TEACHING DOSSIER

Justin C. Wiltshire
University of California, Berkeley
Institute for Research on Labor and Employment

1 Teaching Philosophy and Experience

My enthusiasm for teaching economics was cultivated by my early undergraduate economic courses, which dramatically affected the way I considered most human interactions. Though I was at first heavily-resistant to the idea that complex human decision-making could largely be boiled down to the incentives and constraints faced by relevant actors, the efforts of some particularly excellent professors helped me see the power of this framework, grounding these concepts in creative, real-world examples. This was a powerful way of thinking about the world, and I was excited to bring the same passion, empathy, and rigour to my classroom when I was given a chance as an undergraduate to be a teaching assistant (TA). I was gratified to see my students develop their own enthusiasm for these economic concepts, and was also gratified by their positive feedback, which led to many additional teaching opportunities during my undergraduate career, and eventually to an appointment as Head TA of a *Principles* course in my final semester.

While my own education and experience would gradually add some nuance to the way I viewed these classical economic ideas, those early teaching experiences helped prepare me for further roles as a graduate teaching assistant at SFU, LSE, UCL, and UC Davis, and eventually for opportunities to design and deliver courses as an instructor at UC Davis. These experiences have given me a great number of opportunities to engage with students from many different cultural and educational backgrounds, and with a variety of lived experiences. Throughout my time as a teacher I have consistently set high expectations for my students while assuring them that they, their peers, and I are all partners in their learning process. I have also benefited from their feedback, continually incorporating helpful suggestions into the way I teach, to ensure that my teaching stays fresh, encouraging, and beneficial. This framework is a fundamental expression of

my teaching philosophy, which at its heart views learning as a collaborative experience in which a dedicated teacher equips and empowers the learner to put together the pieces of a puzzle until that "eureka" moment where it suddenly all makes sense and the larger picture is clearly seen.

For example, when teaching concepts in the classroom I often set up short group exercises grounded in real-world examples, asking students to collaboratively determine e.g. how forest fires might impact wages and house prices in affected rural communities. Encouraging students to learn-by-doing with each other actively engages them and gives them agency in their learning process, while also providing more generally beneficial opportunities for them to learn to work as part of a team while meeting new friends.

Similarly, when teaching papers in the classroom I often have my students present the papers, which motivates the presenters to read the text carefully and affords me an opportunity to gauge their understanding of the key concepts. I then follow-up those presentations with inclusive discussions about context and implications, giving students the opportunity to praise or voice misgivings about the papers and to express how the content connects to things that matter to them.

When students visit me with questions during office hours, I often have them walk me through illustrative examples on the whiteboard so I can learn where their understanding is faltering. This lets me give them the nudge they need to reach a point of clarity about the ideas, and affords them the satisfaction and confidence that comes with figuring things out themselves.

Throughout more than a dozen quarters and semesters of teaching over my undergraduate and graduate careers, my students have regularly offered me glowing feedback and many have subsequently sought mentoring in various forms. In the same way my own teachers helped me, I have found it deeply rewarding to play a key role in developing my students' understanding of difficult economic concepts to the point of clarity so they can think like economists, and to more broadly play some small role in their development as confident, positive, thoughtful human beings. I look forward to continuing to do this as a professor.

I am open to teaching any undergraduate economics course, and feel confident in my ability to do so. Even if I have not previously taught the course as a TA or instructor, I believe I would simply need time to immerse myself in the material to prepare. As an example, this summer I designed and delivered an undergraduate *Economics of Education* course at UC Davis even though I had never taught a similar course. Given a choice, my preference would be to teach classes that overlap with my research interests or that deliver foundational microeconomic concepts, including: Labor Economics, Microeconomics (any), Public Economics, Industrial Organization, Urban and Regional Economics, Economics of Education, and Econometrics. I would also be comfortable teaching graduate-level courses, particularly in Labor Economics.

2 Teaching Evaluations

At UC Davis I was a TA for five academic quarters and four additional summer sessions, teaching Introductory and Intermediate Microeconomics, Labor Economics, and Public Finance. I was also an instructor

for *Economics of Education*, which gave me the opportunity to fully design and teach the course, develop course work and exams, and manage a teaching assistant. Feedback on my teaching has been very positive, and my evaluation ratings have exceeded the department averages. Below, I include examples of this sort of feedback from UC Davis students, along with my average scores from student evaluations of my effectiveness as a TA and as an instructor. A full list of unedited comments can be found on my website: https://justinwiltshire.com/teaching.

2.1 Course Evaluation Ratings

Table 1: Student evaluation of teaching as a TA (out of 5)

	Overall, the TA did a good job in this course					
	Summer Sessions	Fall 2016	Winter 2017	Spring 2017	Spring 2018	Fall 2018
Score	4.2	4.5	4.4	4.5	4.6	4.3

Table 2: Student evaluation of teaching as an instructor (out of 5)

	Summer 2021
The instructor is responsive to difficulties students have in understanding the material	4.8
The instructor presents material in a clear and organized manner	4.3
The instructor is available and helpful to student during office hours	5.0
Please indicate the overall teaching effectiveness of the instructor	4.3

2.2 Selected Representative Comments from TA and Instructor Course Evaluations:

"Justin is very good, very effective, and extremely helpful- teaching us material in a way that makes everything connect"

"The professor is very open and easy to talk to. He effectively stimulates discussion during lectures. Whether he agrees or disagrees with students' group discussions, he addresses his thoughts respectfully!"

