

**Microeconomics of Development:
Applications to Health, Nutrition, and Education**
Fall 2021

Professor David E. Sahn

Course description: This seminar will explore recent empirical research and focus on the microeconomics of development. Topics covered are health, nutrition, and education, with an emphasis on models of behavior of households and individuals, as well as impacts of social programs. Although we will briefly review underlying theory and econometric techniques, the course will attempt to bridge the gap between theory and practice, addressing issues such as model identification, functional form, and estimation techniques to control for endogeneity and heterogeneity. A key objective of the class will be to investigate the merits and limitations of randomized control trials (experiments) and non-experimental and econometric methods used to evaluate social interventions, as well as to gain an understanding of behavior and structural relationships. We will also discuss the various types of household surveys that are employed for these purposes.

The course is designed as a seminar, rather than a lecture course, to encourage active participation of all students. Students are expected to be ready to discuss all the assigned readings.

The first few meetings of the class will be devoted to a discussion of the strengths and weaknesses of randomized control trials (RCTs), as well as economic models for examining causal relationships and the behavior of household and individuals in response to interventions and policy. During these sessions, groups of students will be assigned to discuss the merits and weaknesses of RCTs and structural modeling.

For the remainder of the class meetings, we will explore a specific topic related to health, education, and human capital, and two groups of students will be (randomly) assigned to lead a discussion of two papers on the same general theme or topic: one will be an RCT and the other, a structural or economic model using observational data. We will discuss the relative strengths and weaknesses of both. Those leading the session will be required to prepare a short and critical evaluation of the section of the assigned readings, usually 4–5 pages in length, in outline or annotated form. These reviews will cover central issues related to the strengths and weaknesses of the papers and the effectiveness of the readings in addressing underlying concerns of causation, identification, internal and external validity, and so forth. Students will present the paper and offer their critique. The Powerpoint of the presentation/critique will be submitted to me at least 48 hours before the class. This will give me and the other students time to review it and to post their questions or comments.

Replication/empirical assignment: Students will also prepare an empirical paper. There are two options for this paper:

Replication assignment: The replication assignment will involve selecting a published empirical paper in a refereed economics or social science journal. You are encouraged to choose a paper that is consistent with your own research interests; this paper should be broadly related to health, nutrition, education, or other issues concerned with human capital accumulation and poverty alleviation.

In order to perform the replication assignment, you will need to arrange access to the data set. You should first try to find the data set online. If you are not able to do so, you can contact the author(s). Many, if not most major journals now require access to the data as a condition for publication of a paper. You will then try to replicate the analysis in the journal article.

My expectation is that you will be able to closely replicate the results. If not, you need to elaborate in detail your findings and why you think that you were not able to replicate the results. It is certainly possible that you will find errors in the work of others. This may be due to mistakes of the researchers, for example, in coding, or worse, purposeful manipulation of the data and results. There have been a series of such cases in recent years that have received great attention in the social sciences where, traditionally, replication has been given far too little importance.

The second part of the replication assignment is to conduct a variant on the original paper to extend the analysis by, for example, adding additional covariates or changing the dependent variable. For example, if the paper is looking at birthweight outcomes of an intervention program, and the data set has other health measures, such as anthropometrics, you could estimate a similar model using height-for-age as the outcome measure. Or, similarly, if the analysis looks at the impact of a program on children 6 to 36 months of age, you may focus on the impact on other age groups or explore impact by gender or urban/rural location. Alternatively, you may change the econometric model or estimation technique. For example, if the

model is an OLS that looks at the age of first birth, you may want to use a hazard model instead. I understand that your extension of the original paper may not yield new and exciting results that would potentially contribute to the literature. Again, you should be able to discuss the innovations you tried, and your findings.

