

*Department of Maternal and Child Health*  
**MHCH 862: MCH Program Evaluation**  
**Spring 2017**

Time: Mondays 1:25 – 4:05 pm. Class Location: 2303 McGavran-Greenberg, PH

<b>Professor:</b> Gustavo Angeles	<b>Teaching Assistant:</b> Smisha Kaysin
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<b>Office hours:</b> By appointment (& Mo 12-1pm)	<b>Office hours:</b> By appointment

**Prerequisites:**

It is assumed that students are familiar with descriptive and inferential statistics as well as multiple regression analysis. Students without these prerequisites should contact the instructor to determine their eligibility to take this course. Knowledge of Stata or similar statistical package required.

**Course Description:**

This course is an analytical skills seminar focusing on the theory and practice of health program impact evaluation. The course main goal is to increase students' ability to design and conduct an evaluation of a program's impact on health outcomes.

**Course Objectives:**

- Understand the basic concepts of program impact evaluation;
- Understand the key impact evaluation questions and the main issues involved for answering those questions in a credible way;
- Understand selectivity and other common problems encountered when evaluating program impact that threaten the validity of the answer to the impact evaluation question;
- Understand the main experimental and non-experimental evaluation/research designs available to evaluate the impact of a program;
- Understand and appropriately use different estimation strategies and techniques for answering the impact evaluation questions;
- Interpret results appropriately and examine their programmatic implications;
- Examine the challenges involved in implementing program impact evaluations in developing countries.

This course is designed to develop the students' skills necessary to examine data to assess the impact of a health program on a particular population. Even though a good part of the course will be spent reviewing evaluation designs and the application of statistical techniques for evaluating impact, this is not a course in statistics, this is a course on health program evaluation. Therefore, the interest is in understanding the main issues involved for answering evaluation questions of concern for policy makers, program administrators, and other program stakeholders: Does a program have an impact on a specific outcome? If the answer is yes, by how much? Does the program have different impacts on different population groups? Do different program components have different impacts? Does the program have an impact on non-participant groups? What are the causal pathways through which the program has an impact? Why and how does the program have an impact?

We would like to answer those and other related questions in a way that is credible, therefore, we will review the main threats to the validity of our estimates of program impact, and we will review the main experimental and non-experimental designs and methods used by program evaluators to answer the questions. We will review the conditions under which those methods are applicable and provide credible estimates of program impact. Particular attention is given to the problem of selectivity, among others, that threaten the validity of results. Attention will be given to determine criteria for selecting the appropriate analytical procedures given the characteristics of the health outcome of interest, the program, and the available data. Of course, students should know how to apply the chosen analytical procedure. We will also examine the appropriate interpretation of results in the context of evaluating a program.

Most applications presented in the course are drawn from impact evaluations of health and social programs in Africa, Asia, and Latin America. Students will examine MCH and population data typically available in developing countries.

This course also seeks to develop Stata competency via data analysis.

### **Course Format:**

This course is comprised of a combination of lectures from the instructor and invited speakers, homework, student presentations, and preparation of an impact evaluation protocol.

Active student participation is very important.

We will use Stata 14.0 to illustrate the program evaluation techniques and carry out homework exercises.

### **Readings and Materials:**

The course is mainly based on class notes. We will make lecture materials available in the course website before each session or will distribute them in class. Different texts and papers will be used during the course. Selected readings and assignments will be posted to the course site.

#### *Texts*

##### *Required:*

- Gertler PJ, Martinez S, Premand P, Rawlings LB, & Vermeersch, CMJ. (2011). Impact Evaluation in Practice. Washington, DC: World Bank.
  - PDF available free online from:  
<http://documents.worldbank.org/curated/en/2011/01/13871146/impact-evaluation-practice>
- Khandker SR, Koolwal GB, & Samad HA. (2010). Handbook on Impact Evaluation: Quantitative Methods and Practices. Washington, DC: World Bank.
  - PDF available free online from:  
<http://documents.worldbank.org/curated/en/2009/01/11487317/handbook-impact-evaluation-quantitative-methods-practices>
- Lance P, Guilkey D, Hattori A, Angeles G. (2014). How Do We Know if a Program Made a Difference? A Guide to Statistical Methods for Program Impact Evaluation. Chapel Hill, NC: MEASURE Evaluation,
  - PDF available free online from:

<https://www.measureevaluation.org/resources/publications/ms-14-87-en>

- Class notes
- Assigned supplemental readings

*Recommended:*

- Rossi PH, Lipsey MW, & Freeman HE. (2004). Evaluation: A Systematic Approach. 7<sup>th</sup> ed. Thousand Oaks, CA : Sage
- Bertrand J, Magnani R, & Rutenberg N. (1996). Evaluating Family Planning Programs with Adaptations for Reproductive Health. The EVALUATION Project Manual. Document: ms-96-03-en. Available online from the MEASURE Evaluation website (good resource for M&E): <https://www.measureevaluation.org/resources/publications/ms-96-03>
- Wooldridge JM. (2008). Introductory Econometrics: A Modern Approach. 4<sup>th</sup> edition. Thomson South-Western.
- Duflo E, Glennerster R, & Kremer M. Using Randomization in Development Economics Research: A Toolkit. December 2006. Available at <http://www.nber.org/papers/t0333>
- Angrist, Joshua, Jorn-Steffen Pischke. (2008). Mostly Harmless Econometrics. Princeton University Press.
- Angrist, Joshua, Jorn-Steffen Pischke. (2014). Mastering ‘Metrics: The Path from cause to Effect. Princeton University Press.
- See “Recommended Web Sites and Readings” handout.

*Stata*

This course will use Stata 14.0. It is recommended that you use the SE version (Special Edition) because it handles large data files better.

For learning Stata: Review the Stata 14.0 “Getting Started” and “User’s Guide” manuals. Become familiar with the basic syntax, functions and expressions, getting data into Stata, do and log files, and basic data management and summary statistics commands. You can find the manuals selecting **Help** from the Stata menu and clicking **PDF Documentation**.

Recommended for learning Stata:

- Stata Tutorial and other related materials at CPC website: [http://www.cpc.unc.edu/research/tools/data\\_analysis/statatutorial](http://www.cpc.unc.edu/research/tools/data_analysis/statatutorial)
- Stata has very good online tutorials (<http://www.stata.com/links/video-tutorials/>) and resources: <http://www.stata.com/links/> or <https://www.youtube.com/user/statacorp>
- UCLA’s statistical resources: <http://www.ats.ucla.edu/stat/stata/>

UNC Students may access Stata through the UNC Virtual Lab (*note: this is different from the Virtual Computing Lab you may have been using before!*). Virtual Lab is more convenient than UNC Virtual Computing Lab because it has no limit on the number of users and there is no need to make reservations. Instructions for using Virtual Lab are available from <http://sils.unc.edu/it-services/remote-access/its-virtual-lab>. Students may access Virtual Lab directly from <http://virtuallab.unc.edu/>.

## Evaluation

### *Grading*

<u>Component</u>	<u>Grade %</u>
Five homework assignments	50% (10% each)
1. Jan 30. Due February 6, 2017	
2. Feb 13. Due February 27, 2017	
3. Feb 27. Due Friday March 10, 2017	
4. March 20. Due April 3, 2017	
5. April 10. Due April 17, 2017	
Empirical paper presentation	15%
Final paper – Impact Evaluation Proposal	30%
Due April 28, 2017	
Class participation	5%

### *Final Grades:*

H	90% or higher
P	70-89%
L	60-70%
F	below 60%

### Homework

Students will be given one to two weeks to complete each of the four homework assignments. Homework exercises require students to both (1) adapt and implement Stata code to calculate various impact estimates, and (2) interpret results with an emphasis on program impact evaluation. While students are allowed to discuss general methodological and Stata coding concepts, all homework assignments are expected to be completed independently. Students will submit homework assignments electronically under the *Assignments* tab in Sakai by the start of class (1:25 pm) on the due date. Stata syntax should be included in the homework submission file, either as part of the response, or as an appendix. Students SHOULD NOT include their name on homework submission files, only their PID.

### Empirical paper presentation

Students will present peer-reviewed journal articles or working papers on impact evaluation of health programs to the class. The instructor will distribute a list of papers and will assign papers to the students. Presentations will be 15 minutes with 5 minutes for questions and will occur during the last two course sessions. Paper assignments and presentation instructions will be distributed by early-March. Students should upload their PowerPoint presentation files on Sakai under the *Assignments* tab prior to the start of class on the due date. (Note: it is ok to include names on presentation files.)