"I enjoyed this class the Professor was amazing"

"Easily the best TA I've had at Davis thus far. I never felt like discussion was a waste of my time, I always had a clearer grasp on the material after his section"

"Justin was exceptionally passionate and interested in the subject. He went beyond the course material to challenge my understanding and he was extremely helpful in clearly explaining concepts. He promoted discussion and encouraged me to ask questions in class which I appreciate a lot. He was very clear and kept me engaged. I wish he was my professor for this class and not just my TA"

"Notes taken in discussion were beneficial becomes sometimes it would be a recap from lecture or it would be new information for the next lecture. Very much enjoyed how Justin would give us examples to solve on our own time with groups. Group work really helped me learn from my peers"

"Justin clarified everything that the professor introduced in class that I didn't either catch or understand. His problem sets that he created are super helpful, and I honestly would not have learned anything in this class without his help"

"Works as a TA as if he was the course professor and attempt to meet the needs of the student and teach them to understand the subject and not simply aim for passing"

"Justin is personally my favourite TA across all my classes this quarter. Whether it was the 4pm or 8pm discussion, his energy did not fall whatsoever; he was always loud, energetic, and encouraged participation every week, leaving the students with questions to think about over the weekend. He stopped immediately when a student was struggling, making sure everybody in the classroom was caught up on the material. He showed great love and passion for the subject, encouraging me to follow suit and do the same"

"Justin helped my grade on the midterms go from F to A"

"Awesome TA. Cared about his students' understanding, had his own website and lesson plans - really knew his stuff and how to explain it to students"

"Great TA!! He spoke very clearly and was very passionate about the material. He made sure everyone is his section understood the topics we were covering. He also had students do group activities to further understand the material. Best TA I've ever had!"

"Justin was a phenomenal TA. He helped prepare the section extremely well before exams. His notes were very detailed and well thought out. Overall, he was a delightful TA and I thoroughly enjoyed section. As a fellow Canadian, I enjoyed his references and occasional commentary about America. I hope the best for him in his future endeavors"

"Justin is super knowledgeable and I feel like I had a second professor. Not a minute of discussion was wasted and his explanations were very supplementary to the material in class. Loved having him!"

"The absolute best TA I have ever experienced. Justin is an exceptional TA and truly cares about his students as well as the subject at matter. I genuinely looked forward to going to Justin's discussion sections. He explained material in a way that made it so clear and understandable. He was very open to students asking questions and answering questions even if we weren't sure about our answers. He is very passionate about the subject and very knowledgeable about economics. I was extremely happy that I got Justin as a TA. I would never go this in depth about any other TA, but I strongly believe Justin has an extremely bright future in his teaching career. He will make an amazing professor in the future. Absolutely love his teaching method and style. Keep it up Justin!"

3 Sample Syllabus: Economics of Education

Syllabus
Economics of Education (ECN 152)
University of California, Davis | Summer 2021

Instructor: Justin C. Wiltshire | jcwiltshire@ucdavis.edu | https://justinwiltshire.com
Teaching Assistant: *Redacted*
This course will be conducted virtually. Please use the Zoom links and course materials on Canvas.

Meeting times (Pacific Daylight Time):

- Monday - 12:10–1:50pm: Lectures. *No class on July 5*. Midterm on July 19
- Tuesday - 12:10–1:50pm: Student presentations and discussions
- Wednesday - 12:10–1:50pm: Lectures, student presentations and discussions

Study hall: Wednesday - 2:10–3:00pm
One-on-one instructor office hours: Email Justin for an appointment
Discussion sections: The TA will pre-record discussion section material for viewing at your leisure
TA office hours: Monday - 7:00–8:00pm

Course description: Educational attainment varies substantially across countries and even across individuals. Focusing just on the United States, we still see large disparities in attainment across family income levels, race and ethnicity, sex, and birth cohort. Why is this, and why does it matter?

We will consider the economic evidence on the benefits and costs that influence how much education individuals acquire, and on those factors which affect how much and how well students learn along the way. We will read influential research papers in education economics and consider the key ideas within them. We will explore publicly-available data and learn to conduct some analysis ourselves. And we will come up with our own research projects to answer related questions that interest us.

The purpose of this course is *not* to test your ability to memorize things before a test (we will have **one midterm** and **no final exam**). Rather, this course will give you experience reading, thinking about, and analyzing economic research. The skills you learn should serve you well in any job where you are expected put your economic training to use.

You can expect to finish this course with a working knowledge of the seminal research in the field. You will gain an understanding of the key ideas and controversies, and a basic working knowledge of important publicly-available data sources. You will learn to engage these ideas in conversation with each other, and to collaborate with each other.

We will not use a textbook. Instead, you will be expected to read a set of influential research papers and listen to complementary podcasts. As part of your homework assignments, you will be required to submit a short write-up on each paper. On Mondays, and occasionally on Wednesdays, I will typically lecture on the key economic models and econometric methods in these papers. As part of your homework assignments,

you will demonstrate your comprehension of these models and methods. Each assigned paper for that week will be presented by one group. This will be followed by a class discussion of the papers and the podcasts for the week. **The midterm will be held on Monday, July 19**, and will test your comprehension of the models, methods, and key ideas in the papers covered to that point. You will also be expected to complete a final research project proposal, informed by what we have studied together, as well as by your own additional research and a one-on-one conversation with me.