I would expect the replication's text to be around 8 to 10 single-spaced pages, using 12-point font, with one-inch margins. Tables, figures, and references will be additional pages. Your paper will be reviewed and graded by me; two other students will be assigned to serve as referees to carefully review your paper, both for substance and form. These reviews should include identifying grammatical errors or typos, in addition to critiquing in detail what has been done and even proposing new extensions of the work. Based on your peers' detailed referee reports of the draft, you will be required to prepare a point-by-point response and revise the paper accordingly; in turn, the referees will assess the quality of your rebuttal and the revised paper. If you do not agree with the referee on any point, and/or you do not address one or more suggestions, you should clearly state why. For those of you unaccustomed to writing or preparing referee reports, and responding to them, I will provide such examples.

Empirical paper: With my permission, and if the student has a compelling reason, an alternative to the replication assignment is preparing an original empirical paper with one of the panel data sets from Madagascar or Senegal. The topic will be one that is proposed by the student in consultation with me. If this option is selected, my expectation is that, during the semester, there will be sufficient progress to prepare a preliminary draft of what will eventually be a publishable paper. You can find the questionnaires at the following:

<http://www.saga.cornell.edu/Madagascar2004/survey2004.html>
<http://www.saga.cornell.edu/Madagascar2010/survey2010.html>
<http://www.saga.cornell.edu/Madagascar2019/survey2019.html>
http://www.saga.cornell.edu/Senegal_EBMS/surveys.html
<http://www.saga.cornell.edu/Senegal2011/survey2011.html>

Grading:

Replication assignment (or empirical paper)	40%
Research paper and referee reports	20%
Leading class discussion	20%
Participation in class discussion	20%

Dates and deadlines: A prospectus on the replication assignment (or research topic) is due on **September 26**. This should include a discussion of the paper to be replicated, and a confirmation that the data are available, have been reviewed, and are in a format that will allow the conducting of the exercise.

A preliminary progress report is due on **October 24**, which should at least present summary statistics, including means, standard deviations, and basic cross tabulations on the variables to be used in the model. This should include replicating descriptive statistics found in the published paper. Additionally, the progress report should include a discussion and justification for the proposed extension of the research and the broad contours of the model you plan to estimate.

A final draft is due on **November 25**. At that time, I will distribute the drafts to peer referees that I will randomly select to review each paper. Referees are responsible for preparing their reports by **December 4**, at which time they will be made available to the authors. The authors will then have to submit the final revised paper with response to the referees on **December 14**, at which time I will return the paper to the peer referees, who will review and assign a final assessment due on **December 20**. I will provide a template for the referee's comments.

Readings: A preliminary reading list is found below. More details on how to organize the in-class presentations will be posted on the class website on the Blackboard, including the questions and issues to be addressed for each paper reviewed.

Please note that, before we begin our discussion of specific empirical research papers and methods, we will devote the first two classes to a more general discussion on experimental versus non-experimental techniques. This will be organized as a debate, again in which I will provide prompts in advance on the website to be debated by students in the class.

Students who have limited or no experience with STATA, SAS, or similar software will be expected to find appropriate assistance from CISER or other resources on campus, including other students.

Meeting Time and Location: Monday 5:00–7:20 p.m.

Office Hours: Professor Sahn will hold office hours by appointment in MVR Hall 3103A

Course Website: canvas.cornell.edu

I. RESEARCH TRANSPARENCY

<https://www.nber.org/lecture/summer-institute-2019-methods-lecture-research-transparency-and-reproducibility>

II. EVALUATING SOCIAL PROGRAMS: EXPERIMENTAL VS. STRUCTURAL MODELS

Duflo, Esther, and Abhijit V. Banerjee, eds. 2017. *Handbook of Field Experiments*, Vol. 1, 1st ed., Chapters 1, 2, and 3. North Holland: Amsterdam.

Ravallion, Martin. 2008. “Evaluating anti-poverty programs.” In *Handbook of Development Economics*, Vol. 4., edited by T. Schultz, and John Strauss, Chapter 59, 3787–3846. Amsterdam: North Holland.

Deaton, Angus, and Nancy Cartwright. 2016. “Understanding and misunderstanding randomized controlled trials.” NBER Working Paper No. 22595, National Bureau of Economics Research, Cambridge, MA.

Deaton, Angus. 2010. “Instruments, randomization, and learning about development.” *Journal of Economic Literature* 48 (2): 424–455.

