EDU A-845

# THE ECONOMICS OF EDUCATION IN LOW- AND MIDDLE-INCOME COUNTRIES

Harvard Graduate School of Education

Tuesdays and Thursday, 9:00 to 10:15am
Gutman Library, Room 305


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## 1. Objectives

This course examines how key concepts and frameworks in economics may be leveraged to understand the frontier challenges in education in low- and middle-income countries (LMICs) and the circumstances under which policy changes may effectively address them. It seeks to provide you with an approach to help you: (a) diagnose the underlying reasons for existing challenges in education in LMICs; (b) assess the promise and potential pitfalls of proposed solutions; (c) design policies and programs with greater chances of success; and (d) monitor and/or evaluate the consequences of new or existing efforts. The course is intended for master's and doctoral students seeking to apply insights from economics to policy design, analysis, and monitoring/evaluation. It draws on theory and evidence from labor, development, and behavioral economics. It focuses on pre-primary to secondary education—the levels in which enrollments have expanded most rapidly in LMICs.

The course is structured around four main parts. The first one aims to make you view education in LMICs through the eyes of economists (Why do they study education? How do they view education? What do they think are the main challenges in education in LMICs?). This part is essential for you to understand why economists study certain questions and not others and the perspective from which they approach such questions. The second and third parts synthesize the evidence produced by economists in recent decades to improve

both the “quantity” (e.g., enrollment) and “quality” (e.g., learning) of education (How can we increase the share of the population that attends school? How can we improve the quality and relevance of instruction that students receive at school?). These parts constitute the core of the course, integrating economic theory and existing evidence. The fourth and final part identifies the main challenges in translating evidence into policy (How can we make sense of “bundled” interventions? How can we assess the relevance of evidence across contexts?) and offers an overview of the frontier in evidence generation.

## 2. Pre-requisites

You are expected to have taken EVI-101 (“Evidence”) and S-040 (“Introduction to Applied Data Analysis”) or equivalent courses that introduce students to regression analysis. You should be comfortable interpreting regression coefficients, standard errors, p-values, and confidence intervals. (You will not be required to perform statistical analysis in R or Stata).

If you have taken more advanced statistics courses, such as S-052 (“Intermediate and Advanced Statistical Methods for Applied Educational Research”) or S-290 (“Quantitative Methods for Improving Causal Inference in Educational Research”), you will be able to go beyond what is taught in class. Yet, this level of statistical proficiency is not necessary to participate in class and complete the course assignments.

If you are unsure as to whether they meet these pre-requisites, please make an appointment with me in the first two weeks of the semester (see link on the first page).

## 3. Auditing

If the course is well below its enrollment cap, I will consider requests for auditors on a case-by-case basis. I ask that auditors attend every class and complete all the assignments, as students taking the course for a letter grade or on a satisfactory/no-credit basis. If you can commit to this arrangement, make an office-hours appointment with me in the first week of the semester (see link on the first page).

## 4. Readings

There is no textbook for this course. I will post each week’s readings on our Canvas site.

The readings are meant to provide you with an initial understanding of the relevant issues to be discussed in each class. They will often use concepts or mathematical notation with which you will be unfamiliar. Whenever it is crucial for you to understand such concepts or notation on your own, I will provide you with annotated versions of the readings. However, an important objective of the course is to help you consume research, even when you may be unfamiliar with the theory or empirical methods being used. Therefore, for most

readings, you will only be expected to make a good-faith effort to develop an initial understanding, and to rely on pre- and post-class activities to complement this first step.

**5. Grading**

Each student's grade in the course will be determined as follows:
a) pre-class quizzes (20%);
b) class attendance (10%);
c) in-class "labs" (30%); and
d) policy memos (40%).

Pre-class quizzes: Before each class, I will ask you to complete a brief quiz on the readings. The purpose of these quizzes is to help you check your understanding of the aspects of the readings that will be relevant to class. All quizzes will be due the night before class, but you are welcome to complete them before if you prefer. You will receive immediate feedback right after submitting your responses, including the correct answers and the rationale for each one of them. I will only grade quizzes for timely completion, not for performance. I will also use responses to decide what to clarify or reinforce in class. I may also reach out to you before or after class if I notice that you struggled with the readings for a specific class (e.g., offering to answer questions over email and/or individual/group office hours).

Your pre-class quizzes score will be calculated as follows. You will receive a score of 1 for completing each quiz the night before (by 11:59pm) each class, a score of 0.5 for completing it after they are due, and a score of 0 for not completing the quiz before class. Your total pre-class quizzes score will be the sum of all the individual scores over the total number of classes, multiplied by 100. For example, if you completed 23 of 27 pre-class quizzes on time, your score will be (23/27)*100 or 85. The maximum score is 100.

Class attendance: I expect you to attend all classes, arriving before the start time so that we can start on time. The purpose of class is to introduce you to a framework from economics to make sense of the evidence you have read before class and to give you a first opportunity to apply it to a specific situation ("labs," described below). You will be allowed up to 2 absences during the semester, regardless of the reason. I only ask that you let me know before or after your absence so that I know you are okay (you do not need to disclose the reason for your absence or any documentation). Every absence above your 2 allowed absences will be deducted from your attendance score for the course. Even if you miss a class, I still expect you to complete the quiz for that class (after class, if necessary).

Your attendance and punctuality score will be calculated as follows. You will receive a score of 1 for attending each class before the official start time, a score of 0.5 for arriving after the official start time, and a score of 0 for any absence beyond your 2 allowed absences. Your total attendance score will be the sum of all the individual scores over the

total number of classes, multiplied by 100. For example, if you attended 24 of 28 classes, your score will be (26/28)*100 or 93. The maximum score is 100.

In-class "labs": Once a week (typically, on Thursdays), I expect you to participate in "labs:" pair- or team-based (depending on class size) simulations of situations that school systems in LMICs often face, which will require you to integrate your knowledge of economic theory and evidence with the interests of multiple stakeholders to make a policy decision. On these days, everyone will receive a brief description of the situation, and each pair or team will also receive a description of their main objectives in that situation. You will have some time to prepare some bullet points in teams and then you will be asked to discuss the situation with the whole class, defending your pair or team's interests. I will only grade labs for engagement, not for performance. I may also reach out to you after class if I notice that you struggled to participate a specific class (e.g., offering to give you tips on how to better prepare beforehand and engage with your pair or team).

Your labs score will be calculated as follows. You will receive a score of 1 for engaging in labs (either during your team time or whole-class discussions) and a score of 0 for not doing so. Depending on the size of the class, it may not be realistic to expect that every student participates in every class. Your total labs score will be the sum of all the individual scores over the total number of classes, multiplied by 100. For example, if you engaged in 12 of 14 classes, your score will be (12/14)*100 or 86. The maximum score is 100.

Policy memos: I will ask you to write four policy memos throughout the semester; one at the end of each part of the course. The purpose of these memos will be to encourage you to apply the theory and evidence from the readings and class to different contexts. In the first memo, you will be given the results of an assessment and be asked to identify the main challenges to improve learning in a specific country. In the second one, you will be given a policy proposal to address a challenge in learning and be asked to identify its strengths and areas for improvement. In the third one, you will be given alternative policies to address a challenge and be asked to choose between them and explain your rationale. And in the fourth and final one, you will be given a description of a proposed policy and be asked to outline how you would evaluate and monitor its implementation. You may discuss your memos with your peers and even seek their feedback, but you must write them individually. (I will provide detailed instructions and grading criteria for each memo).

Your policy memos score will be calculated as follows. You will receive a score of 0 to 100 on each memo that you submit by the established deadline. Your total memo score will be the average of the 3 highest memo scores (i.e., your lowest memo score will not count). This provision is meant to account for the fact that you may find some of the memos more difficult than others, and to prevent one low problem set score from playing a large role in your overall grade. It is also meant to allow you to "drop" (i.e., choose not to complete) one memo during the semester (e.g., if you cannot complete the memo on time due to

unforeseen circumstances). For example, if you obtained scores of 90, 70, 80, and 100, your score will be (90+80+100)/3 or 90. The maximum score is 100.

Overall course grade: Your overall numeric score will be calculated as the weighted average of your attendance and punctuality, pre-class quizzes, in-class participation and labs, and policy memos. The weights correspond to the percentages allotted to each score above. For example, if you obtained a 85 for pre-class quizzes, a 93 for attendance and punctuality, an 86 for in-class labs, and a 90 for policy memos, your overall numeric score will be (85*0.2)+(93*0.1)+(86*0.3)+(90*0.4) or 88.