### Final paper

The final assignment will involve preparing an impact evaluation protocol for a hypothetical program. Assignment instructions will be distributed by the end of February. Students will submit the final paper electronically on Sakai under the *Assignments* tab, **using only their PID (no names!)**. Proposals are due by 1:25 pm on Friday, April 28, 2017. Students are expected to complete the final paper assignment on their own.

### Class participation

A significant amount of material discussed in class is only available in dispersed sources, so your attendance is very important, unless, of course, you already know impact evaluation, but, if that is the case, you should not be in this class. Students are expected to come to all sessions prepared to discuss the class topic and to interact with the speaker. It is very important to ask questions and to make substantive contributions to the debate in class. If there is an unpredictable extreme circumstance that prevents your attendance, you should communicate with the professor and TA in advance.

**The professor reserves the right to make changes to the syllabus, including assignment due dates, when unforeseen circumstances occur. These changes will be announced as early as possible so that students can adjust their schedules.**

#### Carolina Course Evaluation System (CES)

The Department of Maternal and Child Health participates in the Carolina Course Evaluation System (CES). An online course evaluation survey will be enabled at the end of the semester.

Your participation in CES is a course requirement. Your feedback will be anonymous, and will be used to improve the quality of this course in the future, as well as to provide input into assessment of the instructor and teaching assistant.

#### *Policy on Incomplete and Late Assignments*

All assignments are expected to be posted to Sakai by the due date listed in the course syllabus (1:25 pm). Late assignments will be penalized 10% for each day late. Extension requests must be discussed with the professor and TA at least 24 hours in advance of the due date.

#### **UNC Honor Code**

The principles of academic honesty, integrity, and responsible citizenship govern the performance of all academic work and student conduct at the University as they have during the long life of this institution. Your acceptance of enrollment in the University presupposes a commitment to the principles embodied in the Code of Student Conduct and a respect for this most significant Carolina tradition. Your reward is in the practice of these principles.

Your participation in this course comes with the expectation that your work will be completed in full observance of the Honor Code. Academic dishonesty in any form is unacceptable, because any breach in academic integrity, however small, strikes destructively at the University's life and work.

If you have any questions about your responsibility or the responsibility of faculty members under the Honor Code, please consult with someone in either the Office of the Student Attorney General (966-4084) or the Office of the Dean of Students (966-4042).

#### **– Specific honor code guidelines for MHCH 862:**

Students are allowed and encouraged to discuss general concepts related to impact evaluation methodologies and Stata coding with their classmates and others. When completing homework assignments, the class presentation, and the final paper, however, students are expected to work independently. Homework answer keys are provided to help students improve their understanding of concepts and Stata coding proficiency, but must not be shared with other cohorts of students. ***It***

*is in violation of the honor code to use previous years' answer keys when completing Spring 2016 assignments.*

## Class Schedule

### ❖ **Session 1. Course Overview & Fundamentals of Health Program M&E (January 23, 2017)**

#### *Session Topics*

- Course overview
- Introduction to program impact evaluation. The impact evaluation question(s). The impact on whom? ATE and ATTE. Approximating the counterfactual or looking for a good evaluation design: key issues to consider, multiple factors, selection processes, spillovers, contamination,; internal and external validity; evaluation designs

#### *Readings*

##### *Required*

- Gertler et al.: Ch 1. Why Evaluate?
- Khandker et al.:
  - Ch 1. Introduction
  - Ch 2. Basic Issues of Evaluation
- Lance et al.:
  - Ch 1. Introduction
  - Ch 2. The Program Impact Evaluation Challenge
- Ravallion M. (2001). The Mystery of the Vanishing Benefits: An Introduction to Impact Evaluation. *The World Bank Economic Review*, 15(1): 115-140.

##### *Recommended*

- Bertrand, Ch. 1-3, 5
- Rossi, Ch. 1-3

### ❖ **Session 2. From the Conceptual Framework to the Empirical Model (January 30, 2017)**

#### *Session Topics*

- Introduction to impact evaluation (continued)
- The potential outcomes model
- From the conceptual framework to the empirical model
- About observables and unobservables
- Interpretation of empirical models based on conceptual frameworks: simple and not-so-simple

#### *Readings*

##### *Required*

- Gertler et al.: Ch 2. Determining Evaluation Questions  
Ch 3. Causal Inference and Counterfactuals
- Lance et al.: Ch 2. The Program Impact Evaluation Challenge

##### *Recommended*

- Bertrand, Ch. 4
- Rossi, Ch. 4, 5
- Wooldridge, Ch. 1, 2, 3
- Angrist et al. (2008), Ch. 1, 2
- Angrist et al. (2014), Ch. 1
- Introduction to Stata 14.0 SE