Heckman, James J. 2010. “Building bridges between structural and program evaluation approaches to evaluating policy.” *Journal of Economic Literature* 48 (2): 356–398.

III. EARLY LIFE HEALTH OVER THE LIFE-COURSE: EDUCATION AND HEALTH IMPACTS

Background Reading:

Thomas, Duncan, and John Strauss. 2008. “Health over the life course.” In *Handbook of Development Economics* Vol. 4, edited by T. Schultz, and John Strauss, Chapter 54, 3375–3474. Amsterdam: North Holland.

Glewwe, Paul, and Edward Miguel. 2005. “The impact of child health and nutrition on education in less developed countries.” In *Handbook of Development Economics*, Vol. 4, edited by T. P. Schultz and John Strauss, Chapter 56, 3561–3606. Amsterdam: North Holland.

Maluccio, John, John Hoddinott, Jere R. Behrman, Reynaldo Martorell, Agnes R. Quisumbing, and Aryeh D. Stein. 2009. “The impact of improving nutrition during early childhood on education among Guatemalan adults.” *Economic Journal* 119 (537): 734–763.

Glewwe, Paul, Hanan G. Jacoby, and Elizabeth M. King. 2001. “Early childhood nutrition and academic achievement: A longitudinal analysis.” *Journal of Public Economics* 81 (3): 345–368.

Bleakley, Hoyt. 2009. “Economic effects of childhood exposure to tropical disease.” *American Economic Review* 99 (2): 218–223.

Currie, Janet, and Douglas Almond. 2011. “Human capital before age five.” In *Handbook of Labor Economics*, Vol. 4B, edited by Orley Ashenfelter and David Card, Chapter 15, 1316–1486. Amsterdam/London: North Holland.

Almond, Douglas. 2006. “Is the 1918 influenza pandemic over? Long-term effects of in utero influenza exposure in the post-1940 U.S. population.” *Journal of Political Economy* 114 (4): 672–712.

Chen, Yuyu, and Li-An Zhou. 2007. “The long-term health and economic consequences of the 1959–1961 famine in China.” *Journal of Health Economics* 26 (4): 659–681.

Cutler, David, Winnie Fung, Michael Kremer, Monica Singhal, and Tom Vogl. 2010. “Early-life malaria exposure and adult outcomes: Evidence from malaria eradication in India.” *American Economic Journal: Applied Economics* 2 (2): 72–94.

IV. HEALTH AND NUTRITION

- Strauss, John, and Duncan Thomas. 1998. "Health, nutrition and economic development." *Journal of Economic Literature* 36 (2): 766–817.
- Kremer, Michael, and Edward Miguel. 2004. "Worms: Identifying impacts on education and health in the presence of treatment externalities." *Econometrica* 72 (1): 159–217.
- Bobonis, Gustavo J., Edward Miguel, and Charu Puri Sharma. 2006. "Anemia and school participation." *Journal of Human Resources* 41 (4): 692–721.
- Rivera, Juan A., Daniela Sotres-Alvarez, Jean-Pierre Habicht, Teresa Shamah, and Salvador Villapando. 2004. "Impact of the Mexican Program for Education, Health, and Nutrition (Progresa) on rates of growth and anemia in infants and young children: A randomized effectiveness study." *Journal of the American Medical Association* 291 (21): 2563–2570.
- Field, Erica, Omar Robles, and Maximo Torero. 2009. "Iodine deficiency and schooling attainment in Tanzania." *American Economic Journal: Applied Economics* 1 (4): 140–169.
- Bleakley, Hoyt. 2006. "Disease and development: Evidence from hookworm eradication in the American South." *Quarterly Journal of Economics* 122 (1): 73–117.
- Kremer, Michael, Jessica Leino, Edward Miguel, and Alix Peterson Zwane. 2011. "Spring cleaning: A randomized evaluation of source water quality improvement." *Quarterly Journal of Economics* 126 (1): 145–205.
- Barham, Tania. 2011. "A healthier start: The effect of conditional cash transfers on neonatal and infant mortality in rural Mexico." *Journal of Development Economics* 94 (1): 74–85.
- Manley, James, Seth Gitter, and Vanya Slavchevska. 2013. "How effective are cash transfer programmes at improving nutritional status?" *World Development* 46: 133–155.
- Kazianga, Harounan, Damien de Walque, and Harold Alderman. 2014. "School feeding programs, intrahousehold allocation and the nutrition of siblings: Evidence from a randomized trial in rural Burkina Faso." *Journal of Development Economics* 106: 15–24.
- Ruel, Marie, and Harold Alderman. 2013. "Nutrition-sensitive interventions and programs: How can they help accelerate progress in improving maternal and child nutrition?" *Lancet* 382 (9891): 536–551.