Your overall letter grades will be determined based on the distribution of numeric scores for all students in the course. This is meant to account for the fact that some cohorts may find the material more/less difficult than others. I will assign letter grades as follows:

| If you have a numeric score that is… | …you will earn a/an… |
|---|---|
| …0.5 standard deviation (SD) above the mean… | …A |
| …above the mean by less than 0.5 SD… | …A- |
| …below the mean by less than 0.5 SD… | …B+ |
| …between 0.5 and 1 SD below the mean… | …B |
| …between 1 and 1.5 SD below the mean… | …B- |
| …between 1.5 and 2 SD below the mean… | …C+ or lower |

I will provide all students with a mid-term letter that informs you of your relative standing in the course, and provide you with tips on how to improve, halfway through the semester. I will be available to discuss the letter during office hours.

To prevent this grading scheme from encouraging students to compete against each other, and to account for the fact that students have varying degrees of exposure to the material in the course, I plan to adjust your final letter grade *upwards* if I notice that you have worked hard to improve and/or if you have exceled in one or more aspects of the course. (I will not adjust grades downwards). Therefore, the final distribution of scores will not be exclusively determined by the cutoff scores above.

Feedback, exemplars, and appeals: After each post-class policy memo is graded, I will provide you with both in-line and overall comments. I strongly encourage you to read this feedback carefully and to come see me during office hours if you have questions.

I will also post assignments that have received top grades as exemplars. (I will provide you with a mechanism to opt out of having your memos posted, or post them anonymized, if that is what you prefer). I highly recommend that you to read through these exemplars for inspiration on how to improve—especially, after the first set of memos, to make sure our expectations are aligned.

You may also appeal your grade on your policy memo if you believe it warrants a second look. (I will provide you with instructions on how to do so later in the semester).

**6. Classroom policies and expectations**

Cell phones: I ask that you do not use your cell phone for either making/receiving calls or sending/receiving text messages. If extraordinary personal or professional circumstances require that you take a call during class time, I ask that you let me know in advance if possible and that you sit next to one of the doors to minimize disruption to class dynamics.

Eating and drinking: I prefer that you do not eat during class if you can avoid it. If your class schedule does not allow you for reasonable breaks between classes and you must eat during class, I ask that you let me know early in the semester. You may, however, bring beverages in covered containers to drink during class.

Laptops and tablets: I prefer that students take notes without laptops or tablets, if possible. I understand that using such devices is increasingly the norm, but I worry about their potential to distract you and your peers. If you want to make a case for using a laptop or tablet, please come see me during office hours in the first two weeks of class.

Late assignments: I ask that you budget your time wisely to avoid late assignments. Late pre-class quizzes and post-class memos will automatically incur a grade penalty. I understand that, on some occasions, you may have a good reason for missing a deadline. This is why I have a built-in mechanism to deal with such circumstances (I will drop your lowest post-class memo score). I encourage you to use it judiciously (e.g., reserve it for only the circumstances that truly warrant it). I am reluctant to revise late-submission penalties because, in my experience, students from traditionally disadvantaged groups are less likely to seek such revisions, so I worry that granting them to only the students who reach out to me will lead to inequitable grading practices. Nevertheless, you are always welcome during my office hours if you would like to discuss your personal circumstances.

Surveys: I will ask you to complete two surveys during the semester: a "background survey" (at the beginning of the semester), which will allow me to get to know you better, and a "feedback survey" (after some classes), which will allow you to provide feedback on what is working well and what could be improved in the course. I take feedback surveys very seriously and I will make a good-faith effort to address the concerns raised by students.

Feedback surveys are optional and there are no repercussions if you choose not to answer them. None of the surveys will be considered in your grades. I will delete all survey responses at the end of the course, and I will not use them for other purposes.

## 7. Writing

The post-class policy memos will involve a fair amount of writing. You should not take this writing lightly; an important part of succeeding in this course, and of applying what you learn in your next professional stage, is learning to convey arguments clearly and cogently.

I expect you to review policy memos for typos and grammatical errors before submitting them. You should also take full advantage of the various on-campus resources to help them improve their writing, including the HGSE Writing Center and Communications Lab (https://communicate.gse.harvard.edu/writingcenter).

## 8. Harvard and HGSE policies

I expect you to have read and agreed to the policies outlined in HGSE's student handbook (https://www.gse.harvard.edu/sites/default/files/2024-05/HGSE_Student_Handbook%2024-25.pdf) and to Harvard's policy on academic integrity (https://learn.library.harvard.edu/plagiarism). Please, let me know if you have questions on how these policies may apply to our course in advance of your assignments due dates.

## 9. Accommodations

If you need an accommodation due to a chronic, psychological, visual, mobility and/or learning disability, or if you are deaf or hard of hearing, please follow the procedure stipulated for accommodations and accessibility (https://osa.gse.harvard.edu/student-support-services-1). Let me know if you have questions on how your request for accommodations may apply to our course in advance of your assignment due dates.

## 10. Calendar

Below, I include a draft calendar for the course. Note, however, that I typically adjust this draft based on how students respond to the material. I ask that you check the course site before each class to make sure you are working with the most up-to-date version.

Next to each citation below, I specify the pages I need you to read carefully. If I do not specify a page range, I am asking you to complete the entire reading. You can skim the pages I did not assigned, but you are not expected to do so.

### PART I: INTRODUCTION TO THE ECONOMICS OF EDUCATION

**Class #1: Introduction to the course** (Tue, Jan 28)

- Objectives:

    - Introduce teaching team
    - Introduce *economics* as a framework for allocation of scarce resources
    - Introduce *budget constraint* and *production possibility frontier* as models to think about allocation of inputs and outputs
    - Provide an overview of the material to be covered in the course
- Readings (only for this class, to be completed *after* class):
    - Course syllabus (this document)

**Class #2: Why economists study education** (Tue, Jan 30)

- Objectives:
    - Introduce the *human capital model*
    - Introduce the *education investment model*
    - Discuss theory and evidence on whether more/better education leads to higher probability of employment, wages, and economic growth
    - Engage with the limitations of this focus and other benefits of education
- Required readings:
    - Hanushek, E. A. & Woessmann, L. (2008). Education quality and economic growth. Washington, DC: The World Bank. [pp. 1-10, 12-14]
    - Heckman, J. & Masterov, D. V. (2005). The productivity argument for investing in young children. *Unpublished manuscript* Chicago, IL: University of Chicago. [pp. 446-449, 460-477, 487-488]
- Assignments:
    - Background survey (due on Jan 29 at 11:59pm ET)
    - Quiz (due on Jan 29 at 11:59pm ET)
- Optional resources:
    - Chetty, R., Friedman, J. N., Hilger, N., Saez, E., Schanzenbach, D. W., & Yagan, D. (2011). How does your kindergarten classroom affect your earnings? Evidence from project STAR. *The Quarterly Journal of Economics*. 126, 1593-1660.
    - Danon, A., Das, J., de Barros, A., & Filmer, D. (2024). Cognitive and socioemotional skills in low-income countries: Measurement and associations with schooling and earnings. *Journal of Development Economics*. (168), 103132.
    - Dee, T. S. (2004). Are there civic returns to education? *Journal of Public Economics*. 88(9-10), 1697-1720.
    - Patrinos, H. A. (2020). Chapter 4: Returns to education in developing countries. *The economics of education: A comprehensive overview (2nd Ed.)*. London, San Diego, Cambridge, and Oxford: Elsevier.

**Class #3: The "learning crisis" in low- and middle-income countries** (Tue, Feb 4)

- Objectives:

    - Document progress in school enrollments and educational attainment in low- and middle-income countries
    - Identify pending challenges in learning outcomes: level, progress, and variability
    - Reflect on the use of test scores as the main metric to measure learning
- Required readings:
    - Grantham-McGregor, S., Cheung, Y. B., Cueto, S., Glewwe, P., Richter, L., & Strupp, B. (2007). Developmental potential in the first 5 years for children in developing countries. *The Lancet*. 369(9555), 60-70.
    - World Bank. (2018). Chapter 1: Learning to realize education's promise. *World Development Report 2018: Learning to realize education's promise*. Washington, DC: The World Bank. [pp. 3-16]
- Assignment:
    - Quiz (due on Feb 3 at 11:59pm ET)
- Optional resources:
    - Andrabi, T., Das, J., Khwaja, A. I., Vishwanath, T., & Zajonc, T. (2008). Learning and Educational Achievements in Punjab Schools (LEAPS): Insights to inform the education policy debate. Washington, DC: The World Bank.
    - Angrist, N., Djankov, S., Goldberg, P. K., & Patrinos, H. A. (2021). Measuring human capital using global learning data. *Nature*. 592(7854), 403-408.
    - ASER. (2023). Annual status of education report (ASER) 2022: Provisional. New Delhi, India: ASER Centre.
    - Das, J. & Zajonc, T. (2010). India shining and Bharat drowning: Comparing two Indian states to the worldwide distribution in mathematics achievement. *Journal of Development Economics*. 92(2), 175-187.
    - de Barros, A. & Ganimian, A. J. (2023). The foundational math skills of Indian children. *Economics of Education Review*. 92, 102336.
    - Filmer, D., Rogers, F. H., Angrist, N., & Sabarwal, S. (2020). Learning-adjusted years of schooling (LAYS): Defining a new macro measure of education. *Economics of Education Review*. 77, 101971.
    - Lu, C., Black, M. M., & Richter, L. M. (2016). Risk of poor development in young children in low-income and middle-income countries: An estimation and analysis at the global, regional, and country level. *The Lancet*. 4, 916-922.