Grading and key dates: *The dates and times below are* ***firm***.[1]

- Homework: **20%**** (Due 12:10pm each Monday, except final week (due 12:10 Wednesday, July 28))
- Group presentations: **15%**
- Participation: **15%** (10% for in-class participation; 5% for group participation)
- Midterm: **20%** (Monday, July 19, 2021)
- One-on-one meeting to discuss final project: **5%** (To be scheduled for no later than July 9)
- Final project: **25%** (Due July 28, 2021)

** *Five assignments, each worth 5%. Lowest score will be dropped,* ***excluding the final assignment****.*

Homework: *You are required to complete your homework assignments with a group, and to submit a single assignment with the names of all participating group members at the top.*

Each week, you will read influential research papers (**required reading**) and then submit a short write-up for **two** of the papers to demonstrate that you read and thought about them. You may select the two papers from all those assigned for that week, marked with a *. For the final homework assignment, you will submit write-ups for **four** of the papers with a * from the second half of the course. The write-up *for each paper* should be *no longer than half of one page*, with normal single-spacing and margins, and size 11 font. The write-ups should briefly describe the key question the paper is addressing, describe the model, method, or data the authors use, and summarize the key findings. Additionally, you should include a few sentences describing *what* you liked or disliked about the paper (**not** just *whether* or not you liked it!), and a question or concern/criticism you had after reading the paper (motivated by economic reasoning).

During the first half of the class you will also have additional homework questions based on the models and/or methods and data we study each week. Your answers should be included with your write-ups on the papers. Any Stata code should be submitted as a .do file with all the authors names included in a preamble at the top. Additionally, there is an assigned podcast episode to listen to each week. You should explicitly refer to these podcasts in your reflections on the papers or during the group discussions.

Group presentations: You will be assigned to a group during the first lecture. Your group must select **three** papers (at least one from each "half" of the course) which you will collectively present to the class. *These papers will be selected via a web sign-up on a first-come, first-served basis.* Each presentation should be 20 minutes long (a maximum of 10 slides), and should touch on the key elements of the paper including

[1] No exceptions will be considered without extensive supporting documentation. If you anticipate a conflict (e.g. a pre-booked flight), you must email me for approval *before* June 26. Please provide a brief explanation and supporting documentation.

(as appropriate) the elements in your write-up, the motivation for the paper (*why* the research question is important), as well as important details of any models, methods, or data used, and a summary slide at the end.

Class discussions and participation: After each group presentation of a paper, the class will discuss the paper and the presentation. Participation in these discussions is mandatory, and your informed participation will determine your participation grade. Your thoughtful reference of the content of the assigned podcasts will also indicate your active engagement with the material, and positively impact your participation grade. When listening/reading and preparing for the group discussions, consider the following questions: Can I summarize this in a sentence or two? What is the key takeaway? What model, methods, or data are used? Is an important consideration missing? Do I believe what is being claimed/do I buy the argument being made? Why or why not? Does this give me any ideas for other research questions?

Final project: You must schedule a brief one-on-one meeting with me to discuss your proposal, which should take place no later than **July 9.** You should prepare for this meeting by coming up with a basic proposal for your project (details below), including key papers which you intend to lean on. Before our meeting, look through the reading list and read the papers you think might be relevant for your proposal.

A key element of the course will be a research proposal, individually completed by each student. This proposal should be **five pages, double-spaced, with 11-point font and normal margins**, not including references, figures, or tables. Your proposal should include *a minimum of **six** academic references, including at least **one** of which is marked as required reading on the assigned reading list, below*. See an example research proposal here.

Your proposal should state and motivate a question that you find interesting within the realm of education economics. It can be a replication and update or extension of an existing paper (if an empirical paper, the data used must be publicly available), such as one of those on the reading list. Or it can be a new proposal. If the former, you should include a brief review of more recent academic literature which has substantially engaged your chosen paper, and you should use more recent data to update the results of the paper (after having replicated the authors' results). If the latter, you should include a brief review of similar economic research/literature that helps motivate and frame the proposed research question.

Your proposal should contain a model, methods, or data of particular relevance to the research question, and a discussion of how you propose to use these to address your research question. Depending on the focus of your proposal, it should either contain a first attempt at developing/extending a model, or it should contain a first-pass effort at the analysis (including basic summary statistics of your data). If you propose to conduct an experiment and/or collect new data, your proposal should contain a detailed discussion of the experimental design and the various relevant actors among whom the experiment needs to be coordinated.

Reading and listening list: *Group presentations must be selected from papers marked with *, which are required reading*. At least one presentation per group must be selected from each 'half' of the course (Part I and Part II, below). The paper marked with ** is also required reading, and the author will join us to present the paper and answer questions. You are expected to read all of papers marked with a * and submit write-ups as indicated in the syllabus.[2] Podcasts, marked with a †, are required listening. Listed papers that are not

[2]Articles are accessible through the UCD library using a UC Davis VPN. Simply log on to the VPN then click the links. All articles should be read in full unless otherwise indicated. Appendix content is optional reading for all articles.

marked are for your reference only, and are not required reading.

