THE UNIVERSITY OF THE WEST INDIES

MONA CAMPUS
Department of Economics
Kingston 7
Jamaica, W.I.

ECON6003: Econometrics I

Year: Semester I, 2020

Pre-Requisite: None

Anti-Requisites: None

Lecturer: Nadine McCloud

Office Hours: Monday 11:00 a.m. - 1:00 p.m. Venue: Click Here

Wednesday 11:00 a.m. - 1:00 p.m. Venue: Click Here

Course Description

Econometrics is the application of mathematics and statistical methods to economic data. Econometrics I takes an in-depth look at the issues involved in trying to discover the impact of one variable on another. The purpose of this course is to introduce students to the theoretical underpinnings of Econometrics, which includes, among other things, the derivation of several results that would have been presented in an introductory course on Econometrics.

Learning Outcomes

At the end of the course, students should be able to:

1. Describe, compare and contrast the properties of estimators
2. Find the Cramer-Rao Lower Bound for the variance of any estimator
3. Solve for the maximum likelihood estimator (MLE) of any parameter
4. Describe and derive the properties of the MLE.
5. Describe and derive the finite and asymptotic distributions of estimators
6. Derive the OLS estimator
7. Solve for OLS estimators using matrix algebra
8. Completely describe and derive the properties of the OLS estimator
9. Test restrictions on parameters
10. Analyse the consequences of imposing restrictions
11. Explain multicollinearity
12. Test for multicollinearity
13. Treat multicollinearity
14. Distinguish between GLS and FGLS
15. Explain heteroskedasticity

16. Test for heteroskedasticity
17. Treat heteroskedasticity
18. Explain autocorrelation
19. Test for autocorrelation
20. Treat autocorrelation
21. Explain Endogeneity
22. Treat Endogeneity

Modes of Delivery

Three lecture hours per week.

Assessment

Final Exam	60%
Mid-term Exam	30%
Assignment	10%

Syllabus

1. Introduction and Statistical Review

2. Review: The Simple Linear Regression Model

3. The Multiple Linear Regression Model

4. Hypothesis Testing

5. Multicollinearity

6. Generalized Least Squares
   (a) Heteroskedasticity
   (b) Autocorrelation

7. Endogeneity and Causal Inference

Resources

1. Required Texts:
   - *Econometric Analysis* (8th Edition, Pearson)
     William H. Greene

   - *Econometric Analysis of Cross Section and Panel Data* (The MIT Press)
     Jeffrey M. Wooldridge

2. Highly Recommended Texts:
    - *Econometrics* (Princeton University Press)
      Fumio Hayashi

    - *Econometric Methods* (McGraw-Hill/ Irwin)
      Jack Johnston and John Dinardo

    - *Mostly Harmless Econometrics: An Empiricist's Companion* (1st Edition)
      Princeton University Press
      Joshua D. Angrist and Jörn-Steffen Pischke

    - *Econometrics*. Available on-line here.
      B. E. Hansen (2020)

3. Supplementary References**:**

(a) Articles in Econometrica, American Economic Review, Journal of Economic Perspectives, Quarterly Journal of Economics, Journal of Money, Credit and Banking, etc.
(b) Berndt, E.R., 1991. *The Practice of Econometrics*. Addison Wesley.
(c) Cox, D.R. and Hinkley, D.V., 1974. *Theoretical Statistics*. Chapman & Hall/ CRC.**
(d) Hogg, R.V. and Tanis, E.A., 2006. *Probability and Statistical Inference*. Prentice-Hall.**
(e) Hogg, R.V., McKean, J.W. and Craig, A.T., 2005. *Introduction to Mathematical Statistics*. Pearson Prentice Hall.**
(f) Mood, A.M., Graybill, F.A. and Boes, D.C., 1974. *Introduction to the Theory of Statistics, 3rd edition*. McGraw – Hill.**
(g) Ruud, P.A., 2000. *An Introduction to Classical Econometric Theory*. Oxford University Press.
(h) Rao, C.R., 1973. *Linear Statistical Inference and its Applications*. Wiley.**
(i) White, H., 1999. *Asymptotic Theory for Econometricians*. Academic Press.

**** - These are in the Science Library**

4. Review of Linear Algebra***:***

    (a) *Greene (various eds), see the Appendix A*
    (b) *Ruud, Appendix C*
    (c) *Rao, ch. 1*
    (d) *The Matrix Cookbook. Available here.*

5. Review of Mathematical Statistics*:*

    (a) *Greene (various eds), see the Appendixes*
    (b) *Rao, ch. 2, 3*
    (c) *Mood and Graybill and Hogg and Tanis*