*Additional Readings*

- Duflo E, Glennerster R, & Kremer M. Using Randomization in Development Economics Research: A Toolkit. December 2006. Available at <http://www.nber.org/papers/t0333>
- Mosley H & Chen L. An analytical framework for the study of child survival in developing countries. In: Mosley H & Chen C, editors (1984) *Child Survival: Strategies for Research. Population and Development Review*, 10(suppl.).
- Boerma JT. Understanding the determinants of child survival in developing countries: the Mosley-Chen framework. In: Boerma (1996) *Child Survival in Developing Countries: Can Demographic and Health Surveys Help to Understand the Determinants?* Amsterdam.
- Bauman K, Viadro C, & Tsui A. (1994). Use of true experimental designs for family planning program evaluation: merits, problems, and solutions. *International Family Planning Perspectives*, 20(3).
- Thomas D, Frankenberg E, Friedman J, et al. (2003). Iron deficiency and well-being of older adults: early results from a randomized nutrition intervention. Manuscript available at [http://emlab.berkeley.edu/users/webfac/emiguel/e271\\_s04/friedman.pdf](http://emlab.berkeley.edu/users/webfac/emiguel/e271_s04/friedman.pdf)

*Assignments:* **\*\* Homework 1 will be posted.**

❖ **Session 3. Basic Models: Specification, Estimation, and Interpretation (February 6, 2017)**

*Session Topics*

- Types of empirical models: Structural and reduced form
- Evaluating programs when the outcome of interest is *continuous* and with cross-sectional data
- Evaluating programs when the outcome of interest is *binary* and with cross-sectional data

*Readings*

*Required*

- Lance et al.:  
Ch 2. The Program Impact Evaluation Challenge  
Section 2.3.2 Regression

*Recommended*

- Wooldridge, Ch. 3, 4, 17.1
- Angrist et al. (2008), Ch. 1, 2, 3
- Angrist et al. (2014), Ch. 1, 2
- Stata 14.0 Reference – Sections on: regress, logit, probit, mlogit

\*\*\*\*\* **Homework 1 due before class** \*\*\*\*\*

## ❖ Session 4. Issues to consider when implementing evaluations (February 13, 2017)

### *Session Topics*

- Evaluating programs with multi-level data and multi-level models
- Methods for experimental design; important checks: Representativeness, random assignment, selective participation, selective attrition
- About sampling weights: when to use them; survey response rates and IPW (Inverse Probability weighting)

### *Readings*

#### *Required*

- Gertler: Ch 4. Randomized Selection Methods
- Khandker: Ch 3. Randomization
- Lance et al.: Ch 3. Randomization
- Von Korff M, Koepsell T, Curry S, & Diehr P. Multi-level analysis in epidemiologic research on health behaviors and outcomes. *American Journal of Epidemiology*, 1992; 135(10): 1077-1082.
- Diez-Roux AV. Bringing context back into epidemiology: variables and fallacies in multilevel analysis. *American Journal of Public Health*, 1998; 88(2): 216-222.

#### *Recommended*

- Rossi, Ch 10
- Angeles, Guilkey and Mroz. (2005). The impact of community level variables on individual level outcomes: theoretical results and applications. *Sociological Methods & Research*, 24(1): 76-121.
- Duflo E. (2002). Empirical Methods. Handout. See pages 1-9. At, [http://web.mit.edu/14.771/www/emp\\_handout.pdf](http://web.mit.edu/14.771/www/emp_handout.pdf)
- Duflo E & Kremer M. (2003). Use of randomization in the evaluation of development effectiveness. Proceedings of the Conference on Evaluating Development Effectiveness, July 15-16, 2003, World Bank Operations Evaluation Department (OED): Washington, DC. Available at <http://www.povertyactionlab.org/methodology>
- Angrist et al. (2008), Ch. 2, 3
- Angrist et al. (2014), Ch. 2
- Solon G, Haider S, Wooldridge J. (2013). What are we weighting for? NBER Working Paper 18859

*Assignment:* **\*\* Homework 2 will be posted.**

## ❖ Session 5. Endogeneity and Program Evaluation (February 20, 2017)

### *Session Topics*

- Program evaluation and the issues of selective participation and selective program placement; a form of endogeneity: Causes, consequences, solutions.
- Possible additional topic: Measuring socioeconomic status