Part I: Public and Private Benefits and Costs of Education

Week 1:

† **Podcast:** Economist Radio - Checks and Balance: Merit where it's due

* Mankiw, N.G., Romer, D. and Weil, D.N., 1992. "A Contribution to the Empirics of Economic Growth." *The Quarterly Journal of Economics*, 107(2): 407-437. ***Read Sections I, II, and Conclusion***

* Spence, M., 1973. "Job Market Signaling." *The Quarterly Journal of Economics*, 87(3): 355-374.

Weiss, A., 1995. "Human Capital vs. Signalling Explanations of Wages." *Journal of Economic Perspectives*, 9(4): 133-155.

Tyler, J.H., Murnane, R.J., and Willett, J.B., 2000. "Estimating the labor market signaling value of the GED." *The Quarterly Journal of Economics*, 115(2): 431-468.

Bedard, K., 2001. "Human capital versus signaling models: university access and high school dropouts." *Journal of Political Economy*, 109(4): 749-775.

Jaeger, D.A. and Page, M.E., 1996. "Degrees matter: New Evidence on Sheepskin Effects in the Returns to Education." *The Review of Economics and Statistics*, 78(4): 733-740.

Week 2:

† **Podcast:** Freakonomics Radio - Freakonomics Goes to College, Part 1

* Mincer, J.A., 1974a. "Chapter 4: Age and Experience Profiles of Earnings." In *Schooling, Experience, and Earnings*, NBER: 64-82.

* Mincer, J.A., 1974b. "Chapter 5: The Human Capital Earnings Function." In *Schooling, Experience, and Earnings*, NBER: 83-96.

Week 3:

† **Podcast:** Freakonomics Radio - Freakonomics Goes to College, Part 2

* Grilliches, Zvi, 1977. "Estimating the Returns to Schooling: Some Econometric Problems." *Econometrica*, Econometric Society, 45(1): 1-22.

* Angrist, J.D. and Krueger, A.B., 1991. "Does Compulsory School Attendance Affect Schooling and Earnings?" *The Quarterly Journal of Economics*, 106(4): 979-1014.

Oreopoulos, P., 2006. "Estimating Average and Local Average Treatment Effects of Education When Compulsory Schooling Laws Really Matter." *The American Economic Review*, 96(1): 152-175.

Week 4:

† **Podcast:** Freakonomics Radio - The $1.5 Trillion Question: How to Fix Student-Loan Debt?

* Ashenfelter, O. and Rouse, C., 1998. "Income, Schooling, and Ability: Evidence from a New Sample of Identical Twins." *The Quarterly Journal of Economics*, 113(1): 253-284.

* Card, D. and Lemieux, T., 2001. "Can Falling Supply Explain the Rising Return to College for Younger Men? A Cohort-based Analysis." *The Quarterly Journal of Economics*, 116(2): 705-746.

Katz, L.F. and Murphy, K.M., 1992. "Changes in Relative Wages, 1963-1987: Supply and Demand Factors." *The Quarterly Journal of Economics*, 107(1): 35-78.

* Dynarski, S. and Scott-Clayton, J., 2013. "Financial Aid Policy: Lessons from Research." NBER Working Paper 18710.

Part II: Factors Affecting Learning and Academic Performance

Weeks 5 and 6:

† **Podcast:** Freakonomics Radio - Is America's Education Problem Really Just a Teacher Problem?

* Hanushek, E.A., 2020. "Education Production Functions." In *Economics of Education. Second Edition (Eds. Bradley, S. and Green, C.)*, 161-170. Academic Press.

Hanushek, E.A. and Kimko, D.D., 2000. "Schooling, Labor-Force Quality, and the Growth of Nations." *American Economic Review*, 90(5): 1184-1208.

* Krueger, A.B., 1999. "Experimental Estimates of Education Production Functions." *The Quarterly Journal of Economics*, 114(2): 497-532.

Angrist, J. and Lavy, V., 1999. "Using Maimonides' Rule to Estimate the Effect of Class Size on Scholastic Achievement." *The Quarterly Journal of Economics*, 114(2): 533-75.

Angrist, J.D., Lavy V., Leder-Luis J., and Shany, A., 2019. "Maimonides' Rule Redux." *American Economic Review: Insights*, 1(3): 309-24.

** Rury, D., 2021. "Fixing the Leaky Pipeline: The Role of Beliefs About Ability in STEM Major Choice." Working paper.

† **Podcast:** Revisionist History - Miss Buchanan's Period of Adjustment

* Ludwig, J. and Miller, D.L., 2007. "Does Head Start Improve Children's Life Chances? Evidence from a Regression Discontinuity Design." *The Quarterly Journal of Economics*, 122(1): 159-208.

Oreopoulos, P., Page, M.E. and Stevens, A.H., 2006. "The Intergenerational Effects of Compulsory Schooling." *Journal of Labor Economics*, 24(4): 729-760.

* Dobbie, W. and Fryer Jr., R.G., 2011. "Are High-Quality Schools Enough to Increase Achievement Among the Poor? Evidence from the Harlem Children's Zone." *American Economic Journal: Applied Economics*, 3(3): 158-187.

* Autor, D., Figlio, D., Karbownik, K., Roth, J., and Wasserman, M., 2019. "Family Disadvantage and the Gender Gap in Behavioral and Educational Outcomes." *American Economic Journal: Applied Economics*, 11(3): 338-381.

