

ECON 3720 Introduction to Econometrics - Spring 2024

Dr. Jessica Kripalani (she/her/hers)

Classroom: Nau Hall 211

Office Hours: TBD & by appointment

Location: Monroe

E-mail: jmk4bh@virginia.edu

Course Description

Econometrics is about using data to answer economic questions. This combines a thorough understanding of the statistical techniques combined with a thoughtful approach to the questions of interest. The course will provide an introduction to the theory and practice of econometrics. We will cover the theoretical underpinnings of econometrics through an analysis of the properties of different estimation methods, such as ordinary least squares (OLS); however, the focus will be on the application of the tools to answer causal questions. The course will help you to foster the skills necessary to plan and execute research projects to answer causal questions. We will study many examples and do a fair amount of number crunching ourselves.

Course Objectives and Course Learning Outcomes

Upon completing this course, you should be able to:

1. Explain how simple and multiple regression are different
2. Explain the assumptions of the least-squares method
3. Build a basic econometric model
4. Interpret and explain the results of a common basic regression output
5. Work with Dummy Variables as dependent and independent variables
6. Analyze articles in applied economics (using econometric methodology) by assessing the validity of data and methods used to obtain results and critiquing the interpretation of these results.

The goal is that you develop practical knowledge of basic econometric theory, methods, and applications.

Prerequisites

A good understanding of basic statistics (such as Stat 2120 or 3120) and multivariate calculus (such as Math 1220 or 1320) will be assumed. You may not take intro statistics concurrently with Econ 3720. Economics 2010 and 2020 are also highly recommended

Teaching Philosophy

My primary teaching philosophy is that teaching should be student-centered and learning should be collaborative. Through every interaction, I try to share my enthusiasm for economics and statistics with students. I believe that successful learning starts with a positive and inclusive learning environment and that learning economics and statistics is the same as learning to walk, talk, or throw a ball. It takes time and effort and includes failure, but if you stick with it, you will succeed. Learning from your own mistakes is one of the best ways to demonstrate progress in mastering a topic. Going on this learning path together we can grow as students and educators. I strive to prepare students for the workplace but also to give them the analytic tools to self-educate and become independent critical thinkers and researchers.

Required Textbook and Other Materials

Textbook and Interactive Homework:

Wooldridge, Introductory Econometrics 7e with Mindtap (Inclusive Access - see below). Access to **MindTap** is required for this course to earn credit for homework assignments. Register for your MindTap Course. You will be able to access MindTap through Canvas.

Software:

- [Stata/BE: 6-month license \\$48 \(2,048 variables & up to 2.14 billion observations\)](#)
- [Stata/SE: 6-months license: \\$125 \(32,767 variables & up to 2.14 billion observations\)](#)
- Stata/BE can also be accessed through the UVA remote desktop. Click [here](#) for more information on how to access the remote desktop:

Grading

HW assignments (MindTap): 25%

Exams (3 exams):

- If you sit for all 3 exams, the lowest score will be weighted 10%, and the other two will be weighted 20% each (total of 50% of your grade)
- If you miss an exam with an excused absence, there are no make up exams, and the remaining 2 exams will be worth 25% each
- If you miss two exams with excused absences, the third exam will be worth 50% of your grade

Final paper (15% final paper, 10% intermediate work)

There are no late submissions

Grading Procedure

Your grade in this course will reflect your performance on assignments and adherence to deadlines. Please contact me if you believe your grade contains an error. **You have one week after a grade is posted to bring up any grading issues.** After one week, your grade is considered final. I do not adjust the exam scores. I do, however, reserve the right to adjust the final scores (upwards only). If done, this will be for *everyone* in the class. I decide on this at the end of the course.

Grading Scheme ([UVA UG default](#))

Grades will be rounded at my discretion.

Learning Means Failing

Learning from your own mistakes is one of the best ways to demonstrate progress in mastering a topic. Each question on the homework will allow for 3 attempts and the best score of your attempts will be counted for your final grade.

Assignments

Homework (Online Platform Cengage/Aplia)

There will be weekly problem sets using Mindtap. Each week has 2 assignments, comprehension questions and computer based questions. You may form study groups to work on the problem sets together. You may use the discussion sections to get help with completing the assignments.