**Class #4: How to engage in in-class "labs"** (Thu, Feb 6)

- Objectives:
    - Practice integrating evidence into decisions on education policy
    - Understand that evidence is viewed through positions
    - Learning to reconcile conflicting views of common evidence
- Required readings:
    - Ganimian, A. J. (2024). Guidelines on how to engage in in-class labs. Cambridge, MA: Harvard Graduate School of Education (HGSE).

    - Ganimian, A. J. (2025). Annotated in-class lab. Cambridge, MA: Harvard Graduate School of Education (HGSE).
- Assignment:
    - Lab (in class)
- Optional resources:
    - Bates, M. A. & Glennerster, R. (2017). The generalizability puzzle. *Stanford Social Innovation Review*. 25(3), 50–54.
    - Eble, A., Frost, C., Camara, A., Bouy, B., Bah, M., Sivaraman, M., Hsieh, P.-T. J., Jayanty, C., Brady, T., & Gawron, P. (2021). How much can we remedy very low learning levels in rural parts of low-income countries? Impact and generalizability of a multi-pronged para-teacher intervention from a cluster-randomized trial in The Gambia. *Journal of Development Economics*. 148, 102539.
    - Ganimian, A. J. & Vegas, E. (2011). Education diagnostics: A tool to identify the binding constraints of education systems. Washignton, DC: The World Bank.
    - Hjort, J., Moreira, D., Rao, G., & Santini, J. F. (2021). How research affects policy: Experimental evidence from 2,150 Brazilian municipalities. *American Economic Review*. 111(5), 1442-1480.
    - Vivalt, E. (2020). How much can we generalize from impact evaluations? *Journal of the European Economic Association*. 18(6), 3045-3089.
    - Vivalt, E. & Coville, A. (2023). How do policymakers update their beliefs? *Journal of Development Economics*. 165, 103121.

**Class #5: How economists view education** (Tue, Feb 11)

- Objectives:
    - Conceptualize education as a (public) service
    - Provide an initial framework to think about how to improve service delivery
    - Critically examine how economists believe system-level incentives (e.g., ambitious curricula, high-stakes exams) shape teachers' behavior
- Required readings:
    - World Bank. (2004). Chapter 3: The framework for service provision. *World Development Report 2004: Making services work for poor people*. Washington, DC: The World Bank. [pp. 46-53]
    - Banerjee, A. V. & Duflo, E. (2011). Chapter 4: Top of the class. *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty*. Philadelphia, PA: Public Affairs.
- Assignment:
    - Quiz (due on Feb 10 at 11:59pm ET)
- Optional resources:
    - Abadzie, H. (2009). Instructional time loss in developing countries: Concepts, measurement, and implications. *World Bank Resarch Observer*. 24(2), 267-290.

- Bold, T., Filmer, D., Martin, G., Molina, E., Stacy, B., Rockmore, C., Svensson, J., & Wane, W. (2017). Enrollment without learning: Teacher effort, knowledge, and skill in primary schools in Africa. *Journal of Economic Perspectives*. 31(4), 185-204.
- Bruns, B., Filmer, D., & Patrinos, H. A. (2011). Chapter 1: Motivation and framework. *Making schools work: New evidence on accountability reforms*. Washington, DC: The World Bank.
- Bruns, B. & Luque, J. (2014). Chapter 1: Overview. *Great teachers: How to raise student learning in Latin America and the Caribbean*. Washington, DC: The World Bank.
- Chaudhury, N., Hammer, J., Kremer, M., Muralidharan, K., & Rogers, F. H. (2006). Missing in action: Teacher and health worker absence in developing countries. *The Journal of Economic Perspectives*. 20(1), 91-116.
- Corrales, J. (1999). The politics of education reform: Bolstering the supply and demand; overcoming institutional blocks. *(Education Reform and Management Publication Series)*. Washington, DC: The World Bank.
- Finan, F., Olken, B. A., & Pande, R. (2016). Chapter 6: The personnel economics of the developing state. *Handbook of field experiments*. *Volume 2*. 467-514 North Holland.
- Jayachandran, S. (2008). Incentives to teach badly? After-school tutoring in developing countries. *Journal of Development Economics*. 108, 190-205.
- Molina, E., Fatima, S. F., Ho, A. D., Melo, C., Wilichowsk, T. M., & Pushparatnam, A. (2020). Measuring the quality of teaching practices in primary schools: Assessing the validity of the Teach observation tool in Punjab, Pakistan. *Teaching and Teacher Education*. 96, 103171.
- Pritchett, L. (2013). Chapter 1: Introduction: From universal schooling to universal learning. *The rebirth of education: Schooling ain't learning*. Washington, DC: Center for Global Development (CGD).
- Pritchett, L. (2015). Creating education systems coherent for learning outcomes: Making the transition from schooling to learning. *(RISE Working Paper No. RISE-WP-15/005)*. London, UK: Research on Improving Systems of Education (RISE).
- Pritchett, L. & Beatty, A. (2015). Slow down, you're going too fast: Matching curricula to student skill levels. *International Journal of Educational Development*. 40, 276-288.
- Sabarwal, S., Abu-Jawdeh, M., & Kapoor, R. (2022). Teacher beliefs: Why they matter and what they are. *The World Bank Research Observer*. 37(1), 73-106.
- Stallings, J. A., Knight, S. L., & Markham, D. (2014). Using the Stallings observation system to investigate time on task in four countries. Washington, DC: The World Bank.


**Class #6: Writing policy memos** (Thu, Feb 13)

- Objectives:
    - Introduce the structure of policy memos
    - Describe expectations for overall, paragraph, and sentence structure
    - Practice writing, and receive peer feedback on, memo segments
- Required readings:
    - Ganimian, A. J. (2024). Guidelines on how to write a policy memo. Cambridge, MA: Harvard Graduate School of Education (HGSE).
    - Ganimian, A. J. (2025). Annotated example policy memo. Cambridge, MA: Harvard Graduate School of Education (HGSE).
- Optional resources:
    - Brodsky, L. N. (n.d.). How to write a policy memo. Cambridge, MA: Communications Program, Harvard Kennedy School of Government (HKS). URL: https://bit.ly/4eSXk0X.
    - Fried, S. A. (2021). Assignment genres: Writing a policy memo. Cambridge, MA: Writing & Communications Lab, Harvard Graduate School of Education (HGSE). URL: https://bit.ly/3ZRdt2D.

**PART II: BUILDING DEMAND FOR EDUCATION**

**Class #7: Increasing enrollment by reducing the direct costs of schooling** (Tue, Feb 18)

- Objectives:
    - Introduce the *income elasticity of demand*
    - Introduce the *own-price* and *cross-price elasticity of demand*
    - Understand the extent to which individuals demand more (less) education as its costs decrease (increase) and as their income increases (decreases)
- Required readings:
    - Lucas, A. M. & Mbiti, I. M. (2012). Access, sorting, and achievement: The short-run effects of free primary education in Kenya. *American Economic Journal: Applied Economics*. 4, 226-253. [pp. 226-230, 237-244]
    - Bold, T., Kimenyi, M., Mwabu, G., & Sandefur, J. (2014). Can free provision reduce demand for public services? Evidence from Kenyan education. *World Bank Economic Review*. 29(2), 293-326. [293-296]
- Assignment:
    - Quiz (due on Feb 17 at 11:59pm ET)
- Optional resources:
    - Borkum, E. (2012). Can eliminating school fees in poor districts boost enrollment? Evidence from South Africa. *Economic Development and Cultural Change*. 60(2), 359-398.

