

|  |   |
|--|---|
| <b>Subject Code</b>                            | AF6003  |
| <b>Subject Title</b>                           | Econometric Methods   |
| <b>Credit Value</b>                            | 3   |
| <b>Level</b>                                   | 6   |
| <b>Normal Duration</b>                         | One semester  |
| <b>Pre-requisite / Co-requisite/ Exclusion</b> | Nil   |
| <b>Objectives</b>                              | <p>The basic objectives of this subject are the following:</p> <ol style="list-style-type: none"> <li>a. To help students understand the general theoretical principles of econometrics and its applications.</li> <li>b. To help research students understand specific econometric concepts, techniques and problems in the readings of other course work and their research</li> <li>c. To handle data and make sound econometric inferences in their own research</li> </ol>   |
| <b>Intended Learning Outcomes</b>              | <p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> <li>a. Understand econometric concepts, techniques and applications used in the course work involved in empirical research</li> <li>b. Identify and handle major econometric problems in empirical research</li> <li>c. Apply econometric techniques appropriately to their own research at the level of publishing their research work in decent journals.</li> </ol>  |
| <b>Subject Synopsis/ Indicative Syllabus</b>   | <p><b>Tentative Topics</b> (Subject to revision)</p> <ol style="list-style-type: none"> <li>1. Review of basic concepts and ideas in econometrics <ol style="list-style-type: none"> <li>A. Read appendices A, B and C of your textbook.</li> <li>B. Read lecture note on econometrics review.</li> </ol> </li> <li>2. Linear Regression Model and Least Square (Chapter 2 &amp; 3) <ol style="list-style-type: none"> <li>A. Linear regression model: introduction, problems, and assumptions</li> <li>B. Least squares regression; Partitioned regression and partial regression; Partial regression and partial correlation coefficients; Goodness of fit and the analysis of variance.</li> </ol> </li> <li>3. The Least Squares Estimator: Statistical Properties (Chapter 4 &amp; Appendix D) <ol style="list-style-type: none"> <li>A. Motivating least squares: Population orthogonality conditions; Minimum MSE predictor; Minimum variance linear unbiased estimation.</li> <li>B. Finite sample properties of least squares: Unbiased estimation; Variance of the least squares estimator; Gauss-Markov Theorem; Estimating variance of the least squares estimator; Finite sample properties with normality.</li> <li>C. Probability convergence concept.</li> <li>D. Large sample properties of the least squares estimator: Consistency; Asymptotic normality; Asymptotic efficiency.</li> <li>E. Interval estimation.</li> </ol> </li> </ol> |

4. Hypothesis Tests and Model Selection (Chapter 5)
  - A. Hypothesis testing methodology: T-test on a specific parameter; Nested models; Neyman-Pearson methodology; Size, power, and consistency of a test; The expression of restrictions in hypothesis.
  - B. Wald test based on the distance measure.
  - C. Testing restrictions using the fit of the regression.
  - D. Testing nonlinear restrictions.
5. Endogeneity and Instrumental Variable Estimation (Chapter 8)
  - A. Introduction and assumptions of extended model.
  - B. Estimation: Least squares; The instrumental variables estimator; Motivation of instrumental variables estimator; Two stage least squares.
  - C. Specification tests: The Hausman and Wu specification tests; A test for overidentification.
  - D. Measurement error: Least squares attenuation; IV estimation.
6. The Generalized Regression Model and Heteroscedasticity (Chapter 9)
  - A. Introduction on nonspherical disturbances.
  - B. Least squares estimator: Finite sample properties; Asymptotic properties; Robust estimation of asymptotic covariance matrices.
  - C. Efficient estimation by generalized least squares: Generalized least squares (GLS); Feasible generalized least squares (FGLS).
  - D. Heteroscedasticity: OLS estimation; Estimating appropriate covariance matrix for OLS estimator.
  - E. Testing for Heteroscedasticity: Whites' general test; Breusch-Pagan test.
7. Panel Data Analysis
  - A. Panel data model: General modeling framework; Model structure; Balanced and unbalanced panels; Well-behaved panel data.
  - B. Pooled regression model: Least squares estimation; Robust covariance matrix estimation of least squares estimation; Clustering and stratification; Robust estimation using group means; Estimation with first differences; Within- and between-groups estimators.
  - C. Fixed effects model: Least squares estimation; Small T asymptotics; Testing the significance of the group effects; Fixed time and group effects.
  - D. Random effects: Least squares estimation; Generalized least squares; Feasible generalized least squares when  $\Sigma$  is unknown; Breusch and Pagan test for random effects; Hausman's specification test for the random effects model; Mundlak's model.
  - E. Nonspherical disturbances and robust covariance estimation: Robust estimation of the fixed effects model; Heteroscedasticity in the random effects model; Cluster robust covariance matrices for fixed and random effects estimators.
  - F. Endogeneity: Hausman and Taylor's instrumental variables estimator; A consistent estimation of dynamic panel data models - Anderson and Hsiao's IV estimator; Efficient estimation of dynamic panel data models - the Arellano/Bond estimators.