However, each student must submit their own answers. The homework assignments require working through empirical assignments. Please use this as an opportunity to practice the use of Stata. Always remember “**practice makes perfect**”. Always remember to write do files so that you can more easily reuse the code and apply it to your research paper.

Inclusive Access (Access to Cengage MindTap)

This course will take part in the Inclusive Access program with The UVA Bookstore providing your course material at a low price. ALL students enrolled in the class will have immediate access to their digital course materials through the class UVA Canvas site. Students who remain opted in to the materials will be charged the following on their student accounts (SIS): **\$129.80 for Introductory Econometrics (with MindTap).**

This program is optional for students but you must actively **OPT OUT** in order to not be charged. Students can opt out by going to the student portal link in the emails sent by **UVAInclusiveAccess@virginia.edu**. Students who opt out will lose access to the materials. Due to the special pricing, no refunds can be processed.

Students will see a charge on their Student SIS account for any **Inclusive Access** classes they are enrolled in and will have 30 days to pay that off. If you OPT out or drop the class you will see a refund within 30 days.

This program aims to offer all students accessibility and affordability. If you have any questions regarding the program, please email us at **UVAInclusiveAccess@virginia.edu**.

Tentative Homework schedule

Homework	Chapter Coverage	Due date
HW #1	Chapter 1	1/24 11:59PM EST
HW #2	Chapter 2	1/31 11:59PM EST
HW #3	Chapter 3	2/7 11:59PM EST
HW #4	Chapter 4	2/21 11:59PM EST
HW #5	Chapter 5	2/21 11:59PM EST
HW #6	Chapter 6	3/20 11:59PM EST
HW #7	Chapter 7	3/20 11:59PM EST
HW #8	Chapter 8	3/27 11:59PM EST
HW #9	Chapter 9	4/3 11:59PM EST
HW #10	Chapter 13 (no C)	4/17 11:59PM EST
HW #11	Chapter 14 (no C)	4/24 11:59PM EST
HW #12	Chapter 15 (no C)	5/1 11:59PM EST

Note: HW 4 and 5 are due on the same day, as are HW 6 and 7.

Exams

Students who cannot be present for an exam due to UVA-sanctioned activities or UVA-sanctioned religious accommodations or must notify me by the second week of class. If adequate documentation for missing an exam is provided, the average on the remaining exams will be used. Otherwise, a zero will be recorded.

Exam Schedule (Tentative)

Exam	Chapters	Date
Exam #1	1, 2, 3, 4, 5	Tuesday February 27, 2024
Exam #2	6, 7, 8, 9	Thursday April 4, 2024
Exam #3	13, 14, 15 (17)	See UVA Final Exam Schedule 11:00-12:15 class: Thursday May 2, 9:00-12:00p 12:30-1:45 class: Saturday May 4, 2:00p-5:00p

Extra Credit/Bonus Points

There will be several opportunities during the semester to earn extra credit. I will offer all extra credit opportunities to the whole class with prior announced due dates and will be posted in Gradescope for submission.

Lectures

Lecture notes/slides will be posted to Teams, usually by the evening before the lecture is delivered. You are strongly encouraged to print out a copy of the slides or have them ready on your laptop before coming to class, so you can follow along and take notes on your copies of the slides.

Posted lecture notes/slides **do not** contain all the material which will be discussed in class, and failure to attend all lectures means that you are going to miss important material. Attendance at all lectures is required.

Research Project

As part of this class you are required to complete an empirical research project using econometric methodology. Your paper must be related to current macroeconomic or microeconomic topics (broadly defined). Your research is not expected to be groundbreaking but will be a marginal contribution toward a better understanding of a specific aspect of the literature. While you are not expected to produce groundbreaking econometric research, it is **required that you include material from Chapters 13, 14, and/or 15.**

Projects will be done in teams of no more than 5 students (you are discouraged from working on the project on your own, past experience shows that your grade will likely suffer - please use class time and the discussion sections to identify partners for your project).