V. REPRODUCTIVE HEALTH

- Field, Erica, and Attila Ambrus. 2008. "Early marriage, age of menarche, and female schooling attainment in Bangladesh." *Journal of Political Economy* 116 (5): 881–930.
- Glick, Peter, Alessandra Marini, and David E. Sahn. 2007. "Estimating the consequences of unintended fertility for child health and education in Romania: An analysis using twins data." *Oxford Bulletin of Economics and Statistics* 69 (5): 667–691.
- Ashraf, Nava, Erica Field, and Jean Lee. 2014. "Household bargaining and excess fertility: An experimental study in Zambia." *American Economic Review* 104 (7): 2210–2237.
- Herrera Almanza, Catalina, and David E. Sahn. 2015. "Early childbearing, school attainment and cognitive skills." *Demography* 55 (2): 643–648.
- Miller, Grant. 2010. "Contraception as development? New evidence from family planning in Colombia." *Economic Journal* 120 (545): 709–736.
- Joshi, Shareen, and T. Paul Schultz. 2013. "Family planning and women's and children's health: Long-term

consequences of an outreach program in Matlab, Bangladesh.” *Demography* 50 (1): 149–180.

VI. HIV/AIDS

Thornton, Rebecca L. 2008. “The demand for, and impact of, learning HIV status: Evidence from a field experiment.” *American Economic Review* 98 (5): 1829–1863.

Dupas, Pascaline. 2011. “Do teenagers respond to HIV risk information? Evidence from a field experiment in Kenya.” *American Economic Journal: Applied Economics* 3 (1): 1–34.

Oster, Emily. 2006. “HIV and sexual behavior change: Why not Africa?” *Journal of Health Economics* 31 (1): 35–49.

Thirumurthy, Harsha, and Joshua Graff Zivin. 2012. “Health and labor supply in the context of HIV/AIDS: The long-run economic impacts of antiretroviral therapy.” *Economic Development and Cultural Change* 61 (1): 73–96.

Duflo, Esther, Pascaline Dupas, and Michael Kremer. 2015. “Education, HIV, and early fertility: Experimental evidence from Kenya.” *American Economic Review* 105 (9): 2257–2297.

Thirumurthy, Harsha, Samuel H. Masters, Samwel Rao, Megan A. Bronson, Michele Lanham, Eunice Omanga, Emily Evens, and Kawango Agot. 2014. “Effect of providing conditional economic compensation on uptake of voluntary medical male circumcision in Kenya: A randomized clinical trial.” *JAMA* 312 (7): 703–711.

VII. NUTRITION, HEALTH, AND PRODUCTIVITY

Strauss, John, and Duncan Thomas, 1998. “Health, nutrition, and economic development.” *Journal of Economic Literature* 36 (2) 766–817.

Case, Anne, and Christina Paxson. 2008. “Stature and status: Height, ability, and labor market outcomes.” *Journal of Political Economy* 116 (3): 499–532.

Thomas, Duncan, Elizabeth Frankenberg, Jed Friedman, Jean-Pierre Habicht, Mohammed Hakimi, Nicholas Ingwersen, Jaswadi, Nathan Jones, Christopher McKelvey, Gretel Pelto, Bondan Sikoki, Teresa Seeman, James P. Smith, Cecep Sumantri, Wayan Suriastini, and Siswanto Wilopo. 2006. “Causal effect of health on labor market outcomes: Experimental evidence.” California Center for Population Research On-Line Working Paper Series CCPR-070-06, California Center for Population Research, Los Angeles, CA.