|  |   |
|--|---|
|  | <p>8. Maximum Likelihood Estimation</p> <p>A. The likelihood function and identification of the parameters.</p> <p>B. Efficient estimation: the principle of maximum likelihood.</p> <p>C. Properties of maximum likelihood estimators: Regularity conditions; Properties of regular densities; Likelihood equation; Asymptotic properties of the maximum likelihood estimator – consistency, asymptotic normality, asymptotic efficiency, and invariance; Estimating the asymptotic variance.</p> <p>D. Hypothesis and specification tests and fit measures: the likelihood ratio test; The Wald test; The Lagrange multiplier test;</p> <p>E. Panel data model: General modeling framework; Model structure; Balanced and unbalanced panels; Well-behaved panel data.</p> <p>F. Pooled regression model: least squares estimation; Robust covariance matrix estimation of least squares estimation; Clustering and stratification; Robust estimation using group means; Estimation with first differences; Within- and between-groups estimators.</p> |
|--|---|

|   |  |
|---|--|
| <p><b>Teaching/Learning Methodology</b></p> | <p>Econometrics concepts and techniques are introduced and discussed through lecturing. Students are required to actively participate in class discussion, test and practice.</p> <p>Homework assignments and term paper/presentation are used to help the in-depth understanding of the lecture notes. Final exam is designed to give students a chance to review the course completely and to evaluate their performances.</p> |
|---|--|