**Class #8: Increasing enrollment by reducing the costs of complements to schooling** (Thu, Feb 20)

- Objectives:
    - Introduce *complements*
    - Revisit the *cross-price elasticity of demand*
    - Understand the extent to which individuals demand more (less) education as the costs of complements decreases (increases)
- Required readings:
    - Duflo, E. (2001). Schooling and labor market consequences of school construction in Indonesia: Evidence from an unusual policy experiment. *American Economic Review.* 91, 795-813. [pp. 795-797, 799-800]
- Assignments:
    - Quiz (due on Feb 19 at 11:59pm ET)
    - Lab (in class)
    - Policy memo (due on Feb 20 at 11:59pm ET)
- Optional resources:
    - Adukia, A. (2017). Sanitation and education. *American Economic Journal: Applied Economics*. 9(2), 23-59.
    - Afridi, F. (2011). The impact of school meals on school participation: Evidence from rural India. *Journal of Development Studies*. 47, 1636-1656.
    - Bouguen, A., Filmer, D., Macours, K., & Naudeau, S. (2018). Preschool and parental response in a second best world: Evidence from a school construction experiment. *Journal of Human Resources*. 53(2), 474-512.
    - Burde, D. & Linden, L. L. (2013). The effect of village-based schools: Evidence from a randomized controlled trial in Afghanistan. *American Economic Journal: Applied Economics*. 5, 27–40.
    - Buttenheim, A. M., Alderman, H., & Friedman, J. (2011). Impact evaluation of school feeding programs in Lao PDR. *(World Bank Policy Research Working Paper No. 5518)*. Washington, DC: The World Bank.
    - Glewwe, P., Park, A., & Zhao, M. (2014). A better vision for development: Eyeglasses and academic performance in rural primary schools in China. Cambridge, MA: Abdul Latif Jameel Poverty Action Lab (J-PAL).
    - Kazianga, H., de Walque, D., & Alderman, H. (2012). Educational and child labour impacts of two food-for-education schemes: Evidence from a randomised trial in rural Burkina Faso. *Journal of African Economies*. 21(5), 723–760.
    - Kazianga, H., Levy, D., Linden, L. L., & Sloan, M. (2013). The effects of "girl-friendly" schools: Evidence from the BRIGHT school construction program in Burkina Faso. *American Economic Journal: Applied Economics*. 5, 41-62.
    - Liu, C., Zhang, L., Luo, R., Rozelle, S., & Loyalka, P. (2010). The effect of primary school mergers on academic performance of students in rural China. *International Journal of Educational Development*. 30(6), 570-585.

- Muralidharan, K. & Prakash, N. (2017). Cycling to school: Increasing secondary school enrollment for girls in India. *American Economic Journal: Applied Economics*. 9(3), 321-350.
- Oster, E. & Thornton, R. (2011). Menstruation, sanitary products, and school attendance: Evidence from a randomized evaluation. *American Economic Journal: Applied Economics*. 3, 91-100.

**Class #9: Increasing enrollment by lowering the costs of substitutes to public schools** (Tue, Feb 25)

- Objectives:
  - Revisit *budget constraint*
  - Understand the extent to which individuals demand more (less) education as the costs of substitutes to public school decreases (increases)
  - Discuss the implications of such policies for equity
- Required readings:
  - Epple, D., Romano, R. E., & Urquiola, M. (2017). School vouchers: A survey of the economics literature. *Journal of Economic Literature*. 55(2), 441-492. [pp. 441-445]
  - Muralidharan, K. & Sundararaman, V. (2015). The aggregate effect of school choice: Evidence from a two-stage experiment in India. *The Quarterly Journal of Economics*. 130(3), 1011-1066. [pp. 1011-1037, 1039-1046]
- Assignment:
  - Quiz (due on Feb 24 at 11:59pm ET)
- Optional resources:
  - Angrist, J. D., Bettinger, E., Bloom, E., King, E., & Kremer, M. (2002). Vouchers for private schooling in Colombia: Evidence from a randomized natural experiment. *American Economic Review*. 1535-1558.
  - Alderman, H., Kim, J., & Orazem, P. F. (2003). Design, evaluation, and sustainability of private schools for the poor: The Pakistan urban and rural fellowship school experiments. *Economics of Education Review*. 22(3), 265-274.
  - Angrist, J. D., Bettinger, E., & Kremer, M. (2006). Long-term educational consequences of secondary school vouchers: Evidence from administrative records in Colombia. *American Economic Review*. 96, 847-862 American Economic Association.
  - Bettinger, E., Kremer, M., & Saavedra, J. E. (2010). Are educational vouchers only redistributive? *The Economic Journal*. 120(546), F204-F228.
  - Dean, J. T. & Jayachandran, S. (2019). Attending kindergarten improves cognitive but not socioemotional development in India. *Unpublished manuscript*. Chicago, IL: Booth School of Business, University of Chicago .

- Hsieh, C.-T. & Urquiola, M. (2006). The effects of generalized school choice on achievement and stratification: Evidence from Chile's voucher program. *Journal of Public Economics*. 90(8), 1477-1503.
- Neal, D. (2002). How vouchers could change the market for education. *Journal of Economic Perspectives*. 16(4), 25-44.
- Wong, H. L., Luo, R., Zhang, L., & Rozelle, S. (2013). The impact of vouchers on preschool attendance and elementary school readiness: A randomized controlled trial in rural China. *Economics of Education Review*. 35, 53-65.

**Class #10: Increasing enrollment by compensating parents for the opportunity costs of schooling** (Thu, Feb 27)

- Key concepts:
  - Revisit *opportunity cost*
  - Understand the extent to which parents will demand more education for their children as their compensation for the opportunity costs of doing so increases
  - Practice reading a development economics paper
- Required readings:
  - Barrera-Osorio, F., Bertrand, M., Linden, L. L., & Perez-Calle, F. (2011). Improving the design of conditional transfer programs: Evidence from a randomized education experiment in Colombia. *American Economic Journal: Applied Economics*. 3, 167-195. [pp. 167-173, 177-183]
- Assignments:
  - Quiz (due on Feb 26 at 11:59pm ET)
- Optional resources:
  - Barham, T., Macours, K., & Maluccio, J. A. (2013). Boys' cognitive skill formation and physical growth: Long-term experimental evidence on critical ages for early childhood interventions. *The American Economic Review*. 103(3), 467-471.
  - Baird, S., McIntosh, C., & Ozler, B. (2011). Cash or condition? Evidence from a cash transfer experiment. *The Quarterly Journal of Economics*. 126, 1709-1753.
  - Barrera-Osorio, F. & Filmer, D. (2016). Incentivizing schooling for learning: Evidence on the impact of alternative targeting approaches. *Journal of Human Resources*. 51(2), 461-499.
  - Barrera-Osorio, F., de Barros, A., & Filmer, D. (2018). Long-term impacts of alternative approaches to increase schooling: Evidence from a scholarship program in Cambodia *(Policy Research Working Paper No. 8566)*. Washington, DC: The World Bank.
  - Behrman, J. R., Parker, S. W., & Todd, P. E. (2011). Do conditional cash transfers for schooling generate lasting benefits? A five-year followup of PROGRESA/Oportunidades. *Journal of Human Resources*. 46(1), 93-122.

- Benhassine, N., Devoto, F., Duflo, E., Dupas, P., & Pouliquen, V. (2013). Turning a shove into a nudge? A "labeled cash transfer" for education. *American Economic Journal: Economic Policy.* 7, 86-125.
- Bursztyn, L. & Coffman, L. C. (2012). The schooling decision: Family preferences, intergenerational conflict, and moral hazard in the Brazilian favelas. *Journal of Political Economy.* 120(3), 359-397.
- Kremer, M., Miguel, E., & Thornton, R. (2009). Incentives to learn. *The Review of Economics and Statistics*. 91, 437-456.
- Millán, T. M., Macours, K., Maluccio, J. A., & Tejerina, L. (2020). Experimental long-term effects of early-childhood and school-age exposure to a conditional cash transfer program. *Journal of Development Economics*. 143, 102385.
- Schultz, P. T. (2004). School subsidies for the poor: Evaluating the Mexican Progresa poverty program. *Journal of Development Economics*. 74, 199-250.