* Levitt, S.D., List, J.A., Neckermann, S. and Sadoff, S., 2016. "The Behavioralist Goes to School: Leveraging Behavioral Economics to Improve Educational Performance." *American Economic Journal: Economic Policy*, 8(4): 183-219.

4 Sample Syllabus: Stata Crash Course

Syllabus
Stata Crash Course
University of California, Davis

Instructor: Justin C. Wiltshire | jcwiltshire@ucdavis.edu | https://justinwiltshire.com

Requirements: It is assumed you have a basic knowledge of statistics and econometrics (e.g. ECN 102 ECN 140). You are required to have access to a copy of Stata. Students without current access to Stata may purchase a reduced-price 'student' copy at https://www.stata.com/order/new/edu/gradplans/student-pricing/.

Materials: All materials for the course can be found at https://sites.google.com/site/ucdavisstata/home

Meeting times (Pacific Daylight Time):

- Monday - 9:00am–12:30pm: Interactive lecture
- Tuesday - 9:00am–12:30pm: Interactive lecture
- Wednesday - 9:00am–12:30pm: Student presentations and discussions; interactive lecture
- Thursday - 9:00am–12:30pm: Interactive lecture
- Friday - 9:00–11:00am: Student presentations and discussions

Study hall: Monday–Thursday - 1:00–2:00pm

Course Description: This is an intensive, one-week interactive course designed to give you a basic working knowledge of Stata, a software package widely-used by economists for conducting data analysis. You will also learn basic best practices for managing your data and code. By the end of this course you should have the basic skill set needed to begin an empirical research project in Stata, as well as the ability to effectively use the internet to quickly learn how to use Stata for new purposes.

You will be introduced to Stata and learn several commands each day. As we make our way through each lecture, I will give you several several short exercises to complete which will develop your proficiency with Stata. You will also be given a slightly longer exercise to complete each evening (Mon-Wed). Complete these with a partner, and **submit them to me by 5pm each night** for review. You will additionally have to (quickly) find a data set that you find interesting. **Prepare a 5–10 minute presentation that you will deliver on Wednesday**, which briefly outlines where you found those data and what you find interesting and challenging about using them. **Prepare another 10 minute presentation for Friday**, which demonstrates a few interesting summary statistics from these data—including at least two graphs.

Grading (marks assigned on a complete/incomplete basis. Email me if you have concerns):

- Three nightly exercises (email me a .do file by 5pm): 15% each
- Two in-class presentations: 20% each

- In-class participation: 15%

Topic schedule:

- Monday - **Getting Started**: Basic commands, Exploring data, Best practices, Importing data
- Tuesday - **Data Cleaning**: Basic and intermediate data cleaning
- Wednesday - **Basic Data Analysis**: Basic loops, Basic regression analysis
- Thursday - **Intermediate Data Analysis and Output Management**: Intermediate regression analysis, Regression tables, Basic Graphing
- Friday - If there is time after the presentations, we may cover basic mapping

5 Sample Homework: Economics of Education

ECN 152 (Summer 2021)
Instructor: Justin C. Wiltshire

Homework: Week 2

Due: 12:10pm on Monday, July 5

This assignment is to be completed with your group. Prepare a single submission for the entire group, and include each group member's name at the top.

Listening and reading assignments: Prepare a **single**, *full*-page write-up on the two papers below (they're two chapters of the same book, so treat them as one paper but write a full page). Listen to the podcast. Be prepared to discuss the papers and podcast in class.

† **Podcast:** Freakonomics Radio - Freakonomics Goes to College, Part 1

* Mincer, J.A., 1974a. "Chapter 4: Age and Experience Profiles of Earnings." In *Schooling, Experience, and Earnings*, NBER: 64-82.

* Mincer, J.A., 1974b. "Chapter 5: The Human Capital Earnings Function." In *Schooling, Experience, and Earnings*, NBER: 83-96.

Exercises (*ensure you show all your work*):

1) Consider the Spence (1973) signalling model. Assume schooling has no impact on productivity. Suppose there is a single employer and two distinct skill/productivity groups (1 and 2), with group productivity and proportions of the population as shown in Table 4, below. These groups can acquire some amount of schooling y at the costs shown in Table 4.

Suppose further that the employer believes there is some level of schooling, y^*, such that if a worker has $y < y^*$ then that worker's marginal product is 1 with probability 1, and if $y \geq y^*$ then that worker's marginal product is 2 with probability 1. Suppose the employer offers a wage schedule:

$$w(y) = \begin{cases} 1 & \text{if } y < y^* \\ 2 & \text{if } y \geq y^* \end{cases}$$

Table 3
Simple signalling model setup

Group	Marginal Product	Proportion of population	Cost of y
1	1	q_1	y
2	2	$1-q_1$	$y/2$

a) Draw the wage schedule with y on the x-axis and $w(y)$ on the y-axis. Make sure to label everything

b) What amounts of schooling y will Type 1 workers consider getting? What about Type 2 workers? Do these workers have to think of schooling as a form of signalling for schooling to act as a signal?

c) What is the schooling schedule facing each of Type 1 and Type 2 workers? (Hint: for each type this is a conditional function, similar to the wage schedule above). Show the general functional considerations and then plug in the values and solve for specific conditions

d) Draw a new graph showing the wage schedule and the cost functions for both types. Clearly indicate the payoff for each type of worker given their choices and y^*

e) This setup allows for many signalling equilibria. How many? What are the *specific* conditions and results that support these equilibria?

f) Is there an equilibrium supported by this setup (something that could happen given this setup, and which would be sustained as an equilibrium) such that both types of worker would prefer an equilibrium with no signalling at all (if the employer's beliefs supported it? If so, what is it?

