Econometrics for Applied Economics  
ECON 504, Winter 2014  
University of Michigan

Lectures: Monday and Wednesday, 1:00-2:30, 1427 Mason Hall  
Review Sessions: Friday (TBD)  
Course Web Page: https://ctools.umich.edu/portal

Instructor:  
Prof. Mel Stephens  
341 Lorch, 647-5606  
mstep@umich.edu (Please put ECON 504 in subject line)

Office Hours:  Thursdays, 9:15-11:15 and by appointment

GSI: Yiyuan Zhang (yiyuanz@umich.edu), 123 Lorch

GSI Office hours: TBD

(Note: There are multiple choices for the Wooldridge textbook. We will be using the 5th edition for the class. I do not know how compatible it is with the international editions. Just be aware that if you choose to purchase an alternative edition, you will be responsible for the material found in the 5th edition, U.S. version.)

Textbook Website: http://www.cengage.com/highered/

Recommended Book: *A Gentle Introduction to Stata, 2nd Edition*  
Stata Corporation.

Additional Reading Material: See the articles listed at the end of the syllabus

Pre-Requisites: ECON 503 or comparable course; (B or better)

Software: Stata

The Stata software is available in the various computing clusters as well as through virutalsites.umich.edu. If you want to have your own copy of Stata to use on a laptop or at home, you will need to purchase it yourself. If you choose to do so, you should not purchase the Small Stata program since you will not be able to use all of the course datasets with this version.
Grading Policy

The course grade will be determined by performance on
  homework assignments (20% of the grade)
  the midterm exam held on Wednesday, February 26th in class (30%)
  the final exam held on Wednesday, April 30th from 1:30-3:30 as designated by
  Office of Registrar in the final exam schedule (50%)
  (See the Office of the Registrar’s schedule http://ro.umich.edu/exams/winter13.php)

Policy on Collaboration

You may collaborate on homework assignments. Of course, collaboration does not mean simply copying what someone else has done. Each individual must turn in a separate assignment and each individual is responsible for the content of the assignment that she/he turns in.

You may not collaborate on exams.

Policy on Academic Fraud

Anyone found to have cheated on an exam (including but not limited to consulting another student or consulting unauthorized materials – which includes other students’ exams) will fail the course. In addition, the Assistant Dean for Student Academic Affairs will be asked to place you on disciplinary probation.

Policies on Homework Assignments

All assigned work must be either typed or legibly written. Poor spelling, handwriting, grammar, style, etc., will not necessarily count against you. However, if the grader of the assigned work is unable to discern the meaning of your work, your response will be assumed to be wrong. You must show all of your work in order to receive full credit.

The due date for homework assignments are given at the top of each assignment. A tentative list of assignment due dates will be distributed although it is subject to change. Assignments will be due at the beginning of review sessions. Late assignments will not be accepted except under extreme circumstances and with a documented excuse. If a situation arises that necessitates that an assignment be turned in late (as defined here), it is your responsibility to contact the both instructor and the GSI prior to the time that the assignment is due unless you are physically unable to do so.

You are responsible for collecting your returned homework assignments. If your assignment is not returned to you, you must notify the instructor or the GSI within one week of the return date in order to receive credit.
**Policies on Exams**

As with homework assignments, exam answers must be legibly written. Poor spelling, handwriting, grammar, style, etc., will not necessarily count against you. However, if the grader of the exam is unable to discern the meaning of your work, your response will be assumed to be wrong.

**You must show all of your work in order to receive full credit.** Part of showing all work includes clearly identifying which formula(s)/equation(s) you are using to answer the question and why the specific use of the formula(s)/equation(s) is appropriate. Any answers that are not accompanied by sufficient information to determine how the answer was derived will not be awarded full credit.

**Policy on Aids During Exams**

You can use a calculator for the exam. However, you may not use the calculator to store notes, formulas, etc. In particular, you cannot use a graphing calculator. Any such materials will be considered unauthorized and subject to the Policy on Academic Fraud. No other aids may be used.

**Policy on Missed Exams**

All exams must be taken during the days and times listed above. If you do not take an exam you will receive a score of zero for that exam. An exception will be made for excused absences such as a medical emergency provided that appropriate documentation for the absence is provided.

If you do receive an excused absence for the midterm exam, your score on the final exam will be used as your score for the excused midterm exam when computing your course grade. If you receive an excused absence for the final exam, you will need to arrange a make-up exam.