**Class #11: Increasing attainment by increasing the perceived benefits of schooling**
(Tue, Mar 4)

- Objectives:
  - Understand the extent to which families will demand more education as their estimation of the benefits of sending their children to school increases
  - Discuss how estimation of such benefits may vary within households
- Required readings:
  - Jensen, R. T. (2010). The (perceived) returns to education and the demand for schooling. *The Quarterly Journal of Economics*. 125, 515-548. [pp. 515-518, 522-536]
  - Dizon-Ross, R. (2019). Parents' beliefs about their children's academic ability: Implications for educational investments. *American Economic Review*. 109(8), 2728–2765. [pp. 2728-2731, 2736-2739, 2743-2752]
- Assignment:
  - Quiz (due on Mar 3 at 11:59pm ET)
- Optional resources:
  - Bonilla, L., Bottan, N. L., & Ham, A. (2016). Information policies and higher education choices: Experimental evidence from Colombia. *Journal of Behavioral and Experimental Economics*. 83, 101468.
  - Jensen, R. T. (2012). Do labor market opportunities affect young women's work and family decisions? Experimental evidence from India. *The Quarterly Journal of Economics*. 127, 753–792.
  - Loyalka, P., Song, Y., Wei, J., Zhong, W., & Rozelle, S. (2013). Information, college decisions and financial aid: Evidence from a cluster-randomized controlled trial in China. *Economics of Education Review*. 36, 26–40.

- Dinkelman, T. & Martínez, A. C. (2013). Investing in schooling in Chile: The role of information about financial aid for higher education. *Review of Economics and Statistics*. 96(2), 244-257.
- Thaler, R. H. (2016). Behavioral economics: Past, present, and future. *American Economic Review*. 106(7), 1577-1600.

**Class #12: Increasing student effort by increasing the benefits of productivity** (Thu, Mar 6)

- Objectives:
  - Introduce the *education production function*
  - Understand the extent to which students will increase their effort as the (short-term) benefits of inputs into the education production function increase
- Required readings:
  - Berry, J. (2015). Child control in education decisions: An evaluation of targeted incentives to learn in India. *The Journal of Human Resources*. 50(4), 1051-1080. [pp. 1051-1057, 1062-1067]
- Assignments:
  - Quiz (due on Mar 5 at 11:59pm ET)
  - Lab (in class)
- Optional resources:
  - Behrman, J. R., Parker, S. W., Todd, P. E., & Wolpin, K. I. (2015). Aligning learning incentives of students and teachers: Results from a social experiment in Mexican high schools. *Journal of Political Economy*. 123, 325-364.
  - Berry, J., Kim, H. B., & Son, H. H. (2022). When student incentives do not work: Evidence from a field experiment in Malawi. *Journal of Development Economics*. 158, 102893.
  - Blimpo, M. P. (2014). Team incentives for education in developing countries: A randomized field experiment in Benin. *American Economic Journal: Applied Economics*. 6(4), 90-109.
  - Fryer, R. G. (2010). Financial incentives and student achievement: Evidence from randomized trials. *(NBER Working Paper No. 15898)*. Cambridge, MA: National Bureau of Economic Research (NBER). *[Note: I chose this and not the published version because it includes incentives for inputs in Washington, DC.]*
  - Li, T., Han, L., Zhang, L., & Rozelle, S. (2014). Encouraging classroom peer interactions: Evidence from Chinese migrant schools. *Journal of Public Economics*. 111, 29-45.

**Class #13: Increasing student effort by lowering the costs of productivity** (Tue, Mar 11)

- Objectives:
  - Introduce *dynamic complementarities*

    - Understand the extent to which students will increase their effort as the costs of doing so decreases
- Required readings:
    - Gertler, P. J., Heckman, J. J., Pinto, R., Zanolini, A., Vermeerch, C., Walker, S. P., Chang, S. M., & Grantham-McGregor, S. M. (2014). Labor market returns to an early childhood stimulation intervention in Jamaica. *Science.* 344(6187), 998-1001.
- Assignment:
    - Quiz (due on Mar 10 at 11:59pm ET)
- Optional resources:
    - Andrew, A., Attanasio, O., Augsburg, B., Day, M., Grantham-McGregor, S., Meghir, C., Mehrin, F., Pahwa, S., & Rubio-Codina, M. (2020). Effects of a scalable home-visiting intervention on child development in slums of urban India: evidence from a randomised controlled trial. *Journal of Child Psychology and Psychiatry.* 61(6), 644-652.
    - Attanasio, O. P., Fernández, C., Fitzsimons, E. O. A., Grantham-McGregor, S. M., Meghir, C., & Rubio-Codina, M. (2014). Using the infrastructure of a conditional cash transfer program to deliver a scalable integrated early child development program in Colombia: Cluster randomized controlled trial. *BMJ.* 349, g5785.
    - Banerji, R., Berry, J., & Shotland, M. (2015). The impact of mother literacy and participation programs on child learning: Evidence from a randomized evaluation in India. *Unpublished manuscript.* Cambridge, MA: Abdul Latif Jameel Poverty Action Lab (J-PAL).
    - Carneiro, P., Cruz-Aguayo, Y., Pachon, R. H., & Schady, N. (2022). Dynamic complementarity in elementary schools: Experimental estimates from Ecuador. *Unpublished manuscript.* London, England: University College London.
    - Cunha, F. & Heckman, J. J. (2007). The technology of skill formation. *American Economic Review.* 97(2), 31-47.
    - Meghir, C., Attanasio, O., Jervis, P., Day, M., Makkar, P., Behrman, J. R., Gupta, P., Pal, R., Phimister, A., & Vernekar, N. (2023). Early stimulation and enhanced preschool: A randomized trial. *Pediatrics.* 151(Supplement 2), e2023060221H.
    - Mo, D., Luo, R., Liu, C., Zhang, H., Zhang, L., Medina, A., & Rozelle, S. (2014). Text messaging and its impacts on the health and education of the poor: Evidence from a field experiment in rural China. *World Development.* 64, 766-780.
    - Yousafzai, A. K., Rasheed, M. A., Rizvi, A., Armstrong, R., & Bhutta, Z. A. (2014). Effect of integrated responsive stimulation and nutrition interventions in the Lady Health Worker programme in Pakistan on child development, growth, and health outcomes: A cluster-randomised factorial effectiveness trial. *The Lancet.* 384, 1282–1293.

**Class #14: Increasing student effort by increasing the perceived benefits of productivity** (Thu, Mar 13)

- Objectives:
    - Understand the extent to which students will increase their effort as their estimation of the benefits of productivity increases
- Required readings:
    - Alan, S., Boneva, T., & Ertac, S. (2019). Ever failed, try again, succeed better: Results from a randomized educational intervention on grit. *The Quarterly Journal of Economics*. 134(3), 1121–1162. [1121-1137, 1141-1148, 1149-1150]
- Assignments:
    - Quiz (due on Mar 12 at 11:59pm ET)
    - Policy memo (due on Mar 24 at 11:59pm ET)
- Optional resources:
    - Alan, S. & Ertac, S. (2015). Patience, self-control and the demand for commitment: Evidence from a large-scale field experiment. *Journal of Economic Behavior & Organization*. 115, 111-122.
    - Alan, S. & Ertac, S. (2018). Fostering patience in the classroom: Results from randomized educational intervention. *Journal of Political Economy*. 126(5), 1865-1911.
    - Alan, S., Baysan, C., Gumren, M., & Kubilay, E. (2021). Building social cohesion in ethnically mixed schools: An intervention on perspective taking. *The Quarterly Journal of Economics*. 136(4), 2147-2194.
    - Alan, S., Ertac, S., & Mumcu, I. (2018). Gender stereotypes in the classroom and effects on achievement. *Review of Economics and Statistics*. 100(5), 876-890.
    - Borghans, L., Duckworth, A. L., Heckman, J. J., & Ter Weel, B. (2008). The economics and psychology of personality traits. *Journal of Human Resources*. 43(4), 972-1059.
    - Ganimian, A. J. (2020). Growth mindset interventions at scale: Experimental evidence from Argentina. *Educational Evaluation and Policy Analysis*. 42(3), 417-438.
    - Ganimian, A. J., Barrera-Osorio, F., Biehl, L., & Cortelezzi, M. (2020). Hard cash and soft skills: Experimental evidence on combining scholarships and mentoring in Argentina. *Journal of Research on Educational Effectiveness*. 13(2), 380-400.