### *Readings*

#### *Required*

- Angeles G, Guilkey DK, & Mroz TA. (2003). How and when should one control for endogeneity biases? Part 1: The impact of a possibly endogenous explanatory variable on a continuous outcome. MEASURE Evaluation Working Paper, wp-03-69. Available at: <http://www.cpc.unc.edu/measure/publications/wp-03-69>
- Lance et al.:
  - Ch 4. Section 4.1. Regression

*Recommended*

- Kolenikov S & Angeles G. (2004). The use of discrete data in PCA: theory, simulations, and applications to socioeconomic indices. MEASURE Evaluation Working Paper, wp-04-85. Available at: <http://www.cpc.unc.edu/measure/publications/wp-04-85>
- Bollen KA, Glanville JL, & Stecklov G. (2001). Socioeconomic status and class in studies of fertility and health in developing countries. *Annual Review of Sociology*; 27: 153-185.
- Bollen KA, Glanville JL, & Stecklov G. (2001). Economic status proxies in studies of fertility in developing countries: does the measure matter? MEASURE Evaluation Working Paper, wp-01-38-en. Available at: <http://www.cpc.unc.edu/measure/publications/wp-01-38>
- Rutstein SO & Johnson K. (2004). The DHS Wealth Index. *DHS Comparative Reports No. 6*. Calverton, Maryland: ORC Macro. Available at: <http://www.measuredhs.com/publications/publication-cr6-comparative-reports.cfm>
- Filmer D & Pritchett LH. Estimating wealth effects without expenditure data – or tears: an application to educational enrollments in states of India. *Demography*, 2001;38(1):115-32.

❖ **Session 6. Instrumental Variables Models (February 27, 2017)**

*Session Topics*

- One way to address endogeneity: Instrumental variables models

*Readings*

*Required*

- Khandker: Ch 6. Instrumental Variable Estimation

*Recommended*

- Wooldridge, Ch. 15
- Lance et al.: Ch 6. Section 6.1. Instrumental Variables Basics
- Angrist et al. (2008), Ch. 4
- Angrist et al. (2014), Ch. 3

*Assignment: \*\* Homework 3 posted.*

\*\*\*\*\* Homework 2 due before class \*\*\*\*\*

❖ **Session 7. Endogeneity and Program Evaluation: Models with Longitudinal Data (March 6, 2017)**

*Session Topics*

- Another way to address endogeneity: models with longitudinal data, difference-in-differences models, fixed effect models

*Readings*

*Required*

- Gertler et al.: Ch 6. Difference-in-Differences
- Khandker et al.: Ch 5. Double Difference
- Lance et al.: Ch 5. Within Estimators

*Recommended*

- Bertrand M, Duflo E, & Mullainathan S. How much should we trust differences-in-differences estimates? *Quarterly Journal of Economics*, 2004; 119(1):249-275.
- Angrist et al. (2008), Ch. 5 (5.1, 5.2)
- Angrist et al. (2014), Ch. 5
- Duflo E. (2002). Empirical Methods. Handout. At, [http://web.mit.edu/14.771/www/emp\\_handout.pdf](http://web.mit.edu/14.771/www/emp_handout.pdf)

\*\*\*\*\* **Homework 3 due on Friday March 10<sup>th</sup>** \*\*\*\*\*

\*\*\*\*\* **SPRING BREAK- NO CLASS ON MARCH 13<sup>th</sup>** \*\*\*\*\*

❖ **Session 8. Difference-in-differences Models (March 20, 2017)**

*Session Topics*

- Difference-in-differences models (continue)
- Extensions.

*Readings*

*Required*

- Gertler et al.: Ch 6. Difference-in-Differences
- Khandker et al.: Ch 5. Double Difference
- Lance et al.: Ch 5. Within Estimators

*Recommended*

- Bertrand M, Duflo E, & Mullainathan S. How much should we trust differences-in-differences estimates? *Quarterly Journal of Economics*, 2004; 119(1):249-275.
- Angrist et al. (2008), Ch. 5 (5.1, 5.2)
- Angrist et al. (2014), Ch. 5
- Duflo E. (2002). Empirical Methods. Handout. At, [http://web.mit.edu/14.771/www/emp\\_handout.pdf](http://web.mit.edu/14.771/www/emp_handout.pdf)

*Assignments:* **\*\* Homework 4 posted.**

❖ **Session 9. Regression Discontinuity Methods (March 27, 2017)**

*\*Empirical Paper Student Presentation 1 (30 minutes)*

*Session Topics*

- Regression discontinuity methods: setup, conditions, estimation, limitations, special cases; Sharp and fuzzy discontinuity models.