**Students with Disabilities**

If you believe you need an accommodation for a disability, please let me know at your earliest convenience. Some aspects of this course may be modified to facilitate your participation and progress. As soon as you make me aware of your needs, we can work with the Office of Services for Students with Disabilities to help us determine appropriate accommodations. I will treat any information you provide as private and confidential.
Topics

I. Statistical Review
   A. Random Variables; Probability Distributions (JW Appendix B)
   B. Estimators; Confidence Intervals; Hypothesis Testing (JW Appendix C)

II. Simple (Two Variable) Regression
   A. Estimation (JW Chapter 2)
   B. Inference (JW 4.1-4.3)
   C. Asymptotic Properties (JW 5)
   D. Prediction (JW 6.4)

III. Multiple Regression
   A. Estimation (JW 3)
   B. Inference (JW 4)
   C. Functional Form (JW 2.6, 6.1-6.2, Appendix A.3-A.4)
      (Paper by Barron, Berger, and Black, p.235-244)
   D. Dummy Variables (JW 7.1-7.4, 7.6)
      (Paper by Card and Krueger)

IV. Some Assumption Violations
   A. Heteroskedastic error terms (JW 8.1-8.4)
   B. Serially correlated error terms (JW 12.1-12.3, 12.5)
      (Paper by Brown, Gilroy, and Kohen)
      (Paper by Moulton)
   C. Measurement Error and Proxy Variables (JW 9.2-9.3)
      (Paper by Solon)
      (Paper by Neal and Johnson)
   D. Simultaneity (JW 15.1-15.4, 16.1-16.3)
      (Paper by Hamilton)
      (Paper by Evans and Ringel)
      (Paper by Chay and Greenstone)
      (Paper by Stinebrickner and Stinebrickner)

V. Additional Topics
   A. Binary Dependent Variables (JW 7.5, 8.5, 17.1)

Note: Additional papers may be added during the semester.
Papers discussed in class available via the web

1. “Schooling and Labor Market Consequences of School Construction in Indonesia: Evidence from an Unusual Policy Experiment,”
by Esther Duflo

2. “The Medium Run Consequences of Educational Expansion: Evidence from a Large School Construction Program in Indonesia,”
by Esther Duflo
Available at [http://www.nber.org/papers/w8710](http://www.nber.org/papers/w8710)

3. “Do Workers Pay for On-The-Job Training?”
by John M. Barron, Mark C. Berger, and Dan A. Black

by David Card and Alan B. Krueger

by Charles Brown, Curtis Gilroy, Andrew Kohen

6. “An Illustration of a Pitfall in Estimating the Effects of Aggregate Variables on Micro Units,”
By Brent R. Moulton

7. “Intergenerational Income Mobility in the United States,”
by Gary Solon
   by Derek A. Neal and William R. Johnson

   by Barton H. Hamilton
   Available at [http://www3.interscience.wiley.com/cgi-bin/fulltext/85005217/PDFSTART](http://www3.interscience.wiley.com/cgi-bin/fulltext/85005217/PDFSTART)

10. “Can Higher Cigarette Taxes Improve Birth Outcomes?”
    by William N. Evans and Jeanne S. Ringel
    Available at [www.sciencedirect.com](http://www.sciencedirect.com) (Search under the journal title)

11. “The Impact of Air Pollution on Infant Mortality: Evidence from Geographic Variation in Pollution Shocks Induced by a Recession,”
    by Kenneth Y. Chay and Michael Greenstone
    Available at [http://www.nber.org/papers/w7442](http://www.nber.org/papers/w7442)
    (Published: *Quarterly Journal of Economics*, 2003, 118(3): 1121-1167.)

    by Todd R. Stinebrickner and Ralph Stinebrickner
    *The B.E. Journal of Economic Analysis & Policy*: Vol. 8 : Iss. 1 (Frontiers, 2008), Article 14.
    Available at [http://www.bepress.com/bejeap/vol8/iss1/art14](http://www.bepress.com/bejeap/vol8/iss1/art14)
Class Schedule (Subject to Change)

