SYLLABUS

EKO 2122 – MICROECONOMETRICS

Prerequisite: EKO2122 >= D

(Econometrics I >= D)

Credit Hours: 3

INSTRUCTOR

Name: Gumilang Aryo Sahadewo

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Office Hours for consultancy: by appointment

Class Meetings: TBA

TEACHING ASSISTANTS

Name: Data Avicenna

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Tutorials: TBA

COURSE DESCRIPTION

Microeconometrics is designed to train students to be professional economists and analysts. Students will learn research design and advanced econometric methods for impact evaluation such as difference-in-differences model, instrumental variable, regression discontinuity design, advanced panel data analyses, and matching methods. Students are going to learn how to read formulas and equations to understand various econometric models. Students will review established research article in the relevant literature. More importantly, students are going to learn how to apply appropriate econometric models for different cases.

Students must complete all online lectures and attend virtual tutorials. Students need to independently spend time to learn and use a statistical software during this course. The benefits of learning and mastering a statistical software extend beyond your undergraduate years. The instructor recommends STATA or R, two leading statistical software in the industry. Students are going to learn how to use STATA basic commands and syntaxes for each lecture topic. Students should independently learn how to clean data, calculate simple statistics, create communicative graphics, and conduct regression analyses.

Students are going to read journal articles from well-known economists or econometricians, and to replicate the econometric analyses. Conducting and completing a replication analysis gives students confidence to become a professional economist.

The instructor facilitates a two-way communication during each lecture. Students can state their opinions or ask questions directly to the instructor when they do not understand the materials or detailed derivations in the lecture. Otherwise, the instructors assume that students understand the materials or detailed derivations. Every lecture is opened for discussions. Students are expected to prepare themselves before attending the lectures. A similar environment is also applied in lab and tutorial sessions, where students can communicate intensively with their TA.

The course is quite technical and rigorous. You are expected to attend all lectures and tutorials, complete problem sets, and review relevant book chapters before each meeting. You must have a self-discipline to complete this course. Despite these challenges, the values of mastering the topics extend beyond your undergraduate years. The instructor encourages students to study in a group of at most two or three students. Each student should review the materials independently before taking turn to explain important concepts to their peers in the group. A student understands a particular concept if she can explain the concept to her peers.

COURSE OBJECTIVES

Upon completion of the course students are expected to be able to:

1. Identify an appropriate econometric model to estimate a causal relationship between an outcome variable and explanatory variable of interest. **(CO.1)**
2. Conduct an independent research project using econometrics method **(CO.2)**
3. Use a statistical or econometric software to manage data, clean data, and estimate an econometric model. **(CO.3)**
4. Present a research project that utilizes econometric analysis **(CO.4)**

COURSE MATERIALS

Lecture Notes:

The lecture notes are a combination of slides and in-class notes. Students are responsible to review the lecture notes before each lecture. Students should see the prescribed or the recommended textbooks if they need further explanations on specific concepts.

Prescribed textbook:

Joshua Angrist and Jorn-Steffen Pischke, 2015, *Mastering Metrics: The Path from Cause to Effects*. **(AP)**

Jeffrey M. Wooldridge, 2016, *Introductory Econometrics: A Modern Approach*, 6th Edition. **(JW)**

Paul Gertler, Sebastian Martinez, Patrick Premand, Laura Rawlings, Christel Vermeersch, 2012, Impact evaluation in practice. **(GM)**

Khandker, S.R., G.B. Koolwal, and H.A. Samad, (2010). *Handbook on Impact Evaluation: Quantitative Methods and Practices*, IBRD/World Bank, Washington DC. **(KS)**

Supplementary Textbooks:

Colin Cameron and Pravin Trivedi, 2010, *Microeconometrics using Stata*. **(CT)**

STUDENT RESPONSIBILITIES

1. **Online Meetings through eLOK and WebEx Team.** Online-Meeting will be used by the instructor to confirm student's understanding of the underlying concepts. Students should read the assigned chapters and journal articles before each meeting. Students are expected to attend all scheduled online meetings. Absence from class meetings shall not exceed 25%. Students who exceed the 25% limit without the excuses acceptable to and approved by the FEB rules and regulations shall not be allowed to take the final exam.