All group members are equally responsible for all parts of the paper and thus will receive the same letter grade. The maximum page limit is 16 pages, not including a title page or references. Figures and tables should be embedded in the document. You can find some econ journals that focus on short papers [here](#) and [here](#). The project will consist of the following components listed in the table below (**please keep in mind that completion of each component listed below are milestones necessary to complete, but that the scores on these milestones are not a guarantee for the final grade of the paper**).

Writing Tasks

- **Annotated Bibliography and Research Question:** The annotated bibliography is an important first step before you can write your research proposal. The purpose of this assignment is that you get familiar with the econometric (applied economics) literature and are able to place your research into the context of the existing literature. Each item in your annotated bibliography should include a brief summary, assessment, and reflection. The minimum number of academic, peer-reviewed sources you should be citing and discussing is five (5). There is no maximum; however, please keep in mind that there is a page limit, and it will be difficult to include an extremely large number of sources. At least 1 paper needs to be published in one of the top 20 economic journals as ranked by google scholar: [Economics - Google Scholar Metrics](#) or be published in one of the new AEA journals: <https://www.aeaweb.org/journals>. At the end of this document, you should indicate your research question that addresses causality. That is, based on expectations derived from economic theory and existing empirical research you should explore whether changes in X lead to changes in Y, ceteris paribus (more detail will be provided in the assignment prompt). You will likely want to write this part after you complete your research for the annotated bibliography. The annotated bibliography should be about 5 pages long.
- **Research Proposal:** Explain your paper topic and motivate interest in the project with some of the key effects you will study. In your proposal, you are expected to explain: why your topic is interesting; why the reader should care; why your research question is compelling; and why finding an answer is essential. The answers you provide in your proposal should be grounded in statistics, news articles, and/or current policy debates, not simply in the form of, "I care about this because...". The goal of this assignment is to begin writing parts of what may become the introduction and motivation for your final paper. You are encouraged to use data visualizations as motivation if appropriate. Of course, your research question, thesis, and framing may change substantially by the end of the semester, so you should select the passages you choose to reuse carefully. The proposal should include a well-defined research question that has evolved since the Annotated Bibliography. You should clearly motivate your research question and paper topic using either data or other pieces of literature. You should include a 2-3 sentence thesis statement (italicized) that discusses what you intend to be your main findings, hypothesis, or argument. The research proposal should help you begin to narrow the focus of your final

paper. The proposal should be approximately 2 pages, not including any figures, tables, a title page, or a bibliography (not annotated bibliography). You must have all in-text citations properly cited and attach a works cited page at the end of the proposal document.

- **Data Collection and Metadata Guide:** This component of the project entails the completion and submission of several data and replication documentation components, including: Original data (raw data you initially obtained for your project), importable data, and base data files; Metadata Guide; Data processing command file (processing.do). The Metadata Guide should be organized into one or more sections; each section should provide information about one of your original data files. For each original data file, the Metadata Guide should include the following information: bibliographic citation for the original data file; a digital object identifier for the data file; the date on which you first downloaded the data file; a written step-by-step explanation of how the interested reader can obtain a copy of the original data file; additional important information and independent researcher would need to understand and use the data in the original file.
- **Literature Review:** The literature review is intended to motivate your research question, place it in the context of previous work, and provide a foundation for your analysis. The minimum number of academic, peer-reviewed sources you should be citing and discussing in your literature review is ten. There is no maximum; however, please keep in mind the page limit and the fact that you should devote the appropriate space in your literature review to the discussion of different themes and articles. Detailed summaries of individual articles are typically not necessary or valuable. You should carefully consider the organization of the articles in the literature review. There will be many pieces that you could use, but it is important that you judiciously select those that are most important. The manner in which you group the articles and provide transitions should demonstrate your mastery of the material and build a discussion that provides a foundation for your analysis. Part of this assignment requires you to explain the authors' arguments in your own words and how these findings fit into the context of your research question. You must engage with the authors, rather than blindly accepting their arguments. You can be critical of the author's methodology and/or results (analyze it instead of just describing it), but you must do so with appropriate justification. Your discussion of an article or theme should not simply be a summary and regurgitation of everything you know. Your literature review

should build a discussion that lays the foundation for your analysis. Thus, at the end of your literature review, you should restate your thesis statement (2-3 italicized sentences). Your thesis statement will likely be worded differently than what you included in your initial proposal. Your literature review should be approximately 3 to 4 pages, not including any figures, tables, a title page, etc. Remember, not all of the literature review may show up in your final paper. Please do not write more than 5 pages. Part of the difficulty of this assignment is clearly and concisely explaining the relevant literature. This assignment is for you to familiarize yourself with the previous literature, place your research in context, and lay a foundation for your analysis.

