

**UNIVERSITY OF DELHI
DELHI SCHOOL OF ECONOMICS
DEPARTMENT OF ECONOMICS**

Minutes of Meeting

Subject : B.A. (Hons) Economics– (CBCS) Fifth Semester
Course : Applied Econometrics (HE55)
Date of Meeting : 13th July 2021
Venue : Online
Chair : Prof. Pami Dua

Attended by:

- 1 Deepika Goel, Aryabhata College
- 2 Padma Suresh M, Sri Venkateshwara College
- 3 Madhavi Moni, Hansraj College
- 4 Lokendra Kumawat, Ramjas College
- 5 Arun Kumar Kaushal, Shaheed Bhagat Singh (M)College
- 6 Shilpa Chaudhary, Janaki Devi Memorial College
- 7 Dushyant Chawla, Shyam Lal (Eve) College
- 8 Ajay Kumar, Kamala Nehru College
- 9 Akanksha Aggarwal, Jesus & Mary College
- 10 Swarup Santra, Satyawati College
- 11 Narender Thakur, Bhim Rao Ambedkar College
- 12 Dr. Nehkholen Haokip, Shyam Lal College Eve.
- 13 Dr. Ritu Suri, Lakshmi Bai College
- 14 Mamta Lamba, CVS
- 15 Rohit, Kalindi College
- 16 Gita Golani, Shyama Prasad Mukherji College

1. It was decided that for the academic session 2021-22, the main textbook would be Basic Econometrics, Sixth edition by Gujarati, Porter and Pal (2021) supplemented by Wooldridge(2014) for selected topics. For applications using software, Econometrics by Example by Gujarati (2014) would be the recommended text.
2. The Matrix Approach to Linear Regression Model, i.e. Section II.1 can also be covered from Appendix C in Gujarati, Porter and Pal (2021), 6th edition.

3. Teachers are advised to use the following textbooks for reference in the Applied Econometrics course in the BA(Hons) Semester batch of 2021-22:

- Asteriou, D and Hall, Stephen G, ***Applied Econometrics***, 3rd Edition, 2015, Palgrave Macmillan.
- G.S. Maddala and Kajari Lahiri, ***Introduction to Econometrics***, 4th Edition, 2012, Wiley.
- Badi H. Baltagi, ***Econometrics***, 5th Edition, 2011, Springer.

These books can be used as reference books for any topic but they are particularly recommended for topics IV and V.

4. The Applied Econometrics course must orient students to do a research project and get hands on experience with appropriate software (GRET/L/Views/ R/Stata/EXCEL etc). This would form part of the Internal Assessment.

The details of the Syllabus, Topic-wise Reading list, recommended text books and Student Assessment summary are attached.

SYLLABUS

- I. Stages in Empirical Econometric Research

- II. The Linear Regression Model: Estimation, Specification and Diagnostic Testing
 - i. The Matrix Approach to Linear Regression Model: The k- variable regression model, Assumptions of the Classical Linear Regression Model, OLS estimation, Variance-Covariance Matrix, Coefficient of Determination R^2 .
 - ii. Review of Functional forms and Qualitative explanatory variable regression models
 - iii. Regression Diagnostics
 - a. Detection of and remedial measures for Multicollinearity, Autocorrelation and Heteroscedasticity.
 - b. Model Selection and Diagnostic Testing
 1. Tests of Specification errors: Detecting the presence of unnecessary variables, omitted variables and incorrect functional form (Ramsey RESET and Lagrange Multiplier Test for Adding Variables)
 2. Errors of measurement: Consequences and remedial measures
 3. Model Selection Criteria: R^2 and Adjusted R^2 criteria, Akaike's Information Criterion and Schwarz's Information Criterion.
 4. Additional topics in modelling (Outliers, Leverage, Influence; Recursive least Squares; Chow's Prediction Failure Test; Missing Data)
 5. Non-normal errors and stochastic regressors

- III. Advanced Topics in Regression Analysis
 - i. Dynamic Econometric Models
 - a. Distributed Lag Models: Nature of lagged phenomena, Estimation using Koyck transformation (The Adaptive Expectations and Partial Adjustment Models)
 - b. Estimation of Autoregressive Models
 - ii. Instrumental Variable Estimation
 - a. Omitted variables in a simple regression model
 - b. Measurement errors

- IV. Panel Data Models and Estimation techniques

The Pooled OLS Regression Model, the Fixed Effect Least Squares Dummy Variable Model, the Fixed Effect within Group Estimator, the Random Effects Model.

