Applied Econometrics

Course Syllabus
Graduate School of Economics
De La Salle University

Course Title: Applied Econometrics (ECO601M/ ECO606C/ ACT616M)
Pre-requisite: None
Pre-requisite to: None
Faculty: Justin Raymond S. Eloriaga
Term/Time/Room: Term 2 A.Y. 2020 - 2021 / 09:00 - 12:00 (G01) Saturday (S) / Full Online

1 Course Description

This course is a rigorous introduction to the applications of econometrics in economic analysis, business, finance, and development policy. In particular, this course aims to introduce students the main theoretical and empirical underpinnings of econometrics starting from the classical linear regression model. We will discuss how the CLRM is derived, is formulated, and is used to model basic relationships. We will then proceed to understand a few deficiencies and biases which may arise when violations to its properties and incurred and the corresponding consequences to these violations. We will then explore other models which address the deficiencies of the CLRM starting with the binary outcomes model such as the Logit and Probit. From there, we will move on to panel data models which are the fixed effects, random effects, within and between regressions, SURE, and GMM. Next, we will explore versatile estimation methods such as the quantile regression, the least absolute deviations, and the LOESS regression. Lastly, we will undertake discussions on frontier econometric tools such as the regression discontinuity design, difference in differences, and causal impact analysis.

The course relies heavily on concepts that have been introduced in the introductory statistics course such as probability distributions, the theory of inference, and the theory of estimation. Therefore, students enrolled in the course are expected to review their basic mathematics and calculus, especially for the first half of the term. Adittionally, students are entrusted to study the R Programming language and STATA as these tools will be used extensively and interchangably throughout the course.

2 Course Objectives

This course is intended to

1. Familiarize students with various applications of econometrics to economic analysis, finance, business, and development policy.
2. Introduce students to the classical linear regression model, its assumptions and underlying methodology, derivations, properties, and violations.
3. Introduce econometric models aimed at addressing directly the violations incurred by the CLRM in some special instances.
4. Provide a thorough discussion on econometrics in R and STATA
5. Introduce modern econometric methods such as non-parametric regressions and causal inference, the backbone of modern econometric literature.
6. Enhance students' problem-solving, critical thinking, and analytical skills by using verbal reasoning, graphs, statistics, and mathematics to evaluate economic problems and issues.

3 Learning Plan

An estimate of the topics covered per week are given in the table to follow and closely follows the flow in the lecture notes. As such, it is expected that the student continually refer to the notes in case they miss sessions or need to refresh on certain topics. Each week, we will meet synchronously for 45 minutes to 1 hour and 15 minutes. After this synchronous session, students are expected to watch the YouTube lectures on my channel and attempt answering the Problem Sets. Use the repeat button on the videos *liberally*.

Week	Topic	Learning Activities
0	*Brief Introduction to R and RStudio and Review of Statistics*	Class Discussion
1	*Introduction to the Classical Linear Regression Model*	Problem Set 1 Term Paper Class Discussion
2	*CLRM Problem of Inference and Estimation*	Problem Set Term Paper Class Discussion
3	*Violations to the Assumptions of the CLRM*	Problem Set Term Paper Class Discussion
4	*Extensions to the CLRM*	Problem Set Term Paper Class Discussion
5	*Working with Panel Data using the Fixed and Random Effects Model*	Problem Set Term Paper Class Discussion
6	*Non Parametric Methods in Econometrics*	Problem Set Term Paper Class Discussion
7	*Binary and Multinomial Response Models*	Problem Set Term Paper Class Discussion
8	*The (Modern) Generalized Method of Moments*	Problem Set Term Paper Class Discussion
9	*Independent Learning Week*	Problem Set Term Paper Class Discussion
10	*Causal Inference in Economics*	Problem Set Term Paper Class Discussion
11	*Synthetic Controls*	Problem Set Term Paper Class Discussion
12	*Course Capstone and Model Combination*	Problem Set Term Paper
13	*Research Break*	Class Discussion
14	*Group Presentations*	Term Paper Paper Presentation