- **Data and Methods:** This phase of the project entails completing and submitting three components, including: 1. Data & Methods section of your final paper, 2. Data construction command file (construction.do) [Command Files]; 3. Analysis data file in Stata format (analysis.dta). The Data & Methods section should include the subsections Conceptual/Theoretical Model, Data, and Model Specification. The Conceptual/Theoretical Model subsection serves as the introduction to this section and should again include your italicized thesis statement. In the Data subsection (1-3 pages) you should include a description of your analysis data, variable descriptions, summary statistics, and a discussion of data limitations (more detail will be provided in the assignment prompt). In the model specification subsection, you should include your regression equation, classify explanatory variables as variables of interest or controls, and indicate the expected sign of the coefficients and the variables of interest. This section should be about 1-2 pages. The total length of the Data and Methods section should be about 3-5 pages, including tables. The Data Construction part of this submission needs to include a Stata do file that explains how you transform your base data file into analysis data files.
- **Results and Discussion:** The Results section should follow directly from your Data & Methods section where you developed your model specification. However, your regression specification can/may have changed since you submitted your Data & Methods section and received feedback. This is acceptable and, in fact, encouraged. Just be sure to update the Data & Methods in the final version of your paper. In this section, you provide a table of your regression results (potentially including multiple columns) – or several tables if

necessary – and a brief description of those results. This section should be concise (1-3 pages, including tables), but will vary depending on the number of specifications included. Some things to consider in presenting and describing your results are: Use `outreg2` (or a similar Stata command) to generate your tables, or otherwise format them to disciplinary conventions – do not copy/paste tables from Stata; Do not report your estimates in terms of β 's or by using obscure abbreviations used in your codebook (such as `lrgdppc`). For the purposes of a results table, write out the variable name (such as logged real GDP per capita) that is consistent with the name you used in the Data & Methods section; Do not include too many significant digits. The goal is readability, not false precision; If you estimate several different specifications of your model (using the same dependent variable), include these as several different columns of the same table to facilitate comparison and improve readability; In describing your results – be brief. Your reader has already seen the table; Pay attention to practical/economic significance (effect size), not just statistical significance and provide the reader with some context to put the effect in perspective; If any of your results are strange or unexpected be sure to note this, you can and should return to it in your discussion section; Are your results consistent with or counter to the existing empirical research? Note this so that you can return to it in your discussion section. By the end of your results section, you should be able to draw a conclusion, even if it is not the one you expected. An unexpected result is a result nonetheless. Insignificant results can also be important and have significant policy implications. The Discussion section includes a discussion of the interpretation and implications of your empirical results, a discussion of potential explanations for the results based on your conceptual framework and/or previous literature, and a discussion of how your results are consistent with, an extension of, or at odds with the existing literature. This section should be concise (1-3 pages) and provide the reader with all the relevant context needed to understand and interpret your results. Many good research questions in economics have policy implications. This is your chance to mention these (you may have already alluded to these in your introduction and/or literature review). Be careful not to make value judgments – let your analysis speak for itself. Some things to consider in discussing your results are: If your results are strange or unexpected, suggest reasons why. This could be due to limitations of your methodology or data or perhaps inconsistencies in the theoretical framework; Discuss these potential limitations of your research, such as: small sample size, less than ideal unit of analysis (state or national vs. individual), simplicity

of the functional form, data (un)availability, selection bias, time period, omitted variables, etc; If there are several different possible explanations or interpretations of your results, which of these do you think are more likely? Are your interpretations based on a theoretical or conceptual understanding of the issue based in the previous literature or both? The Results & Discussion section should be about 3 to 6 pages, including tables (you can find more information in the assignment prompt).