- V. Limited Dependent Variable

Logit and Probit Models for Binary Response, Tobit Model

- VI. Introduction to Econometric Software (GRET/ EVIEWS/ R /Stata/ EXCEL: ANY ONE)
- i. Generation of data sets and data transformation; data analysis (Graphs and Plots, Summary Statistics, Correlation Matrix etc.)
 - ii. Running an OLS regression; Testing for Linear Restrictions and Parameter Stability.
 - iii. Regression Diagnostics: Collinearity, Autocorrelation, Heteroscedasticity, Normality of residuals
 - iv. Estimation of Other Linear Models: Weighted Least squares, Cochran-Orcutt/ Hildreth-Lu/ Prais-Winsten etc.
 - v. Model Selection Criteria (AIC, SIC) and Tests (Adding and Omitting Variables, Non Linearities: Squares, Cubes and Logs, Ramsey's RESET test)

Topic-wise reading list

S.No.	TOPIC	REFERENCES FROM RECOMMENDED TEXT BOOKS
I.	Stages in Empirical Econometric Research	<ul style="list-style-type: none"> • Chapter 1, Introduction, Section 1.3: 'Methodology of Econometrics' in Gujarati, Porter and Pal, Basic Econometrics, 6th ed.
II.i.	The Matrix Approach to Linear Regression Model	<ul style="list-style-type: none"> • Appendix-C: 'The Matrix Approach to Linear Regression Model' in Gujarati, Porter and Pal, Basic Econometrics, 6th ed.
II.ii.	Review of Functional forms and Qualitative explanatory variable regression models	<ul style="list-style-type: none"> • Chapter 2 'Functional Forms of Regression Models' • Chapter 3 'Qualitative Explanatory Variables Regression Models in Gujarati, Econometrics by Example.
II.iii.a	Regression Diagnostics: Detection of, and remedial measures for Multicollinearity, Autocorrelation Heteroscedasticity	<ul style="list-style-type: none"> • Chapter 4 'Regression Diagnostic I: Multicollinearity', • Chapter 5 'Regression Diagnostic II: Heteroscedasticity' • Chapter 6 'Regression Diagnostic III: Autocorrelation in Gujarati, Econometrics By Example
II.iii.b	Regression Diagnostics: Model Selection	<ul style="list-style-type: none"> • Chapter 13 'Econometric Modeling: Model Specification and Diagnostic Testing', Section 13.1-13.5 and 13.9-13.12 in Gujarati, Porter and Pal, Basic Econometrics. • Chapter 9.5 'More on Specification and Data issues', Section 9.5 in Wooldridge, Introductory Econometrics. • Chapter 7 'Regression diagnostic IV: model specification errors', Section 7.1-7.8 in Gujarati, Econometrics By Example

III.a.	Advanced Topics in Regression Analysis: Dynamic Econometric Models	<ul style="list-style-type: none"> • <i>Chapter 17 'Dynamic Econometric Models: Autoregressive and Distributed-Lag Models' in Gujarati, Porter and Pal, Basic Econometrics.(except 17.9 and 17.13)</i>
III.b.	Advanced Topics in Regression Analysis: Instrumental Variable Estimation, Simultaneous Equations Model	<ul style="list-style-type: none"> • <i>Chapter 15 'Instrumental Variable Estimation and Two Stage Least Squares', Section 15.1, 15.2 and 15.4 in Wooldridge, Introductory Econometrics.</i> • <i>Chapter 18 'Simultaneous Equation Models' in Gujarati, Porter and Pal, Basic Econometrics.</i>
IV.	Panel Data Models and Estimation Techniques	<ul style="list-style-type: none"> • <i>Chapter 16 'Panel Data Regression Models' in Gujarati, Porter and Pal, Basic Econometrics</i>
V.	Limited Dependent Variable	<ul style="list-style-type: none"> • <i>Chapter 15 'Qualitative Response Regression Models' in Gujarati, Porter and Pal, Basic Econometrics. (except 15.12 and 15.13). Appendix 15A is to be done.</i>
VI.	Introduction to Econometric Software	<ul style="list-style-type: none"> • <i>Chapter 19 'Carrying Out an Empirical Project', in Wooldridge, Econometrics.</i> • <i>Relevant Instruction Manual for the Software</i>

Recommended textbooks

1. D. N. Gujarati, D.C. Porter and Manoranjan Pal, Basic Econometrics, 6th edition, McGraw Hill, 2021 Indian edition.
2. Damodar Gujarati, Econometrics by Example, 2nd edition, Palgrave Macmillan, 2014.
3. Jeffrey M. Wooldridge, Introduction to Econometrics: A Modern Approach, 5th Edition, Cengage Learning, 2014.

Student Assessment Summary

Students will have to pass the end-semester exam and the total of the internal assessment and end-semester exam as per university rules to clear the paper.

The end-semester final examination will be of 75 marks. The question paper will consist of seven questions of 15 marks each from Topics I, II, III, IV and V only. Students will have to answer any five questions.

The software skills of the students will be tested by the teachers during internal assessment and not in the end-semester final exam. The paper setting committee should take a note of this.

Internal assessment will be of 25 marks, divided further as follows:

1. Attendance: 5 marks
2. Class Test/ Assignment: 10 marks
3. Empirical project using the econometric software learnt: 10 marks. (Projects can be done in groups of 2 or 3)

Note:

- In view of the pandemic the criteria for grading may be as per the university norms.
- Applied Econometrics paper should be attempted by the students on the first day of electives as it is decided alphabetically.