*[Spring recess: Mar 17-21]*

**PART III: IMPROVING THE SUPPLY OF EDUCATION**

**Class #15: Increasing the quality of instruction by providing schools/homes with learning materials (e.g., textbooks, computers, flipcharts)** (Tue, Mar 25)

- Objectives:
    - Revisit *complements*

    - Understand when teaching and learning materials (e.g., textbooks) are most/least likely to improve instruction/learning
    - Consider *crowd-in* and *crow-out* effects
- Required readings:
    - Glewwe, P., Kremer, M., & Moulin, S. (2009). Many children left behind? Textbooks and test scores in Kenya. *American Economic Journal: Applied Economics*. 1, 112-135. [112-119, 121, 125-127]
    - Malamud, O. & Pop-Eleches, C. (2011). Home computer use and the development of human capital. *The Quarterly Journal of Economics*. 126, 987-1027. [987-991]
- Assignment:
    - Quiz (due on Mar 24 at 11:59pm ET)
- Optional resources:
    - Beasley, E. & Huillery, E. (2015). Willing but unable: Short-term experimental evidence on parent empowerment and school quality. *Unpublished manuscript*. Paris, France: Sciences Po.
    - Beuermann, D. W., Cristia, J. P., Cruz-Aguayo, Y., Cueto, S., & Malamud, O. (2015). Home computers and child outcomes: Short-term impacts from a randomized experiment in Peru. *American Economic Journal: Applied Economics*. 7(2), 53-80.
    - Cristia, J. P., Ibarrarán, P., Cueto, S., Santiago, A., & Severín, E. (2012). Technology and child development: Evidence from the One Laptop per Child program. *(Working Paper No. IDB-WP-304)*. Washington, DC: Inter-American Development Bank.
    - Das, J., Dercon, S., Habyarimana, J., Krishnan, P., Muralidharan, K., & Sundararaman, V. (2013). School inputs, household substitution, and test scores. *American Economic Journal: Applied Economics*. 5, 29-57.
    - Glewwe, P., Kremer, M., Moulin, S., & Zitzewitz, E. (2004). Retrospective vs. prospective analyses of school inputs: The case of flip charts in Kenya. *Journal of Development Economics*. 74, 251-268.
    - Pradhan, M., Suryadarma, D., Beatty, A., Wong, M., Gaduh, A., Alisjahbana, A., & Artha, R. P. (2014). Improving educational quality through enhancing community participation: Results from a randomized field experiment in Indonesia. *American Economic Journal: Applied Economics*. 6, 105-126.

**Class #16: Improving the match between teachers' instruction and students' preparation by reducing class sizes** (Thu, Mar 27)

- Objectives:
    - Revisit *complements*
    - Introduce *peer effects*

    - Understand when class-size reductions are most/least likely to improve learning (e.g., in combination with ability tracking)
- Required readings:
    - Duflo, E., Dupas, P., & Kremer, M. (2015). School governance, teacher incentives, and pupil-teacher ratios: Experimental evidence from Kenyan primary schools. *Journal of Public Economics*. 123, 92–110. [pp. 92-99]
- Assignment:
    - Quiz (due on Mar 26 at 11:59pm ET)
    - Lab (in class)
- Optional resources:
    - Asadullah, M. N. (2005). The effect of class size on student achievement: Evidence from Bangladesh. *Applied Economics Letters*. 12(4), 217-221.
    - Chin, A. (2005). Can redistributing teachers across schools raise educational attainment? Evidence from Operation Blackboard in India. *Journal of Development Economics*. 78(2), 384-405.
    - Jackson, C. K. (2010). Do students benefit from attending better schools? Evidence from rule-based student assignments in Trinidad and Tobago *The Economic Journal*. 120(549), 1399-1429.
    - Jackson, C. K. (2013). Can higher-achieving peers explain the benefits to attending selective schools? Evidence from Trinidad and Tobago. *Journal of Public Economics*. 108, 63-77.
    - Pop-Eleches, C. & Urquiola, M. (2013). Going to a better school: Effects and behavioral responses. *American Economic Review*. 103, 1289-1324.
    - Urquiola, M. (2006). Identifying class size effects in developing countries: Evidence from rural Bolivia. *Review of Economics and Statistics*. 88(1), 171-177.
    - Urquiola, M. & Verhoogen, E. (2009). Class-size caps, sorting, and the regression-discontinuity design. *American Economic Review*. 99, 179-215.

**Class #17: Improving the match between teachers' instruction and students' preparation by remedying gaps in students' foundational skills** (Tue, Apr 1)

- Objectives:
    - Introduce the *potential pedagogical function*
    - Understand how remedial education can benefit not only low-achieving students but also their higher-achieving peers
- Required readings:
    - Banerjee, A. V., Cole, S., Duflo, E., & Linden, L. L. (2007). Remedying education: Evidence from two randomized experiments in India. *The Quarterly Journal of Economics*. 122, 1235-1264. [pp. 1235-1244, 1248-1257]
- Assignment:
    - Quiz (due on Mar 31 at 11:59pm ET)
- Optional resources:

- Angrist, N., Bergman, P., & Matsheng, M. (2022). Experimental evidence on learning using low-tech when school is out. *Nature Human Behaviour.* 6(7), 941-950.
- Battaglia, M. & Lebedinski, L. (2022). With a little help from my friends: Medium-Term effects of a remedial education program targeting Roma minority. *Economics of Education Review.* 86, 102196.
- Ganimian, A. J. & Djaker, S. (2022). How can developing countries address heterogeneity in students' preparation for school? A review of the challenge and potential solutions. *Unpublished manuscript.* New York, NY: Steinhardt School of Culture, Education, and Human Development, New York University.
- Marinelli, H. A., Berlinski, S., & Busso, M. (2021). Remedial education: Evidence from a sequence of experiments in colombia. *Journal of Human Resources*. 0320-10801R10802.

**Class #18: Improving the match between teachers' instruction and students' preparation by using technology to deliver differentiated instruction** (Thu, Apr 3)

- Objectives:
  - Understand how technology (e.g., computer-adaptive software) may complement teacher-led instruction to reduce such variability
- Required readings:
  - Muralidharan, K., Singh, A., & Ganimian, A. J. (2019). Disrupting education? Experimental evidence on technology-aided instruction in India. *American Economic Review.* 109(4), 1426-1460. [1426-1447, 1450-1454]
- Assignment:
  - Quiz (due on Apr 2 at 11:59pm ET)
- Optional resources:
  - Büchel, K., Jakob, M., Kühnhanss, C., Steffen, D., & Brunetti, A. (2022). The relative effectiveness of teachers and learning software: Evidence from a field experiemnt in El Salvador. *Journal of Labor Economics*. 40(3), 737-777.
  - de Barros, A. & Ganimian, A. J. (2023). Which students benefit from computer-based individualized instruction? Experimental evidence from public schools in India. *Journal of Research on Educational Effectiveness*. .
  - Mo, D., Huang, W., Shi, Y., Zhang, L., Boswell, M., & Rozelle, S. (2014). Computer technology in education: Evidence from a pooled study of computer assisted learning programs among rural students in China. *China Economic Review.* 36, 131-145.
  - Lai, F., Zhang, L., Hu, X., Qu, Q., Shi, Y., Qiao, Y., Boswell, M., & Rozelle, S. (2013). Computer assisted learning as extracurricular tutor? Evidence from a randomised experiment in rural boarding schools in Shaanxi. *Journal of development effectiveness*. 5(2), 208-231.

- Lai, F., Luo, R., Zhang, L., Huang, X., & Rozelle, S. (2015). Does computer-assisted learning improve learning outcomes? Evidence from a randomized experiment in migrant schools in Beijing. *Economics of Education Review.* 47, 34-48.
- Ma, Y., Fairlie, R. W., Loyalka, P., & Rozelle, S. (2024). Isolating the "tech" from EdTech: Experimental evidence on computer assisted learning in China. *Economic Development and Cultural Change.* 72(4), 1923-1962.
- Mo, D., Swinnen, J., Zhang, L., Yi, H., Qu, Q., Boswell, M., & Rozelle, S. (2013). Can one-to-one computing narrow the digital divide and the educational gap in China? The case of Beijing migrant schools. *World Development*. 46, 14-29.
- Mo, D., Zhang, L., Luo, R., Qu, Q., Huang, W., Wang, J., Qiao, Y., Boswell, M., & Rozelle, S. (2014). Integrating computer-assisted learning into a regular curriculum: Evidence from a randomised experiment in rural schools in Shaanxi. *Journal of development effectiveness*. 6, 300-323.