4 Course Learning Outcomes

School of Economics Expected Lasallian Graduate Attributes (ELGAs)	Learning Outcomes
Intellectually Inquisitive	LO1: Understand how econometrics can factor into policy decisions made by industry and government. LO2: Describe different econometric methodologies and their corresponding assumptions and limits. LO3: Discuss coherently the CLRM methodology and how it is used as a fundamental model. LO4: Find and understand new econometric approaches emerging in the literature.
Technically Proficient	LO5: Masterfully code econometric specifications in R and STATA LO6: Apply mathematical modelling abilities in modelling economic behavior. LO7: Apply microeconomic and macroeconomic theories in the construction of econometric models. LO8: Develop and justify a journal quality econometric project
Agent of Positive Social Change	LO9: Identify limits and problems in the current landscape of the econometric procedure
Globally Competitive	L10: Explain in non-technical terms the fundamental econometric intuition associated with the standard and intermediate models used in econometric analysis.

5 Assessment and Evaluation

Below are the requirements for the course and their corresponding weights

Student Assessment Items	Due Date	Weighting	Learning Outcomes
Concept Paper	Week 7	20%	LO1, LO2, LO5, LO7, LO9, LO10
Project Presentation	Week 14	10%	LO1, LO2, LO5, LO6, LO7, LO9, LO10
Final Term Paper	Week 14	40%	LO1, LO2, LO5, LO6, LO10
Course Problem Set	Week 14	30%	LO1, LO2, LO3, LO7, LO8, LO9, LO10

The grading scheme that will be followed is

96 – 100.0	4.0	72 – 77.99	2.0
90 – 95.99	3.5	66 – 71.99	1.5
84 – 89.99	3.0	60 – 65.99	1.0
78 – 83.99	2.5	Below 60	0.0

5.1 Course Problem Set

The course shall revolve under one fully summative course problem set. The summative problem set is done individually and may be submitted on the Fourteenth week.

The problem set comprises of three different types of problems. First, and least in number, the proving and theoretical section. In here, students are asked to prove properties of certain estimators and is used to evaluate their empirical and mathematical understanding of the subject matter. Second, results and model reasoning. In this section, students will be given a couple of model structures and results wherein they are tasked to interpret, understand, and explain the underlying story. Last, and most in number, would be the application of econometric techniques through STATA or R. Students are encouraged to actively try and accomplish this section to attain mastery of the different models.

Your answers should be word processed (MSWord or Pages or LaTeX). You can generate equations using the application MathType or the built in Equation Editors if you are using MSWord or Pages. It is the most convenient way to work in Word or Pages with mathematical expressions that have many. Greek letters and may be useful for your homework answers. Google Docs is not recommended. For any results asked, place a screenshot in line in the document and label these accordingly. All codes and other paraphanelia must be placed in a well documented appendix

You need to submit electronically in the submission portal of Canvas a pdf version of your word-processed assignment. PLEASE NAME the pdf file "SURNAME - ECO601M/ACT616M/ECO606C - Problem Set". You must also upload the corresponding .R or .do files to garner a score. No codes, no grade. Open deadline is observed. Students are advised of the last date to submit.

5.2 Final Term Paper, Project Presentation, and Concept Paper

Students are to submit a final empirical term paper which concerns any empirical study which is an application of lessons or concepts learned in class. Students are suggested to explore their respective research interests, whether it is in the field of microeconomics or macroeconomics. Other applications may also be explored. Students may opt to make the term paper individually or in pairs.

Students are to submit a concept paper on Week 10 of the term which contains the following

1. Brief Background of the Study
2. Research Objectives
3. Methodology

This concept paper shall be *peer reviewed* using AnimoSpace's peer review function. Give a half page review of what you think the paper you reviewed should improve upon. The professor will likewise review all papers and give a similar review. Please take these reviews into consideration as you build your final project.

At the end of the term, students are to submit a final term paper which contains everything in the concept paper in addition to the following.