| <p><b>Assessment Methods in Alignment with Outcomes</b></p> | <table border="1" data-bbox="438 1108 1332 1680"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td><b>Continuous Assessment</b></td> <td><b>100%</b></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Term paper and presentation</td> <td>50%</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Final Test</td> <td>50%</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Total</b></td> <td><b>100 %</b></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>Given many concepts and techniques in econometrics, class participation and class tests are used to help and check students’ understanding. This requires students to review lecture notes and do their homework assignments before coming to class.</p> <p>The term paper and presentation are designed to assess to what extent a student can apply the econometrics concepts and techniques to a research project properly and how to conduct empirical research.</p> | Specific assessment methods/tasks | % weighting | Intended subject learning outcomes to be assessed (Please tick as appropriate) |  |  |  |  |  | a | b | c |  |  |  | <b>Continuous Assessment</b> | <b>100%</b> |  |  |  |  |  |  | Term paper and presentation | 50% | √ | √ | √ |  |  |  | Final Test | 50% | √ | √ | √ |  |  |  | <b>Total</b> | <b>100 %</b> |  |  |  |  |  |  |
|---|--|-----------------------------------|-------------|--|--|--|--|--|--|---|---|---|--|--|--|------------------------------|-------------|--|--|--|--|--|--|-----------------------------|-----|---|---|---|--|--|--|------------|-----|---|---|---|--|--|--|--------------|--------------|--|--|--|--|--|--|
| Specific assessment methods/tasks                           | % weighting  |                                   |             | Intended subject learning outcomes to be assessed (Please tick as appropriate) |  |  |  |  |  |   |   |   |  |  |  |                              |             |  |  |  |  |  |  |                             |     |   |   |   |  |  |  |            |     |   |   |   |  |  |  |              |              |  |  |  |  |  |  |
|   |  | a                                 | b           | c  |  |  |  |  |  |   |   |   |  |  |  |                              |             |  |  |  |  |  |  |                             |     |   |   |   |  |  |  |            |     |   |   |   |  |  |  |              |              |  |  |  |  |  |  |
| <b>Continuous Assessment</b>                                | <b>100%</b>  |                                   |             |  |  |  |  |  |  |   |   |   |  |  |  |                              |             |  |  |  |  |  |  |                             |     |   |   |   |  |  |  |            |     |   |   |   |  |  |  |              |              |  |  |  |  |  |  |
| Term paper and presentation                                 | 50%  | √                                 | √           | √  |  |  |  |  |  |   |   |   |  |  |  |                              |             |  |  |  |  |  |  |                             |     |   |   |   |  |  |  |            |     |   |   |   |  |  |  |              |              |  |  |  |  |  |  |
| Final Test  | 50%  | √                                 | √           | √  |  |  |  |  |  |   |   |   |  |  |  |                              |             |  |  |  |  |  |  |                             |     |   |   |   |  |  |  |            |     |   |   |   |  |  |  |              |              |  |  |  |  |  |  |
| <b>Total</b>  | <b>100 %</b>   |                                   |             |  |  |  |  |  |  |   |   |   |  |  |  |                              |             |  |  |  |  |  |  |                             |     |   |   |   |  |  |  |            |     |   |   |   |  |  |  |              |              |  |  |  |  |  |  |

|                                      |  |         |
|--------------------------------------|--|---------|
|                                      | <p>Final examination is designed to give students a chance to review and summarize what they have learned from the course, and is one of the most important ways to assess a student's performance in this course.</p> <p>To pass this subject, students are required to obtain Grade D or above in BOTH the Continuous Assessment and Final Exam components.</p>  |         |
| <b>Student Study Effort Expected</b> | Class contact:   |         |
|                                      | · Lecture/workshop   | 39Hrs.  |
|                                      | · Project presentation   | 2Hrs.   |
|                                      | Other student study effort:  |         |
|                                      | · Term paper   | 39Hrs.  |
|                                      | · Review and homework  | 39Hrs.  |
|                                      | Total student study effort   | 119Hrs. |
| <b>Reading List and References</b>   | <p><b>Textbook</b><br/>Greene W. H., <i>Econometric Analysis</i>, 7<sup>th</sup> ed., Pearson, 2012</p> <p><b>Reference Books:</b><br/>Wooldridge, Jeffrey M., <i>Introductory Econometrics: A Modern Approach</i>, 4<sup>rd</sup> ed., South-Western, 2009. [If you feel the textbook is difficult to read, please read this reference book first.]<br/>Joshua D. Angrist &amp; Jorn-Stefeen Pischke, <i>Mastering Econometrics</i>, Princeton University Press, 2015</p> <p>There is an extensive matrix algebra book for econometricians (for your reference only): Harville, D.A., <i>Matrix Algebra from a Statistician's Perspective</i>, Springer, 1997. For this course, Appendices A and B of your textbook are much relevant. You can also read Appendices A-E of Wooldridge's book "<i>Introductory Econometrics</i>." (See the reference book above)</p> <p>There are a large number of books/documents on SAS and Stata. I will point to some that may be helpful for this course as well as for your future research. The following two books may be worthwhile to buy:</p> <ol style="list-style-type: none"> <li>1. Lora D. Delwiche and Susan J. Slaughter., <i>The Litter SAS Book</i>, 4<sup>th</sup> edition, SAS Publishing.</li> <li>2. Christopher F. Baum., <i>An Introduction to Modern Econometrics Using Stata</i>, Stata Press.</li> </ol> <p>A few <b>suggested</b> papers (for idea and duplication exercises, not mandatory):</p> <ol style="list-style-type: none"> <li>1. Ball, Ray and Philip Brown, 1968, An Empirical Evaluation of Accounting Income Numbers, <i>Journal of Accounting Research</i>.</li> <li>2. Ball, Ryan, Eric Ghysels, and Huan Zhou, 2014, Can We Automate Earnings Forecasts and Beat Analysts? <i>working Paper</i>.</li> <li>3. Bernard, Victor and Jacob Tomas, 1989, Post-Earnings-Announcement Drift: Delayed Price Response or Risk Premium, <i>Journal of Accounting Research</i>.</li> <li>4. Bernard, Victor and Jacob Tomas, 1990, Evidence that Stock Prices Do Not</li> </ol> |         |