**Class #19: Increasing principal/teacher effort by increasing the salience of gaps in student learning** (Tue, Apr 8)

- Objectives:
  - Introduce the *principal-agent model*
  - Understand how informing principals/teachers of their students' learning levels may increase principal/teacher effort
- Required readings:
  - de Hoyos, R., Ganimian, A. J., & Holland, P. (2021). Teaching with the test: Experimental evidence on diagnostic feedback and capacity-building for schools in Argentina. *World Bank Economic Review.* 35(2), 499-520. [pp. 499-506, 510-516]
- Assignment:
  - Quiz (due on Apr 7 at 11:59pm ET)
- Optional resources:
  - Anand, G., Atluri, A., Crawfurd, L., Pugatch, T., & Sheth, K. (2023). Improving school management in low and middle income countries: A systematic review. *Unpublished manuscript*. Corvallis, OR: Oregon State University.
  - Andrabi, T., Das, J., & Khwaja, A. I. (2017). Report cards: The impact of providing school and child test scores on educational markets. *American Economic Review.* 107(6), 1535-1563.
  - Banerjee, A. V., Banerji, R., Duflo, E., Glennerster, R., & Khemani, S. (2010). Pitfalls of participatory programs: Evidence from a randomized evaluation in education in India. *American Economic Journal: Economic Policy.* 2, 1-30.
  - Barrera-Osorio, F. & Ganimian, A. J. (2016). The barking dog that bites: Test score volatility and school rankings in Punjab, Pakistan. *International Journal of Educational Development*. 49, 31-54.

- Camargo, B., Camelo, R., Firpo, S., & Ponczek, V. (2018). Information, market incentives, and student performance: Evidence from a regression discontinuity design in Brazil. *The Journal of Human Resources*. 53(2), 414-444.
- de Hoyos, R., Djaker, S., Ganimian, A. J., & Holland, P. (2024). The imapct of combining performance-management tools and training with diagnostic feedback in public schools: Experimental evidence from Argentina. *Economics of Education Review*. 9, 102518.
- Djaker, S., Ganimian, A. J., & Sabarwal, S. (2024). Out of sight, out of mind? The gap between students' test performance and teachers' estimations in India and Bangladesh. *Economics of Education Review*. 102, 102575.
- Hanna, R. N. & Linden, L. L. (2012). Discrimination in grading. *American Economic Journal: Economic Policy*. 4(4), 146-168.
- Mizala, A. & Urquiola, M. (2013). School markets: The impact of information approximating schools' effectiveness. *Journal of Development Economics*. 103, 313-335.
- Muralidharan, K. & Sundararaman, V. (2010). The impact of diagnostic feedback to teachers on student learning: Experimental evidence from India. *The Economic Journal*. 120, F187-F203.
- Pandey, P., Goyal, S., & Sundararaman, V. (2009). Community participation in public schools: Impact of information campaigns in three Indian states. *Education Economics*. 17, 355-375.

**Class #20: Increasing teacher effort by paying them based on (improvements in) student achievement** (Thu, Apr 10)

- Objectives:
  - Understand how paying teachers for their students' learning levels may increase principal/teacher effort
- Required readings:
  - Muralidharan, K. & Sundararaman, V. (2011). Teacher performance pay: Experimental evidence from India. *Journal of Political Economy*. 119, 39-77. [pp. 39-43, 47-52, 54-57]
- Assignment:
  - Quiz (due on Apr 9 at 11:59pm ET)
  - Lab (in class)
- Optional resources:
  - Barrera-Osorio, F. & Raju, D. (2015). Teacher performance pay: Experimental evidence from Pakistan. *Unpublished manuscript*. Washington, DC: The World Bank.
  - Barlevy, G. & Neal, D. (2012). Pay for percentile. *American Economic Review*. 102(5), 1805-1831.

- Chang, F., Wang, H., Qu, Y., Zheng, Q., Loyalka, P., Sylvia, S., Shi, Y., Dill, S.-E., & Rozelle, S. (2020). The impact of pay-for-percentile incentive on low-achieving students in rural China. *Economics of Education Review.* 75, 101954.
- de Ree, J., Muralidharan, K., Pradhan, M., & Rogers, F. H. (2016). Double for nothing? Experimental evidence on the impact of an unconditional teacher salary increase on student performance in Indonesia. *Unpublished manuscript*. Washington, DC: The World Bank.
- Duflo, E., Hanna, R., & Ryan, S. P. (2012). Incentives work: Getting teachers to come to school. *The American Economic Review.* 102, 1241-1278.
- Gilligan, D. O., Karachiwalla, N., Kasirye, I., Lucas, A. M., & Neal, D. (2022). Educator incentives and educational triage in rural primary schools. *Journal of Human Resources*. 57(1), 79-111.
- Glewwe, P., Ilias, N., & Kremer, M. (2010). Teacher incentives. *American Economic Journal: Applied Economics*. 2, 205-227.
- Loyalka, P., Sylvia, S., Liu, C., Chu, J., & Shi, Y. (2019). Pay by design: Teacher performance pay design and the distribution of student achievement. *Journal of Labor Economics*. 37(3), 621-662.
- Menezes-Filho, N. & Pazello, E. (2007). Do teachers' wages matter for proficiency? Evidence from a funding reform in Brazil. *Economics of Education Review.* 26(6), 660-672.
- Vegas, E. & Umansky, I. (2005). Chapter 1: Introduction. *Improving teaching and learning through effective incentives: What can we learn from education reforms in Latin America?* , Washington, DC: The World Bank.

**Class #21: Improving instruction by training teachers** (Tue, Apr 15)

- Objectives:
  - Discuss the pros and cons of changing teachers' practice through training
  - Consider how such training is typically delivered and whether such delivery mechanisms are well suited to encourage and sustain behavior change
  - Develop hypotheses for the disappointing results of traditional training efforts
- Required readings:
  - Cilliers, J., Fleisch, B., Prinsloo, C., & Taylor, S. (2018). How to improve teaching practice? Experimental comparison of centralized training and in-classroom coaching. Washington, DC: Georgetown University. [pp. 926-931, 940-945]
  - Loyalka, P., Popova, A., Li, G., & Shi, Z. (2019). Does teacher training actually work? Evidence from a large-scale randomized evaluation of a national teacher training program. *American Economic Journal: Applied Economics*. 11(3), 128-154. [pp. 128-134, 140-148]
- Assignment:
  - Quiz (due on Apr 14 at 11:59pm ET)
- Optional resources:

- Cilliers, J., Fleisch, B., Kotze, J., Mohohlwane, N., Taylor, S., & Thulare, T. (2022). Can virtual replace in-person coaching? Experimental evidence on teacher professional development and student learning. *Journal of Development Economics*. 155, 102815.
- Popova, A., Evans, D. K., Breeding, M. E., & Arancibia, V. (2022). Teacher professional development around the world: The gap between evidence and practice. *The World Bank Research Observer*. 37(1), 107-136.
- Yoshikawa, H., Leyva, D., Snow, C. E., Treviño, E., Arbour, M. C., Barata, M. C., Weiland, C., Gómez, C., Moreno, L., Rolla, A., & D'Sa, N. (2015). Experimental impacts of a teacher professional development program in Chile on preschool classroom quality and child outcomes. *Journal of Developmental Psychology*. 51, 309-322.
- Zhang, L., Lai, F., Pang, X., Yi, H., & Rozelle, S. (2013). The impact of teacher training on teacher and student outcomes: Evidence from a randomised experiment in Beijing migrant schools. *Journal of development effectiveness*. 5, 339-358.

**Class #22: Improving instruction by automating or delegating instructional tasks** (Thu, Apr 17)

- Objectives:
  - Consider the areas in which teachers need most help
  - Discuss the pros and cons of automating (e.g., through pre-recorded lessons or scripts) or delegating (e.g., through inquiry-based methods) instructional tasks
  - Examine the implications of such automation
- Required readings:
  - Gray-Lobe, G., Keats, A., Kremer, M., Mbiti, I., & Ozier, O. W. (2022). Can education be standardized? Evidence from Kenya. *(Working Paper No. 2022-68)*. Chicago, IL: Becker Friedman Institute For Economics. [pp. 1-17, 31-39, 41-46]
- Assignment:
  - Quiz (due on Apr 16 at 11:59pm ET)
- Optional resources:
  - Abeberese, A. B., Kumler, T. J., & Linden, L. L. (2014). Improving reading skills by encouraging children to read in school: A randomized evaluation of the Sa Aklat Sisikat reading program in the Philippines. *Journal of Human Resources*. 49, 611-633.
  - Bando, R., Näslund-Hadley, E., & Gertler, P. (2019). Effect of inquiry and problem based pedagogy on learning: Evidence from 10 field experiments in four countries. *(NBER Working Paper No. 26280)*. Cambridge, MA: National Bureau of Economic Research (NBER).
  - Berlinski, S. & Busso, M. (2017). Challenges in educational reform: An experiment on active learning in mathematics. *Economics Letters*. 156, 172-175.