2) Suppose now that the employer's beliefs are instead:

$$\text{A worker is } \begin{cases} \text{Type 1 with probability 1} & \text{if } y < y^* \\ \text{Type 1 with probability } q_1 & \text{if } y \geq y^* \\ \text{Type 2 with probability } 1-q_1 & \text{if } y \geq y^* \end{cases}$$

Note this is <u>not</u> the same set of beliefs as in the second example in the lecture and the paper!

a) Write down the new wage schedule offered by the employer (Hint: assume workers are paid their expected marginal product)

b) What are the plausible choices of y for each type of worker now?

c) What is the education schedule facing each of Type 1 and Type 2 workers?

d) Draw a new graph showing the wage schedule and the cost functions for both types. Clearly indicate the payoff for each type of worker given their choices and y^*

e) Can this setup result in a signalling equilibrium? If yes, what are the specific conditions and results that support such an equilibrium, and how many equilibria are there? If not, why does this setup not support a signalling equilibrium?

f) What wage does each type of worker make here? What is the outcome (wage minus costs) for each type of worker?

g) How does your answer to the previous question (2f) change if the employer's beliefs are instead as given below? Compare your answers for each of these alternative sets of employer beliefs: what effect does getting more schooling have? Discuss.

$$\text{A worker is } \begin{cases} \text{Type 1 with probability } q_1 & \text{if } y < y^* \\ \text{Type 2 with probability } 1-q_1 & \text{if } y < y^* \\ \text{Type 2 with probability 1} & \text{if } y \geq y^* \end{cases}$$

3) This is a setup for next week. You need to download American Community Survey (ACS) data from IPUMS USA and provide basic summary statistics to show you've done so. Please use Stata's do file editor (see the instructions on Canvas if you don't have access to Stata) to create these summary statistics, and save and submit your do file with your assignment. Use the instructions below to create your working directory so that your do file can be run by anyone with an identical directory and setup. I will go over these basic instructions on Wednesday, June 30.

a) Go to https://usa.ipums.org/usa/ and sign up for a free account using your UC Davis email

b) Once you've gained access, go to 'CHANGE SAMPLES'. De-select everything, then select the 2019, 2015, and 2010 ACS samples (these are the 1-year samples. Don't use those marked as ACS 3yr, ACS 5yr, or 10%). Click 'SUBMIT SAMPLE SELECTIONS'

c) Select variables which capture the following data (I leave it to you to look through everything and decide which variables to select and download) for each respondent. Make sure the variables are found in all of the samples you selected:

- State, indicated by Federal Information Processing Standards (FIPS) codes
- Whether the respondent is considered the 'head' of the household
- Sex
- Age
- Race, including whether the respondent has Hispanic origins
- Citizenship status
- If the respondent is an immigrant, the year of immigration
- Educational enrollment
- Educational attainment
- Employment status
- Labor force status
- Occupation (2010 codes)
- Industry (NAICS codes)
- Weeks worked last year
- Usual hours worked per week
- Income from wages or salaries

d) Provide the following summary statistics for each year: Total population (unweighted and weighted); proportion of the (weighted) population that is male; proportion of the (weighted) population that has a Bachelor's degree or more education; and proportion of the (weighted) population that is employed.

6 Sample Exam: Economics of Education

ECN 152 (Summer 2021)
Instructor: Justin C. Wiltshire

Midterm Exam: Version A

Due: You must upload your completed exam **no later** than 6:00pm Pacific Time, tonight

Academic Integrity: The purpose of this exam is just to ensure you have a basic understanding of what we have been doing in class. We want you to do well. You should **feel free to use all resources posted on Canvas** (papers, homework assignments and answer keys, and presentation slides) or your own notes to help you with this exam (Note: I cannot guarantee the accuracy or thoroughness of other students' presentation slides)

However, we **do** expect you to complete this exam entirely on your own. Please **do not** exchange answers with each other or get any help from anyone else.

Instructions:

- Print out a copy of this exam (or download a digital copy for use with a tablet)
- Read this page in its entirety
- This exam has 4 questions, each worth 25 points in total, for a total of 100
- Make sure you **thoroughly** read each part of a question before beginning your answer
- Complete each portion of a question in the space provided.
- **All answers are to be written by hand**. Any typed answers will receive 0.
- **Show all your work**. Answers without work shown will **not** receive full marks
- If you feel you do not know how to answer a question, consider the following:
  - Consult the homework questions, answer keys, and your own group submissions
  - Review the relevant paper, if necessary
  - **If and only if you leave all parts of a question entirely blank, you will receive 7.5/25 points**
  - If any mark at all is made in any answer space for a question, it will be graded between 0 and 25
- If you have a pressing question, email me: jcwiltshire@ucdavis.edu
- In the unlikely case I wish to clarify something to everybody, I will send a mass email. Watch for one
- Upload a digital copy of your answers, including this title page, as a single PDF file to Canvas **before 6pm this evening, July 19, 2021**. Ensure the page numbers are in order in your uploaded PDF.
- **You are strongly encouraged to upload your exam well before 6pm.** Late submissions will be penalized 1 percentage point for each minute they are late.
- Relax. You know this material, and there's plenty of time to complete everything. Good luck!