LaFave, Daniel, and Duncan Thomas. 2016. “Height and cognition at work: Labor market productivity in a low income setting.” NBER Working Paper No. 22290, National Bureau of Economic Research, Cambridge, MA.

Thomas, Duncan, and John Strauss. 1997. “Health and wages: Evidence on men and women in urban Brazil.” *Journal of Econometrics* 77 (1): 159–185.

Pitt, Mark M., Mark R. Rosenzweig, and Mohammad Nazmul Hassan. 2012. “Human capital investment and the gender division of labor in a brawn-based economy.” *American Economic Review* 102 (7): 3531–3560.

Vogl, Tom S. 2014. “Height, skills, and labor market outcomes in Mexico.” *Journal of Development Economics* 107: 84–96.

VIII. INTRAHOUSEHOLD DECISION-MAKING

Ward-Batts, Jennifer. 2008. “Out of the wallet and into the purse: Using micro data to test income pooling.” *Journal of Human Resources* 43 (2): 325–351.

Thomas, Duncan. 1990. “Intra-household resource allocation: An inferential approach.” *Journal of Human Resources* 25 (4): 635–664.

Thomas, Duncan. 1994. “Like father, like son; like mother, like daughter: Parental resources and child height.” *Journal of Human Resources* 24 (4): 950–988.

Duflo, Esther. 2003. "Grandmothers and granddaughters: Old-age pensions and intrahousehold allocations in South Africa." *World Bank Economic Review* 17 (1): 1–25.

Dercon, Stefan, and Pramila Krishnan. 2000. "In sickness and in health: Risk sharing within households in rural Ethiopia." *Journal of Political Economy* 108 (4): 688–727.

Jacoby, Hanan G. 2002. "Is there an intrahousehold "flypaper effect"? Evidence from a school feeding program." *Economic Journal* 117 (476): 196–221.

Ashraf, Nava. 2009. "Spousal control and intra-household decision making: An experimental study in the Philippines." *American Economic Review* 99 (4): 1245–1277.

Boboni, Gustavo. 2009. "Is the allocation of resources within the household efficient? New evidence from a randomized experiment." *Journal of Political Economy* 117 (3): 453–503.

IX. IMPACT OF HEALTH AND NUTRITION ON EDUCATION AND SCHOOLING

Ashraf, Nava, James Berry, and Jesse M. Shapiro. 2010. "Can higher prices stimulate product use? Evidence from a field experiment in Zambia." *American Economic Review* 100 (5): 2383–2413.

Cohen, Jessica, and Pascaline Dupas. 2010. "Free distribution or cost-sharing? Evidence from a randomized malaria prevention experiment." *Quarterly Journal of Economics* 125 (1): 1–45.

Dupas, Pascaline. 2014. "Short-run subsidies and long-run adoption: Evidence from a field experiment." *Econometrica* 82 (1): 197–228.

Cohen, Jessica, Pascaline Dupas, and Simone Schaner. 2015. "Price subsidies, diagnostic tests, and targeting of malaria treatment: Evidence from a randomized controlled trial." *American Economic Review* 105 (2): 609–645.

X. EDUCATION OUTCOMES

A. EARLY CHILDHOOD ABILITY AND LATER LIFE OUTCOMES

Duncan, Greg J., and Katherine Magnuson. 2011. "The nature and impact of early achievement skills, attention skills, and behavior problems." In *Whither Opportunity? Rising Inequality, Schools, and Children's Life Chances*, edited by Greg J. Duncan and Richard J. Murnane, 47–70. New York: Russell Sage.

Heckman, James, Rodrigo Pinto, and Peter Savelyev. 2013. "Understanding the mechanisms through which an influential early childhood program boosted adult outcomes." *American Economic Review* 103 (6): 2052–2086.

Heckman, James J., and Stefano Mosso. 2014. "The economics of human development and social mobility." *Annual Review of Economics* 6 (1): 689–733.