*Readings*

*Required*

- Gertler: Ch 5. Regression Discontinuity Design
- Khandker: Ch 7. Regression Discontinuity and Pipeline Methods
- Imbens G & Lemieux T. Regression discontinuity designs: a guide to practice. NBER Working Paper No. 13039. April 2007. Available at: <http://www.nber.org/papers/w13039>
- Lance et al.: Ch 6. Section 6.3. Regression Discontinuity Designs.

*Recommended*

- Lee, D & Lemieux T. Regression discontinuity Designs in Economics. Journal of Economic Literature 48 (June 2010): 281-355. At <https://www.princeton.edu/~davidlee/wp/RDDEconomics.pdf>
- Angrist et al. (2008), Ch. 6
- Angrist et al. (2014), Ch. 4
- Cook, Thomas (2007). “Waiting for Life to Arrive”: A history of the regression discontinuity design in Psychology, Statistics and economics.” Journal of Econometrics 142.
- Klerman, J.A., Olsho, L., Barlett, S. (2015). “Regression Discontinuity in Prospective Evaluations: The Case of the FFVP Evaluation.” American Journal of Evaluation 36(3).

❖ **Session 10. Matching Methods and Propensity Score Analysis (April 3, 2017)**

*\*Empirical Paper Student Presentation 2 (30 minutes)*

*Session Topics*

- Matching and propensity score analysis to construct the counterfactual in program evaluation
- Propensity score methods as a corrective approach for sample selection bias

*Readings*

*Required*

- Gertler: Ch 7. Matching
- Khandker: Ch 4. Propensity Score Matching
- Lance et al.: Ch 4. Section 4.2. Matching
- Carolyn Heinrich, Alessandro Maffioli, Gonzalo Vázquez. (2010). A Primer for Applying Propensity Score Matching. Inter-American Development Bank, at: <http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=35320229>

*Recommended*

- Rubin, D.B. (2008). For objective causal inference, design trumps analysis. *Annals of Applied Statistics*, 2, 808-840.
- D’Agostino, R. B., Jr. (1998). Tutorial in biostatistics: Propensity score methods for bias reduction in the comparison of a treatment to a non-randomized control group. *Statistics in Medicine*, 17, 2265-2281.

\*\*\*\*\* **Homework 4 due before class** \*\*\*\*\*

❖ **Session 11. Sample Selectivity and Program Evaluation: Selection Models (April 10, 2017)**

\**Empirical Paper Student Presentation 3 (30 minutes)*

*Session Topics*

- Evaluating programs and the issue of sample selectivity
- Sample selection models

*Readings*

*Required*

- Winship C & Mare RD. Models for sample selection bias. *Annual Review of Sociology*, 1992; 18:327-350.

*Recommended*

- Wooldridge, Ch 17
- Heckman JJ. Sample selection bias as a specification error. *Econometrica*, 1979:47(1):153-161.

**\*\*\* Homework 5 due posted**

❖ **Session 12. Measuring Heterogeneous Program Effects; Review (April 17, 2017)**

\**Empirical Paper Student Presentation 4 (30 minutes)*

*Session Topics*

- Measuring heterogeneous program effects
- Review

*Readings*

*Required*

- Khandker: Ch 8. Measuring Distributional Program Effects

*Recommended*

- Frankenberg E & Thomas D. (2001). Women's health and pregnancy outcomes: do services make a difference? *Demography* 38(2).
- Rosenzweig M & Wolpin K. (1986). Evaluating the effects of optimally distributed public programs: child health and family planning interventions. *American Economic Review* 76.
- Gertler P & Molyneaux J. (1994). How economic development and family planning programs combined to reduce Indonesian fertility. *Demography* 31(1).
- Angeles G, Guilkey D, & Mroz T. (1998). Purposive program placement and the estimation of family planning program effects in Tanzania. *JASA* 93(443).

**\*\*\*\*\* Homework 5 due before class\*\*\*\*\***

❖ **Session 13. Student Presentations and Review (April 24, 2017)**

\*\**Empirical Paper Presentations (30 minutes each)*

- Review

**\*\*\*\*\* April 28, 2017 - Evaluation Proposal due (1:25 pm)\*\*\*\*\***