Question 1: There are 6 parts to this question. Please ensure you see part (f) on page 4.

Consider the Spence (1973) signalling model. Assume schooling has no impact on productivity. Suppose there is a single employer and two distinct skill/productivity types (1 and 2), with group-type productivity and proportions of the population as shown in Table 4, below. These groups can acquire some amount of schooling y at the costs shown in Table 4.

Suppose further that the employer believes there is some level of schooling, y^*, such that if a worker has $y < y^*$ then that worker's marginal product is 1 with probability 1, and if $y \geq y^*$ then that worker's marginal product is 2 with probability 1. Suppose the employer offers a wage schedule:

$$w(y) = \begin{cases} 1 & \text{if } y < y^* \\ 2 & \text{if } y \geq y^* \end{cases}$$

Table 4
Simple signalling model setup

Worker Type	Marginal Product	Proportion of population	Cost of y
1	2	q_1	$y/2$
2	1	$1-q_1$	y

There are a few differences between this setup and that in the homework. Look closely at Table 1.

a) [/2 points]
Given this setup, what amounts of schooling y will each type of worker consider getting? Do these workers have to consider schooling as a form of signalling for schooling to act as a signal?

b) [/5 points]
What is the schooling schedule facing each type of worker? (Hint: for each type this is a conditional function). Show the general functional considerations, then plug in the values and solve for specific conditions.

c) [/5 points]
Graph the wage schedule with y on the x-axis and $w(y)$ on the y-axis. Draw the cost functions for each type on the same graph. Clearly indicate y^* and the choice of y for each type of worker. Label everything!

d) [/3 points]
How many signalling equilibria does this setup allow for? What are the *specific* conditions and results that support these equilibria?

e) [/5 points]
Is there an equilibrium supported by this setup such that both types of worker would prefer an equilibrium with no signalling at all (if the employer's beliefs supported it)? If so, what is it? If not, why not? A simple example and explanation why or why not will suffice here.

f) [/5 points]
In your own words, explain how Spence (1973) differentiates schooling as a signal from schooling as human capital accumulation (as in Mankiw, Romer, and Weil, 1992).

Use the space below only if necessary for showing work for parts of Question 1 that you couldn't fit in the allotted spaces. Clearly indicate for which part this space is being used. Otherwise, leave this space blank

Question 2: There are 6 parts to this question, though part (f) has 5 sub-parts.

Consider the model set up in the first four pages of Grilliches (1977). Suppose the true relationship between income and human capital is

$$Y = p_h H e^u \tag{1}$$

where Y is a measure of income, p_h is the market rental rate for a unit of human capital, H is a measure of (implied, unobserved) quantity of human capital, and u is other (possibly random) influences on income. Furthermore, let human capital, H, be a function of years of schooling, S, ability, A, and other augmenting influences, v, according to:

$$H = e^{\beta S} e^{\gamma A} e^v \tag{2}$$

a) [/2]
Combine equations (1) and (2) to find an equation for $y = ln(Y)$ as a function of $ln(p_h)$ S, A, v, u, where the parameters of the model are β and γ.

b) [/2]
Take $ln(p_h)$ to be constant and assume we only observe Y and S. Convert your answer for (a) to an econometric model that you could estimate by OLS regression of y on S, with a constant term, α, and a single error term, w. Define (write down) w as a function of A, v, and u. What must be true of w relative to y and S such that an OLS regression of y on S will yield an unbiased estimate of the relationship between schooling and income, such that $\hat{\beta}_{OLS} = \beta$?

c) [/4]
What key variable, discussed in Chapter 4 of Mincer (1974), is missing from this model? Suppose v is a function of this variable, E, such that $v = \phi E + \psi E^2$. Given what we saw in both chapters of Mincer (1974), do you think an OLS regression of y on S (as discussed in 2b, above) will yield an unbiased estimate of β if $cov(S,A) = 0$? Why or why not?

d) [/5]
Hopefully you learned in ECN 102 or some other course that $\hat{\beta}_{OLS} = \frac{cov(S,y)}{var(S)}$. Plug $y = ln(Y)$ into $\hat{\beta}_{OLS}$ and simplify it out (break apart the covariances as much as possible). What must be true in order for $\hat{\beta}_{OLS}$ to be an unbiased of β (such that $\hat{\beta}_{OLS} = \beta$)?

e) [/2]
Suppose $cov(S,A) = 0$, $cov(S,u) = 0$, and $cov(S,v) > 0$. Will $\hat{\beta}_{OLS}$ from an OLS regression of y on S be biased upward or downward (assuming $\beta > 0$)?

f) [/10]