Fully Reflect the Implications of Current Earnings for Future Earnings, *Journal of Accounting and Economics*, 13, 305-340.

5. Abarbanell, Jeffery and Victor Bernard, 1992, Tests of Analysts' Overreaction/Underreaction to Earnings Information as an Explanation for Anomalous Stock Price Behavior, *The Journal of Finance*.
6. Bradshaw, Mark T., Michael S. Drake, James N. Myers, and Linda A. Myers, 2012, A-Re-examination of Analysts' Superiority over Time-Series Forecasts of Annual Earnings, *Review of Accounting Studies*.
7. Bradshaw, Mark T. and Richard G. Sloan, 2002, GAAP versus The Street: An Empirical Assessment of Two Alternative Definitions of Earnings, *Journal of Accounting Research*.
8. Basu, MSudipta, Stanimir Markov, and Lakshmanan Shivakumar, 2010, Inflation, earnings forecasts, and post-earnings announcement drift, *Review of Accounting Studies*.
9. Choi, Jung Ho, Alon Kalay, and Gil Sadka, 2012, Earnings News and Aggregate Stock Returns, *working Paper*.
10. Chordia, Tarun and Lakshmanan Shivakumar, 2005, Inflation Illusion and Post- Earnings-Announcement Drift, *Journal of Accounting Research*.
11. Gallo, Lindsey A., Rebecca N. Hann, and Congcong Li, 2013, Aggregate Earnings Surprises, Monetary Policy, and Stock Returns, *working paper*.
12. Gerakos, J. and R. Gramacy, 2013, Regression-based Earnings Forecasts. Working paper.
13. Hribar, Paul and John McInnis, 2012, Investor Sentiment and Analysts' Earnings Forecast Errors, *Management Science*.
14. Hou, Kewei., Mathijs A. van Dijk, and Yinglei Zhang, 2012, The Implied Cost of Capital: A New Approach, *Journal of Accounting and Economics*.
15. Konchitchki, Yaniv and Panos N. Patatoukas, 2014, Accounting Earnings and Gross Domestic Product, *Journal of Accounting and Economics*.
16. Konchitchki, Yaniv, Xiaoxia Lou, Gil Sadka, and Ronnie Sadka, 2013, Expected Earnings and the Post-Earnings-Announcement Drift, *working paper*.
17. Kothari, S.P., Jonathan Lewellen, and Jerold B. Warner, 2006, Stock Returns, Aggregate Earnings Surprises, and Behavior Finance, *Journal of Financial Economics*.
18. Kothari, S.P., Lakshmanan Shivakumar, and Oktay Urcan, 2013, Aggregate Earnings Surprises and Inflation Forecasts, *working paper*.
19. Li, Kevin and Partha S. Mohanram, 2014, Evaluating Cross-Sectional Forecasting Models for Implied Cost of Capital, *Review of Accounting Studies*, forthcoming
20. Livnat, Joshua., and Richard R. Mendenhall, 2006, Comparing the Post-Earnings Announcement Drift for Surprises Calculated from Analyst and Time Series Forecasts, *Journal of Accounting Research*.
21. O'Brien, Patricia, 1988, Analysts' Forecasts as Earnings Expectations, *Journal of Accounting and Economics*.
22. So, Eric C., 2013, A New Approach to Predicting Analyst Forecast Errors: Do Investors Overweight Analyst Forecasts? *Journal of Financial Economics*.