- Final paper (15%): Recall, the goal of this project is for you to develop an understanding of how economists conduct applied empirical research. To this end, you should demonstrate: an understanding of Stata syntax, data management skills, and best coding and documentation practices for reproducibility; the ability to place a research question in the context of existing scholarly discourse through an effective literature review; and an understanding of the necessary components of a well-written empirical research paper and the economics discipline formatting and style conventions. The final version of your paper should incorporate most comments you received in the previous submission stages. The final empirical research paper should be structured as follows. The following is a general structure that you do not necessarily have to follow but it should serve as a basic guideline: Section 1: Introduction (1-2 pages); Section 2: Literature Review (2-4 pages); Section 3: Empirical Methodology (2-5 pages, including tables); Section 4: Results (1-3 pages, including tables); Section 5: Discussion and Conclusion (1-3 pages); Section 6: References (more detail will be provided in the assignment prompt).

Paper Deadlines

Writing Task (Submit the following items)	Due Date
Annotated Bibliography & Research Question (1.5%)	Friday, February 2, 2024
Proposal (1.5%)	Friday, March 1, 2024
Original & Base Data Files; Data Processing Do.File (1.5%)	Friday, March 22, 2024
Literature Review (1.5%)	Friday, April 12, 2024
Data & Methods Section; Data Construction & Summary Do.File (2%)	Friday, April 19, 2024
Results & Discussion Section; Data Analysis Do.File (2%)	Friday, April 26, 2024
Final Paper (15%)	Tuesday, April 30, 2024

Potential data sources for your paper

The data source in the papers you are citing in your bibliography should be your primary data source. Additionally, the following data sources might be helpful for your research paper (this list is not exclusive, do your own research):

- Federal Reserve Economic Database (FRED): Collection of U.S national, state, and international macroeconomic and finance data from multiple sources.
<https://research.stlouisfed.org/fred2/>
- Integrated Health Interview Series: Collection of household and individual data on health outcomes, health behaviors, and personal and socio-economic demographics.
<https://nhis.ipums.org/nhis/>
- IPUMS CPS: Collection of household and individual data from the U.S. Current Population Survey. It includes but is not limited to data on educational attainment, income, health insurance, migration, disability, employment, housing, poverty, and welfare.
<https://cps.ipums.org/cps/>
- IPUMS USA: Collection of household and individual data from the U.S. Census and American Community Survey. It includes data on educational attainment, income, language proficiency, migration, disability, employment, and housing. <https://usa.ipums.org/usa/>
- IPUMS International: Collection of census data from around the world, measured at the household and individual level. <https://international.ipums.org/international/>
- U.S. Bureau of Economic Analysis includes but is not limited to data on US GDP by Industry, State, Country, and Metro Area and also Consumer Spending, Income & Savings by State, County, and Metro Area: <https://www.bea.gov/data>
- U.S. Bureau of Economic Analysis, national income and product accounts: https://apps.bea.gov/iTable/index_nipa.cfm
- U.S. Bureau of Labor Statistics, includes but is not limited to data on US Employment, Productivity, Price Index, and Compensation Data: <http://www.bls.gov/>
- Congressional Budget Office, Budget and Economic Data, includes but is not limited to projections and historical data for the US budget and economic and demographic projections: <https://www.cbo.gov/data/budget-economic-data>
- US Census Bureau: demographic and economic data from the U.S. Census Bureau: <https://data.census.gov/cedsci/>
- World Bank, provides access to all World Bank data sorted by countries and years, including information for sustainable development goals and international debt statistics: <https://data.worldbank.org/>
- International Monetary Fund (IMF), includes but is not limited to data on international financial statistics, global financial stability, direction of trade statistics, financial soundness indicators, etc: <https://www.imf.org/en/Data>

Class Policy on GenAI

- You may use AI programs e.g. ChatGPT to help generate ideas, search for code, brainstorm, support your use of analytical tools and methods. However, you may not submit any work generated by AI as your own, in your team, or on assignments for class. You may not submit any work generated by a GenAI program as your own and if you reference material that you sourced in any part from a GenAI program in class you should acknowledge. If you include material generated by a GenAI program in any submission, it should be cited like any other reference material. GenAI is a tool, but one that you need to acknowledge using.
- GenAI is not a substitute for developing a fundamental understanding of Econometrics, and you should be aware of the limitations of GenAI as you engage with it for class preparation. In some instances, GenAI can provide reasonable answers to our assignment questions. But you will ultimately be responsible for demonstrating an understanding of the underlying Econometric framework.
- Please include a paragraph at the end of any assignment that uses GenAI explaining what you used the GenAI for and what prompts you used to get the results. You are wise to assume that anything generated by GenAI has inaccuracy and should be validated by other sources before relying on it. Failure to disclose your use of GenAI in this course is in violation of honor policies.
- It is prohibited in this class to use generative AI in any way that violates UVA's policies on Academic Integrity and/or Honor.

