic-advising-and-support/student-academic-integrity. As part of an academic community it is your responsibility to be aware of appropriate conduct. Any academic offence will be reported and acted upon immediately.

9. Student Accessibility

For accessibility concerns *immediately* visit http://www.studentlife.utoronto.ca/as and also register with Accommodated Testing Services (ATS): https://www.ace.utoronto.ca/ats/. We can only provide accommodations for assessments as directed by ATS. If you have trouble, seek help right

away from us, your College Registrar, and/or the Academic Success Centre. For any issues that extend beyond our course, or last more than a week, contact your College Registrar immediately.

10. PRIVACY

We are all expected to respect university privacy and copyright restrictions in this course.

Synchronous Events: The relevant policy states "Students may not create recordings of weekly synchronous events with the exception of those students requiring an accommodation for a disability, who should speak to the instructor prior to beginning to record these events."

Course Recordings: The relevant policy states "Download and re-use is prohibited. Course videos and materials belong to your instructor, the University, and/or other sources depending on the specific facts of each situation and are protected by copyright. Do not download, copy, or share any course or student materials or videos without the explicit permission of the instructor. Non-compliance with these terms violates an instructor's intellectual property rights and the Canadian Copyright Act. Students violating this agreement will be subject to disciplinary actions under the Code of Student Conduct."

Course Materials (lecture slides, tests and assignment questions and other course content): The relevant policy states: "Do not download, copy, or share any course or student materials or videos without the explicit permission of the instructor. Non-compliance with these terms violates an instructor's intellectual property rights and the Canadian Copyright Act. Students violating this agreement will be subject to disciplinary actions under the Code of Student Conduct."