2. **Exams.** There will be a mid-term exam and a **comprehensive** final exam. Students will **not** be given an access to any textbooks and notes during the exams. Each student must only put **student number** in the exam papers. Exams will cover materials from the lectures, problem sets, and tutorials. Some of the exam questions will be quite technical so I expect students to fully understand the concepts of each material. Make-up exams will not be administered unless justified by a doctor's note from the Gadjah Mada Medical Center (GMC).

3. **Problem Sets.** I will also hand out problem sets through eLOK, and the problem sets serve as practices for the exams. I encourage students to first work on the problem sets on their own and then to discuss the solutions with a small group of students. Problem sets are **due before the start of each class** and will be returned to students during tutorials. Problem sets will be graded lightly however late submissions will not be accepcted, unless accompanied by a doctor's note from the GMC.

4. **Tutorials.** Students are **required** to attend tutorials held by the class' teaching assistant (TA). The objective of the tutorials is twofolds. First, the tutorials discuss problem sets given in the preceeding weeks. Second, students will further learn the software STATA during the tutorials. Students will also get a hand-on approach of using STATA for regression analysis. Students are encouraged to install STATA on their PC or MAC. Students can also get an access to STATA in the FEB Computer Lab, 3rd Floor, South Wing.

5. **Quizzes.** I will hold online quizzes. Students will work on these quizzes individually. The quiz include all materials taught preceeding the quiz. These quizzes are incentives for you to read the book chapter before each meeting and pay attention to the course.

6. **Individual Projects**. Individual assignment is in the form of:

   o Replication of international economics journals using the econometrics methods that is covered in the Syllabus, or

   o students may also start an individual project using the econometrics methods covered in the class.

   For replication, students choose one published paper to be replicated based on their own interest and proposed selected topic should be submitted by week 8. The final paper is submitted one week after the final exam and should be between 8-10 pages excluding references. The paper should include introduction, methods, results, and discussion sections. Students need to consult the journal that they choose to replicate and the plan of the replication to the lecturers.

ACADEMIC INTEGRITY

Academic integrity forms a fundamental bond of trust between colleagues, peers, lecturers, and students, and it underlies all genuine learning. There is **no tolerance** for plagiarism or academic dishonesty in any form, including, but not limited to, viewing the exams of others, sharing answers with others, using books or notes while taking the exam, copying answers or papers, or passing off someone else's work as one's own. **A FAILURE OF AN ENTIRE COURSE (a grade of "E")**.

The Department of Economics FEB UGM does not tolerate academic dishonesty. All violation will be recorded in the FEB systems. All of assignments and homework (if any) must be submitted both softcopy and hardcopy, unless being asked differently. The softcopy will be checked using TURNITIN or AiMOS (anti-plagiarism software). Ensure that your work has been check to AiMOS by login to https://aimos.ugm.ac.id/user-management/auth/login prior to submission. Please refer to https://paleffi.feb.ugm.ac.id/images/test/01-160801080151.pdf for anti-plagiarism guidelines.

For the first offense, a student who violates the academic integrity will receive a zero point for the assignment (i.e. homework, quiz or exam). For the second offense, the student will receive a grade of "E" in the course where the student commits the second. For the third offense, the Department will recommend that the student be dismissed from the University.

TEACHING METHODS

To achieve the course and learning objectives, the instructor will take an active role in the online class. The instructor will combine discussions about theory and hands-on practices with an econometric package. Problem sets are designed to improve students' understanding on the theories and practices. Therefore, students should work independently first before discussing the answers with their colleagues. Tutorial sessions are designed to complement each meeting and they are obligatory for every students.

GRADING

Your grade will be determined based on your total score on the following items:

1. Mid Exam   (30)%
2. Final Exam   (30)%
3. Individual project   (20)%
4. Quizzes   (10)%
5. Problem Sets   (10)%

Materials

Meeting	Topic	Delivery	Reference
1	Syllabus Review of OLS Assumptions • Heteroscedasticity • Zero Conditional Mean Assumption • Endogeneity: omitted variable bias and reverse causality • Measurement errors in the explanatory variables • Stata Paper • Angrist, Joshua D., and Jörn-Steffen Pischke. 2010. "The Credibility Revolution in Empirical Economics: How Better Research Design Is Taking the Con out of Econometrics." *Journal of Economic Perspectives*, 24 (2): 3-30. Online Quiz 1 Tutorial 1 Problem Set 1	Online materials through eLOK	JW Ch. 2 JW Ch. 3 JW Ch. 4
2	Basic Issues of Impact Evaluation • Why evaluate • Counterfactuals • Potential outcome framework • Treatment Effect and Average Treatment Effect • OLS regression using pre-post method • OLS regression using simple difference method • Randomized evaluation • Stata Online Quiz 2 Tutorial 2	Online materials through eLOK	GM Ch.1 GM Ch.3