Schedule (tentative - depends on the progress of the course):

	Tuesday	Thursday
Week 1 (1/15)		Introduction to the course & Chapter 1
Week 2 (1/22)	Chapter 2	Chapter 2
Week 3 (1/29)	Chapter 2	Chapter 3
Week 4 (2/5)	Chapter 3	Chapter 4
Week 5 (2/12)	Chapter 4	Chapter 4
Week 6 (2/19)	Chapter 5	Review for Exam #1
Week 7 (2/26)	Exam #1	Chapter 6
Week 8 (3/4)	Spring Recess	Spring Recess
Week 9 (3/11)	Chapter 6	Chapter 6
Week 10 (3/18)	Chapter 7	Chapter 8
Week 11 (3/25)	Chapter 8	Chapter 9
Week 12 (4/1)	Review for Exam #2	Exam #2
Week 13 (4/8)	Chapter 13	Chapter 13
Week 14 (4/15)	Chapter 14	Chapter 14
Week 15 (4/22)	Chapter 15	Chapter 15
Week 16 (4/29)	Review for Exam #3	

Add, Drop, and Withdrawal:

Please see the UVA webpage for information on important administrative dates:

<https://college.as.virginia.edu/calendar>

Honor

Because of the UVA Honor System, I assume that students in EC3720 are truthful with teaching assistants and me and do not cheat on tests and assignments. In the unlikely event that you observe an incidence of cheating, I assume you will contact an Honor Advisor. Students deemed by Professor Kripalani to have violated the University's Honor System are not eligible for a final grade. All exams must be completed independently.

An Inclusive Environment:

I recognize and value the many perspectives my students bring to the classroom. Many factors—social identities, visible and invisible disabilities, family circumstances, physical location, mental health, and access to the internet—all influence the experiences that every individual can have in my courses this and every semester. I am committed to building an environment to support your learning, one in which you will be supported and rewarded for going out on a limb to communicate and defend your ideas. I believe that economics as a discipline is constrained to a narrow set of topics unless it opens itself up and attracts more diverse students and becomes a more inclusive field.

Mental Health and Well-being

The Student Health and Wellness Center offers Counseling and Psychological Services (CAPS, <https://www.studenthealth.virginia.edu/CAPS>) for its students; call 434-243-5150 to speak with an on-call counselor and/or schedule an appointment. If you prefer to speak anonymously, you can call Madison House's HELP Line at any hour of any day: 434-295-TALK. Alternatively, you can call or text the Disaster Distress Helpline (1-800-985-5990, or text TalkWithUs to 66746) to connect with a trained crisis counselor; this is toll-free, multilingual, and confidential, available to all residents in the US and its territories.

Classroom Policy:

Please respect your fellow students' desire to learn and refrain from talking or engaging in other disruptive behavior during class. You are not allowed to talk on your cell phones during class.

Please mute your cell phones for the duration of the class. Cell phone and computer use is only allowed for the purpose of note-taking, (possibly as a classroom response system), and following the material discussed during class.

Our Contract:

This syllabus is an important document if you remain in the course. Continued enrollment in the course indicates agreement with all the stipulations laid out in this document. All future discussions between you and me assume your agreement with this syllabus.

Legal Notice:

Students are prohibited from selling or sharing materials from this course with any person or commercial firm (or being paid to take notes) without the express written permission of Professor Kripalani. It is considered a violation of academic integrity to utilize course materials that are illegally sourced. Please ensure that you are ordering and paying for your own materials as outlined in the ordering instructions.

Information contained within this syllabus (except grading and absence policies) is subject to change.