Todd, Petra E., and Kenneth I. Wolpin. 2007. "The production of cognitive achievement in children: Home, school, and racial test score gaps." *Journal of Human Capital* 1 (1): 91–136.

Cunha, Flavio, James J. Heckman, and Susanne M. Schennach. 2010. "Estimating the technology of cognitive and noncognitive skill formation." *Econometrica* 78 (3): 883–931.

Aubery, Frédéric, and David E. Sahn. 2021. "Cognitive Achievement Production in Madagascar: A Value-Added Model Approach." *Education Economics* <https://doi.org/10.1080/09645292.2021.1921110>

B. SCHOOLS AND EDUCATION INTERVENTIONS AND POLICIES

Evans, David K., and Amina Mendez Acosta. 2021. "Education in Africa: What Are We Learning?" *Journal of African Economies* 30 (1): 13–54.

Glewwe, Paul, and Michael Kremer. 2008. "Schools, teachers, and education outcomes in developing countries." In

Handbook of the Economics of Education, Vol. 2, edited by Eric A. Hanushek, and Finis Welch, Chapter 16, 945–1017. Amsterdam: North Holland.

Glewwe, Paul, Michael Kremer, and Sylvie Moulin. 2007. “Many children left behind? Textbooks and test scores in Kenya.” *American Economic Journal: Applied Economics* 1 (1): 112–135.

Urquiola, Miguel. 2006. “Identifying class size effects: Evidence from rural Bolivia.” *Review of Economics and Statistics* 88 (1): 171–177.

Attanasio, Orazio P., Costas Meghir, and Ana Santiago. 2012. “Education choices in Mexico: Using a structural model and a randomized experiment to evaluate PROGRESSA.” *Review of Economic Studies* 79 (1): 37–66.

Angrist, Joshua, and Victor Lavy. 1999. “Using Maimonides’ Rule to estimate the effect of class size on scholastic achievement.” *Quarterly Journal of Economics* 114 (2): 533–575.

Duflo, Esther. 2001. “Schooling and labor market consequences of school construction in Indonesia: Evidence from an unusual policy experiment.” *American Economic Review* 91 (4): 795–813.

Todd, Petra E., and Kenneth I. Wolpin. 2006. “Assessing the impact of a school subsidy program in Mexico: Using experimental data to validate a dynamic behavioral model of child schooling.” *American Economic Review* 96 (5): 1384–1417.

Duflo, Esther, Pascaline Dupas, and Michael Kremer. 2011. “Peer effects, teacher incentives, and the impact of tracking: Evidence from a randomized evaluation in Kenya.” *American Economic Review* 101 (5): 1739–1774.

XI. CLIMATE CHANGE AND HUMAN CAPITAL

Marchetta, Francesca, David E. Sahn, and Luca Tiberti. 2019. “The role of weather on schooling and work of young adults in Madagascar.” *American Journal of Agricultural Economics* 101 (4): 1203–1227.

Maccini, Sharon, and Dean Yang. 2009. “Under the weather: Health, schooling, and economic consequences of early-life rainfall.” *American Economic Review* 99 (3): 1006–26.

Tiwari, Sailesh, Hanan G. Jacoby, and Emmanuel Skoufias. 2017. “Monsoon babies: Rainfall shocks and child nutrition in Nepal.” *Economic Development and Cultural Change* 65 (2): 167–88.

Asfaw, Solomon, and Giuseppe Maggio. 2017. “Gender, weather shocks and welfare: Evidence from Malawi.” *Journal of Development Studies* 54 (2): 271–91.

XII. MULTIDIMENSIONAL POVERTY: HEALTH AND EDUCATION AS ALTERNATIVE/COMPLEMENTARY METRICS

Alkire, Sabina, and James Foster. 2011. “Counting and multidimensional poverty measurement.” *Journal of Public Economics* 95 (7–8): 476–487.

Ravallion, Martin. 2010. “Mashup indices of development.” *World Bank Research Observer* 27 (1): 1–32.

Duclos, Jean-Yves, David E. Sahn, and Stephen D. Younger. 2006. “Robust multidimensional poverty comparisons.” *Economic Journal* 116 (514): 943–968.