1. Brief Review of Related Literature
2. Theoretical Framework
3. Results and Discussion
4. Conclusions

Students are expected to submit just a soft copy of the paper to justin.eloriaga@dlsu.edu.ph in addition to any codes used to generate the results and an excel file of the data used. The paper must be submitted in .pdf form. The deadline will be on the 14th week at a schedule announced by the professor. Each student is also required to submit the .pdf file of the paper on AnimoSpace. The criteria for grading the term paper is seen in the next page. I do not impose a specific format (i.e. Chapter I, Chapter II, Chapter III, etc.). You are all graduate students with the capability to write clearly and in the manner you see fit. I also have

no prescribed length. Generally, I think a good term paper can be less than 10 pages in length (excluding references). Do not afraid to be novel in your approach, just do what you think is right. Excellent papers shall be *required* to submit their papers for presentation at the Philippine Economics Summit. Details on that will follow.

Each group shall be required to present their work to the rest of the class during the last meeting of the term. This group presentation shall comprise 15 percent of the total grade allocation for the empirical paper. The presentation should be at most 15 minutes per paper. The criteria for grading is in the next page.

Learning Outcome/Criteria	Excellent (90-100)	Very Satisfactory (80-89)
Technical Sophistication	The review adequately covers all technical aspects needed to carry out the empirical methodology of the paper.	The review satisfactorily covers some technical aspects that are critically needed to carry out the empirical methodology of the paper.
Replicability	The authors did submit and fully documented data and provided log and other relevant files. No problems were encountered in replicating the results.	The authors did submit and fully documented data and provided log and other relevant files but some problems are encountered in replicating the results.
Clarity and degree of testability of hypotheses	The paper's hypotheses are testable and the all steps were taken to achieve the conclusion	The paper's hypotheses are testable but not all steps were taken to achieve the conclusion.
Application of Economic Theories	The paper adequately covers all technical aspects and is able to apply necessary foundations to the full extent.	The paper satisfactorily covers some technical aspects that are critically needed to carry out the empirical methodology of the paper.

Learning Outcome/Criteria	Satisfactory (60-79)	Needs Improvement (0-59)
Technical Sophistication	The review provides a minimal (many of the technical aspects are ignored) yet acceptable coverage of the technical aspects needed to carry out the empirical methodology of the paper.	The review is not helpful and totally irrelevant for carrying out the methodological objectives of the empirical paper.
Replicability	The authors did submit and fully documented data and provided log and other relevant files but there are a lot of problems in replicating the results.	The authors did not submit the dataset or failed to provide log files and other relevant files.
Clarity and degree of testability of hypotheses	The paper's hypotheses are non – testable	The hypotheses are in no way related to the paper's
Application of Economic Theories	The paper provides a minimal (many of the technical aspects are ignored) yet acceptable coverage of the technical aspects needed to carry out the empirical methodology of the paper.	The paper is not helpful and totally irrelevant for carrying out the methodological objectives of the empirical paper.

6 Workload Allocation

Below is the expected workload allocation for the term

Time Spent in Class (Synchronous and Asynchronous)	3 hours per week x 13 weeks	39 hours
Time Allocated for Course Readings and Personal Study	3 hours per week x 12 weeks	36 hours
Time allocated preparing for the Term Paper	1.5 hours per week x 13 weeks	19.5 hours
Time allocated answering problem sets and other exercises	1 hour per topic x 12 weeks	12 hours
Total hours for the course	$\sim$107 hours	

7 References and Learning Resources

All course materials including my lecture notes, reference materials, problem sets, assignments, and the syllabus can be accessed through your DLSU Google Drive account and are posted in AnimoSpace. Some materials are also available on justineloriaga.com

- Wooldridge, J. M. (2016). Introductory econometrics: A modern approach. Nelson Education.
- Heiss, F. (2016). Using R for introductory econometrics. Florian Heiss.
- Damodar, N. G. (2004). Basic Econometrics. McGraw Hill.
- Eloriaga, J. Lecture Notes in Econometrics
- Eloriaga, J. Time Series Econometrics

8 Contact and Consultation Hours

My consultation hours are from 18:00 - 19:00 (Thursday) over Zoom. Please set an appointment at least 24 hours in advance. Consultation is strictly by appointment only. All contact may be made through justin.eloriaga@dlsu.edu.ph or through 09260321823. Alternatively, students may fill up the contact form in justineloriaga.com

Syllabus prepared by:

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Noted by:

Dr. Arlene B. Inocencio
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