	Problem Set 2			
3	Randomized Evaluation • Why randomize • How to randomize • Threats • Generalizability • Muralidharan, K. 2016. Field Experiments in Education in Developing Countries. In A. V. Banerjee and E. Duflo (Eds.), *Handbook of Field Experiment, forthcoming* Online Quiz 3 Tutorial 3 Problem Set 3	Online materials through eLOK	GM Ch. 4
4	Difference-in-differences (DID) model • Pooled cross section analysis • Case study: Kiel and McClain (1995) • Difference-in-differences estimator • DID versus pre-post model • DID versus simple difference model • Parallel trend assumptions • Correlated standard errors • Stata Online Quiz 4 Tutorial 4 Problem Set 4	Online materials through eLOK	JW Ch. 13 AP Ch. 5 GM Ch. 6
5	Review of Research Papers using Difference-in-Differences Model • Goldstein, et al. 2013. "The Effect of Absenteeism and Clinic Protocol on Health Outcomes: The Case of Mother-to-Child Transmission of HIV in Kenya." *American Economic Journal: Applied Economics*, 5(2), 58-85.	Online materials through eLOK and WebEx Team	

	• Ferrara, et al. 2012. "Soap Operas and Fertility: Evidence from Brazil." *American Economic Journal: Applied Economics*, 4(4), pp 1-31. http://www.aeaweb.org.ezp-prod1.hul.harvard.edu/atypon.php?return_to=/doi/pdfplus/10.1257/app.4.4.1 • Kiel, K. A., and K. T. McClain (1995), "House Prices during Siting Decision Stages: The Case of an Incinerator from Rumor through Operation," Journal of Environmental Eco- nomics and Management 28, 241–255. • Meyer, B. D., W. K. Viscusi, and D. L. Durbin (1995), "Workers' Compensation and Injury Duration: Evidence from a Natural Experiment," American Economic Review 85, 322–340. Empirical Exercise using Difference-in-Differences Model		
6	Advanced Panel Data Analysis • Panel data modeling • Fixed-effect model • Random-effect model • Fixed-effect or random-effect models • Stata Online Quiz 5 Tutorial 5 Problem Set 5	Online materials through eLOK	JW Ch. 14 KS Ch. 5
7	Research proposal presentation Groups are randomly selected to present their research proposal	Students' recorded presentations in YouTube	
Mid Exam			
8	Review of Research Papers using Advanced Panel Data Analysis	Online materials through	

	• Deming, D. 2009. "Early Childhood Intervention and Life-Cycle Skill Development: Evidence from Head Start." *American Economic Journal: Applied Economics.* URL: https://www.aeaweb.org/articles?id=10.1257/app.1.3.111 • Vella, F., and M. Verbeek (1998), "Whose Wages Do Unions Raise? A Dynamic Model of Unionism and Wage Rate De- termination for Young Men," *Journal of Applied Econometrics* 13, 163–183. URL: https://doi.org/10.1002/(SICI)1099-1255(199803/04)13:2%3C163::AID-JAE460%3E3.0.CO;2-Y • Papke, L. E. (1994), "Tax Policy and Urban Development: Evi- dence from the Indiana Enterprise Zone Program," Journal of Public Economics 54, 37–49. • Cornwell, C., and W. N. Trumbull (1994), "Estimating the Economic Model of Crime Using Panel Data," Review of Eco- nomics and Statistics 76, 360–366. • Vella, F., and M. Verbeek (1998), "Whose Wages Do Unions Raise? A Dynamic Model of Unionism and Wage Rate De- termination for Young Men," Journal of Applied Econometrics 13, 163–183. Empirical Exercise using Advanced Panel Data Analysis	eLOK and WebEx Team	
9	Instrumental Variable (IV): Homogenous Effect • Review of Endogeneity: omitted variable bias, reverse causality, measurement errors • IV estimator • Relevance and exclusion assumptions • IV estimation using multiple regression model • TSLS • Testing for endogeneity • First-stage test • Overidentification test Online Quiz 6 Tutorial 6 Problem Set 6	Online materials through eLOK	JW Ch. 15 AP Ch. 3