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Wooldridge</th>
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</thead>
<tbody>
<tr>
<td>1/8</td>
<td>Introduction; Statistical Review</td>
<td>Appendix B</td>
</tr>
<tr>
<td>1/13</td>
<td>Statistical Review</td>
<td>Appendices B and C</td>
</tr>
<tr>
<td>1/15</td>
<td>Statistical Review</td>
<td>Appendix C</td>
</tr>
<tr>
<td></td>
<td><strong>II. Simple (Two Variable) Regression</strong></td>
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<tr>
<td>1/20</td>
<td>No Class – MLK Day</td>
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<tr>
<td>1/22</td>
<td>Sample Regression Function; Ordinary Least Squares</td>
<td>Sections 2.1, 2.2</td>
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<tr>
<td>1/27</td>
<td>Properties, Assumptions, Unbiasedness, Variance</td>
<td>Sections 2.3, 2.5, 3.5</td>
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<tr>
<td>1/29</td>
<td>Normality; Hypothesis Testing; Prediction</td>
<td>Sections 4.1-4.3, 6.4</td>
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<tr>
<td>2/3</td>
<td>$R^2$; Asymptotic Properties; Maximum Likelihood; Methods of Moments</td>
<td>Sections 2.3, 5.1-5.3</td>
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<td></td>
<td><strong>III. Multiple Regression</strong></td>
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<tr>
<td>2/5</td>
<td>Assumptions, Unbiasedness, Interpretation, Matrix</td>
<td>Sections 3.2-3.3</td>
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<tr>
<td>2/10</td>
<td>OLS Variance, Misspecification, Gauss-Markov</td>
<td>Sections 3.3-3.4</td>
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<tr>
<td>2/12</td>
<td>Inference, Hypothesis Testing, F-Tests</td>
<td>Sections 4.2, 4.4</td>
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<tr>
<td>2/17</td>
<td>F-tests, Multicollinearity, Asymptotic Properties</td>
<td>Sections 3.4, 4.4, 5.2</td>
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<td>2/19</td>
<td>Through the Origin, Units of Measurement, Logs</td>
<td>Section 2.4, 2.6</td>
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<tr>
<td>2/24</td>
<td>Elasticity, Reciprocal, Higher Order Terms</td>
<td>Section 2.4, 6.2</td>
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<tr>
<td>2/26</td>
<td>Midterm</td>
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<tr>
<td>3/3</td>
<td>No Class - Spring Break</td>
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<tr>
<td>3/5</td>
<td>No Class - Spring Break</td>
<td></td>
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<tr>
<td>3/10</td>
<td>Dummy Variables</td>
<td>Sections 7.1, 7.2</td>
</tr>
<tr>
<td>3/12</td>
<td>Dummy Variables</td>
<td>Sections 7.3, 7.4</td>
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<tr>
<td></td>
<td><strong>IV. Some Assumption Violations</strong></td>
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<tr>
<td>3/17</td>
<td>Difference-in-Differences, Heteroskedasticity</td>
<td>Sections 7.4, 8.1</td>
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<tr>
<td>3/19</td>
<td>Heteroskedasticity: Detection and Correction</td>
<td>Sections 8.2, 8.3</td>
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<tr>
<td>3/24</td>
<td>Generalized Least Squares; Weighted Least Squares</td>
<td>Section 8.4</td>
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<tr>
<td>3/26</td>
<td>Time-Series Data, OLS Assumptions and Properties, Serial Correlation</td>
<td>Sections 10.1, 10.3, 11.2, 12.1</td>
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<tr>
<td>3/31</td>
<td>Detecting Serial Correlation</td>
<td>Section 12.2</td>
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<tr>
<td>4/2</td>
<td>Detecting Serial Correlation, Generalized Least Squares</td>
<td>Section 12.3</td>
</tr>
<tr>
<td>4/7</td>
<td>Newey-West; Correlated Errors in the Cross-Section</td>
<td>Section 12.5</td>
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<tr>
<td>4/9</td>
<td>Measurement Error</td>
<td>Section 9.4</td>
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<tr>
<td>4/14</td>
<td>Proxy Variables</td>
<td>Section 9.2</td>
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<tr>
<td>4/16</td>
<td>Instrumental Variables and Two Stage Least Squares</td>
<td>Chapter 15</td>
</tr>
<tr>
<td>4/21</td>
<td>Binary Dependent Variables</td>
<td>Sections 7.5, 8.5, 17.1</td>
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## Tentative Schedule of Assignment Due Dates

<table>
<thead>
<tr>
<th>Assignment #</th>
<th>Tentative Date Due*</th>
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<tbody>
<tr>
<td>1</td>
<td>January 24, 2014</td>
</tr>
<tr>
<td>2</td>
<td>February 7, 2014</td>
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<tr>
<td>3</td>
<td>February 19, 2014 (In Lecture!)</td>
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<tr>
<td>4</td>
<td>March 14, 2014</td>
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<tr>
<td>5</td>
<td>March 21, 2014</td>
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<tr>
<td>6</td>
<td>April 4, 2014</td>
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<tr>
<td>7</td>
<td>April 11, 2014</td>
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<tr>
<td>8</td>
<td>April 18, 2014</td>
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</tbody>
</table>

*Note: The exact due date will be written at the top of each assignment. The date shown on the assignment is date that the assignment will be due.