Suppose we clean the ACS data we downloaded as in Homework 3. Let `lny2` be the log of hourly earnings, as we calculated for that assignment. Also let `schooling`, `exper`, `exper2` and `male` be as we calculated for that assignment. Suppose we run the following regression in Stata:

```
reg lny2 schooling exper exper2 i.year i.male [pw=perwt], vce(cluster year)
```

and we get the following output:

```
(sum of wgt is 261,084,031)

Linear regression                               Number of obs     =  2,534,113
                                                F(1, 2)           =          .
                                                Prob > F          =          .
                                                R-squared         =     0.2552
                                                Root MSE          =     .57497

                                    (Std. Err. adjusted for 3 clusters in year)
------------------------------------------------------------------------------
             |               Robust
        lny2 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  schooling  |   .1037012   .0007265   142.74   0.000     .1005752    .1068271
       exper |   .0397832   .0012488    31.86   0.001     .0344103    .0451562
      exper2 |  -.0005892   .0000267   -22.05   0.002    -.0007042   -.0004743
             |
        year |
       2015  |  -.0134312   .0004051   -33.16   0.001    -.0151742   -.0116882
       2019  |   .0379016     .00067    56.57   0.000      .035019    .0407843
             |
      1.male |   .2014842   .0030516    66.03   0.000     .1883543    .2146141
       _cons |   .9530285   .0186967    50.97   0.000     .8725829    1.033474
------------------------------------------------------------------------------
```

(i) What is the coefficient on `schooling`? What should we interpret this to mean, assuming it's an unbiased estimate of the population parameter?

(ii) What can we say about the relationship between experience and earnings given the coefficient on `exper` is positive and the coefficient on `exper2` is negative?

(iii) Why do we include `[pw=perwt]`?

(iv) How much of the variation in log hourly earnings does this specification account for?

(v) Do you think the coefficient on `schooling` is an unbiased estimate of the population parameter? Why or why not?

Question 3: There is one part to this question, though it is comprehensive. **You should write your answer by hand**, and it should be approximately **one page** long. **Any typed submission will receive 0.** In all cases, your answer must be contained in the space provided on pages 8 and 9 of this exam paper.

a) [/25 points]
What is your **favorite** paper of those on the mandatory reading list? Feel free to choose one of the papers from the second half of the course, which have not yet been presented. Summarize this paper, describing the research question, the background, the research design/methodological approach, the data used, and the key takeaway/contribution.

Why is this your favorite paper on the reading list? Do you have any concerns about it? Did anything in the mandatory podcasts complement or contradict this paper? If so, briefly elaborate.

Question 3, continued:

Question 4: There is one part to this question, though it is comprehensive. **You should write your answer by hand**, and it should be approximately **one page** long. **Any typed submission will receive 0.** In all cases, your answer must be contained in the space provided on pages 10 and 11 of this exam paper.

a) [/25 points]
What is your **least favorite** paper of those on the mandatory reading list? Feel free to choose one of the papers from the second half of the course, which have not yet been presented. Summarize this paper, describing the research question, the background, the research design/methodological approach, the data used, and the key takeaway/contribution.

Why is this your least favorite paper on the reading list? Do you like anything about it? Contrast it with your favorite paper (from Question 3). Did anything in the mandatory podcasts complement or contradict this paper? If so, briefly elaborate.

Question 4, continued:

7 Equity, Diversity, and Inclusion Statement

EQUITY, DIVERSITY, AND INCLUSION STATEMENT

Justin C. Wiltshire
University of California, Davis

Numerous experiences have nurtured, within me, a deep-rooted commitment to reducing barriers and expanding opportunities for students and colleagues who face "invisible" hardships. This has greatly influenced the way I teach and the topics I research. As one notable example, it has been eye-opening for me to witness the life experience of my wife, who suffers from a chronic illness. Regular pain and fatigue mean she faces significant barriers to accomplish daily tasks that able-bodied people take as a given. Yet as her disability isn't visually obvious, few people are aware of how exhausting and time-consuming it can sometimes be for her to complete even simple, rote tasks. Privileged as I've been to have my health, it was only after I came to know my wife well that I began to appreciate how costly an effort it can be for some smart, hard-working, motivated people to accomplish things I had taken for granted as being straightforward.

Along with numerous other experiences, this has given me much greater empathy and appreciation for the great potential of students who may, for whatever reason, appear less capable at first glance. In fact, I have found such students tend to be incredibly hard-working, and often need only a little extra flexibility and accommodation to enable them to be highly successful. For example, I have had numerous students confide in me various health issues, neurodiversities, or family responsibilities which they were concerned might hinder their academic success. I have found that even minimal accommodation and encouragement has quite often allowed these students to flourish and demonstrate they are among my strongest pupils. This has helped me learn to grade assignments and to design syllabi in ways that provide my students with substantial time and flexibility to demonstrate their learning without needing to request it. Over the years quite a few of these students have gotten in touch afterward to express a newfound confidence and interest in their studies, and have often sought mentoring or opportunities to further conduct research under my guidance. Many have gone on to successful graduate studies. Witnessing their success has only reinforced my belief that, as educators, we can best empower our students to learn by checking our assumptions, and being flexible and generous as supportive partners on their journeys to academic success.

My research agenda has been similarly influenced by these experiences. A common theme in my research is the economic well-being of workers who are less-advantaged—born from my own experiences before I became a first-generation graduate student. Many such workers have little power to negotiate fair employment contracts and few opportunities to pursue non-menial jobs, whether because they are immigrants or are less-educated, because they have family responsibilities or are chronically ill or face other structural barriers, or because they are simply subject to the local effects of large, low-wage employers exercising labor market power. A key motivation for me, as a researcher, is a hope that my research will inform policies which can help re-balance the bargaining power of employers and these workers.

As a professor, I hope to continue pursuing this research agenda and offering this type of instruction and mentoring to students, continually working to reduce barriers and to increase opportunities for people who face hardships both visible and invisible.