10	Review of Research Papers using Instrumental Variable Method • Angrist, Joshua and Alan Krueger. 1991. "Does Compulsory Schooling Attendance Affect Schooling and Earnings?" *Quarterly Journal of Economics*, 106(91), pp. 976–1014. URL: http://www.jstor.org.ezp-prod1.hul.harvard.edu/stable/2937954 • Angrist, J. D. (1990), "Lifetime Earnings and the Vietnam Era Draft Lottery: Evidence from Social Security Ad- ministrative Records," American Economic Review 80, 313–336. • Card, D. (1995), "Using Geographic Variation in College Proximity to Estimate the Return to Schooling," in Aspects of Labour Market Behavior: Essays in Honour of John Vanderkamp, ed. L. N. Christophides, E. K. Grant, and R. Swidinsky, 201–222. Toronto: University of Toronto Press • Angrist, Joshua and William Evans. 1998. "Children and Their Parents Labor Supply: Evidence from Exogenous Variation in Family Size." *American Economic Review*, 88, 450–77. URL: http://www.jstor.org.ezp-prod1.hul.harvard.edu/stable/116844 Empirical Exercise using Instrumental Variable Method	Online materials through eLOK and WebEx Team	
11	Sharp Regression Discontinuity Design • Problem of counterfactuals • Impact evaluation using RDD • RDD assumptions • Graphical analysis • Conditions for valid inference • Estimation Method Online Quiz 7 Tutorial 7 Problem Set 7	Online materials through eLOK	AP Ch. 4
12	Review of Research Papers using Regression Discontinuity Design • Angrist, Joshua and Victor Lavy. 1999. "Using Maimonides Rule to Estimate the Effect of Class Size on Scholastic Achievement." *Quarterly Journal of Economics*,	Online materials through	

	114(2), pp. 533–75. URL: http://www.jstor.org.ezp-prod1.hul.harvard.edu/stable/pdfplus/2587016.pdf?acceptTC=true • Page et al. 2019. "More than Dollars for Scholars: The Impact of the Dell Scholars Program on College Access, Persistence and Degree Attainment." *Journal of Human Resource.* URL: http://jhr.uwpress.org/content/early/2017/12/01/jhr.54.3.0516.7935R1.abstract • Anderson, Michael et al. 2012. "The Effect of Health Insurance Coverage on the Use of Medical Services." *American Economic Journal: Economic Policy*, 4(1), 1-27. URL: http://www.aeaweb.org.ezp-prod1.hul.harvard.edu/atypon.php?return_to=/doi/pdfplus/10.1257/pol.4.1.1 Empirical Exercise using Sharp Regression Discontinuity Design Sharp RDD using simulated dataset	eLOK and WebEx Team	
13	Matching Methods • Review of Potential Outcome Framework • Matching Method Assumptions: Selection on Observables and Common Support • Problem of Matching • Propensity Score Matching • Steps to conduct PSM • ATT • Combine methods of PSM and DiD Review of Research Papers using Matching Methods • Page et al. 2019. "More than Dollars for Scholars: The Impact of the Dell Scholars Program on College Access, Persistence and Degree Attainment." *Journal of Human Resource.* URL: http://jhr.uwpress.org/content/early/2017/12/01/jhr.54.3.0516.7935R1.abstract • Caliendo and Kopeinig. 2008. "Some Practical Guidance in the Implementation of Propensity Score Matching". *Journal of Economic Surveys.* URL: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-6419.2007.00527.x	Online materials through eLOK	GM 7

	• Van de Walle, Dominique and Ren Mu. 2007. "Fungibility and the Flypaper Effect of Project Aid: Microevidence for Vietnam." *Journal of Development Economics*. 84: 667-685. URL: https://www.sciencedirect.com/science/article/pii/S0304387806002069 Empirical Exercise using Matching Methods Online Quiz 8 Tutorial 8 Problem Set 8		
14	Microproject final presentation Groups are randomly selected to present their research projects	Students' recorded presentations in YouTube	
Final Exam			