- Beg, S., Halim, W., Lucas, A. M., & Saif, U. (2022). Engaging teachers with technology increased achievement, bypassing teachers did not. *American Economic Journal: Economic Policy.* 14(2), 61-90.
- Beuermann, D. W., Naslund-Hadley, E., Ruprah, I. J., & Thompson, J. (2013). The pedagogy of science and environment: Experimental evidence from Peru. *The Journal of Development Studies.* 49(5), 719-736.
- Ganimian, A. J., Mbiti, I. M., & Mishra, A. (2024). Teach for science: Experimental evidence on a STEM teaching fellowship in India. *Unpublished manuscript.* New York, NY: Steinhardt School of Culture, Education, and Human Development, New York University.
- Lucas, A. M., McEwan, P. J., Ngware, M., & Oketch, M. (2014). Improving early-grade literacy in East Africa: Experimental evidence from Kenya and Uganda. *Journal of Policy Analysis and Management.* 33, 950-976.
- Naslund-Hadley, E., Parker, S. W., & Hernandez-Agramonte, J. M. (2014). Fostering early math comprehension: Experimental evidence from Paraguay. *Global Education Review.* 1, 135-154.
- Piper, B., Zuilkowski, S. S., & Mugenda, A. (2014). Improving reading outcomes in Kenya: First-year effects of the PRIMR Initiative. *International Journal of Educational Development.* 37, 11-21.

**PART IV: THE FRONTIER OF EVIDENCE IN ECONOMICS**

**Class #23: Field experiments** (Tue, Apr 22)

- Objectives:
  - Understand the evolution of the use of field experiments in economics
  - Consider their potential limitations to inform policy decisions
- Required readings:
  - Banerjee, A. V., Duflo, E., & Kremer, M. (2019). The influence of randomized controlled trials on development economics research and on development policy. *The state of economics, the state of the world.* Cambridge, MA and London, England: MIT Press. [pp. 439-469]
- Assignment:
  - Quiz (due on Apr 21 at 11:59pm ET)
- Optional resources:
  - Akyeampong, T., Andrabi, T., Banerjee, A. V., Banerji, R., Dynarksi, S., Glennerster, R., Grantham-McGregor, S. M., Muralidharan, K., Piper, B., Ruto, S., Saavedra, J., Schmelkes, S., & Yoshikawa, H. (2023). 2023 cost-effective approaches to improve global learning. What does recent evidence tell us are "smart buys" for improving learning in low- and middle-income countries? , London, UK; Washington, DC; New York, NY: Foreign, Commonwealth & Development Office (FCDO), World Bank, United Nations International

Children's Emergency Fund (UNICEF), United States Agency for International Development (USAID).
- Conn, K. M. (2017). Identifying effective education interventions in Sub-Saharan Africa: A meta-analysis of rigorous impact evaluations. *Review of Educational Research*. 87(5), 863-898.
- Deaton, A. (2010). Instruments, randomization, and learning about development. *Journal of Economic Literature*. 48(2), 424-455.
- Duflo, E. (2017). The economist as plumber. *American Economic Review*. 107(5), 1-26.
- Evans, D. K. & Popova, A. (2017). What really works to improve learning in developing countries? An analysis of divergent findings in systematic reviews. *The World Bank Research Observer*. 31, 242-270.
- Evans, D. K. & Yuan, F. (2022). How big are effect sizes in international education studies? *Educational Evaluation and Policy Analysis*. 44(3), 532-540.
- Ganimian, A. J. & Murnane, R. J. (2016). Improving educational outcomes in developing countries: Lessons from rigorous evaluations. *Review of Educational Research*. 86(3), 719-755.
- Glewwe, P. & Muralidharan, K. (2016). Chapter 10: Improving education outcomes in developing countries: Evidence, knowledge gaps, and policy implications. *Handbook of the Economics of Education*. 5, 653-743Amsterdam, The Netherlands: North Holland.
- Harrison, G. W. & List, J. A. (2004). Field experiments. *Journal of Economic Literature*. 42(4), 1009-1055.
- Kremer, M., Brannen, C., & Glennerster, R. (2013). The challenge of education and learning in the developing world. *Science*. 340, 297-300.
- Levitt, S. D. & List, J. A. (2009). Field experiments in economics: The past, the present, and the future. *European Economic Review*. 53(1), 1-18.
- McEwan, P. (2014). Improving learning in primary schools of developing countries: A meta-analysis of randomized experiments. *Review of Educational Research*. XX, 1-42.
- Muralidharan, K. (2017). Field experiments in education in developing countries. *Handbook of field experiments (Vol. 1)*. North Holland.
- Ravallion, M. (2012). Fighting poverty one experiment at a time: A review of Abhijit Banerjee and Esther Duflo's poor economics: A radical rethinking of the way to fight global poverty. *Journal of Economic Literature*. 50(1), 103-114.
- Snilstveit, B., Stevenson, J., Phillips, D., Vojtkova, M., Gallagher, E., Schmidt, T., Jobse, H., Geelen, M., Pastorello, M. G., & Eyers, J. (2015). Interventions for improving learning outcomes and access to education in low- and middle-income countries: A systematic review. London, UK: International Initiative for Impact Evaluation (3ie).

**Class #24: A/B experiments and mega-studies** (Thu, Apr 24)

- Objectives:
    - Discuss the limitations of field experiments to produce timely answers to policy questions
    - Introduce A/B testing and mega-studies as a substitute or complement to field experiments
- Required readings:
    - Angrist, N., Beatty, A., Cullen, C., & Matsheng, M. (2024). A/B testing in education: Rapid experimentation to optimise programme cost-effectiveness. Oxford, England: What Works Hub for Global Education.
    - Milkman, K. L., Gromet, D., Ho, H., Kay, J. S., Lee, T. W., Pandiloski, P., Park, Y., Rai, A., Bazerman, M., & Beshears, J. (2021). Megastudies improve the impact of applied behavioural science. *Nature*. 600(7889), 478-483. [pp. 478-482]
- Assignment:
    - Quiz (due on Apr 23 at 11:59pm ET)
    - Policy memo (due on Apr 24 at 11:59pm ET)
- Optional resources:
    - Athey, S., Bergstrom, K., Hadad, V., Jamison, J. C., Özler, B., Parisotto, L., & Sama, J. D. (2023). Can personalized digital counseling improve consumer search for modern contraceptive methods? *Science Advances*. 9(40), eadg4420.
    - Caria, A. S., Gordon, G., Kasy, M., Quinn, S., Shami, S. O., & Teytelboym, A. (2024). An adaptive targeted field experiment: Job search assistance for refugees in Jordan. *Journal of the European Economic Association*. 22(2), 781-836.
    - Kasy, M. & Sautmann, A. (2021). Adaptive treatment assignment in experiments for policy choice. *Econometrica*. 89(1), 113-132.

**Class #25: Lab-in-the field experiments** (Tue, Apr 29)

- Objectives:
    - Discuss the limitations of field experiments to shed light on individual-level mechanisms of impact
    - Introduce lab-in-the-field experiments as an effort to maximize the benefits and minimize the costs of both lab and field experiments
    - Understand the conditions for which such experiments are best suited
- Assignment:
    - Quiz (due on Apr 28 at 11:59pm ET)
- Required readings:
    - Gneezy, U. & Imas, A. (2017). Chapter 10: Lab in the field: Measuring preferences in the wild. *Handbook of field experiments (Vol. 1)*. Amsterdam, The Netherlands: North Holland. [pp. 439-441, 459-461]

    - Rao, G. (2019). Familiarity does not breed contempt: Generosity, discrimination, and diversity in Delhi schools. *American Economic Review.* 109(3), 774-809. [pp. 774-780, 788-793]
- Optional resources:
    - Al-Ubaydli, O. & List, J. A. (2015). Do natural field experiments afford researchers more or less control than laboratory experiments? *American Economic Review.* 105(5), 462-466.
    - Ludwig, J., Kling, J. R., & Mullainathan, S. (2011). Mechanism experiments and policy evaluations. *Journal of Economic Perspectives.* 25(3), 17-38.
    - Viceisza, A. C. G. (2016). Creating a lab in the field: Economics experiments for policymaking. *Journal of Economic Surveys.* 30(5), 835-854.
    - DellaVigna, S., Pope, D., & Vivalt, E. (2019). Predict science to improve science. *Science.* 366(6464), 428-429.

**Class #26: Final in-class lab** (Thu, May 1)

- Objectives:
    - Integrate knowledge of economic theory, evidence on improving the supply of education, and familiarity with frontier research designs
    - Apply such integration to a culminating lab experience
- Assignment:
    - Lab (in class)
    - Policy memo (due on May 12 at 11:59pm ET)