

Why, When, and How to Teach the Fundamentals of Inequality in Principles

Can Erbil and Geoffrey Sanzenbacher

Why should we teach inequality?

The continued rise of economic inequality in the U.S. has been on the radar of economists and policymakers for the last few years. New initiatives and platforms like EfIP (Economics for Inclusive Prosperity) have emerged, where economists work on creating fresh and useful policy ideas to promote more “inclusive” models of generating prosperity. Yet, students still face a lot of confusion, “noise,” and disagreement when it comes to the topic of inequality.¹ Especially in the age of easy access to information online, students not fully literate in economics struggle to sift through the literature and separate rigorous scientifically based research from opinion pieces. This article discusses a way to introduce some recent trends in U.S. inequality to students, and then delve into a specific topic (e.g., racial inequality) in a two-lecture module at the end of an introductory economics course.

After all, it is not that the students are not interested in this topic. But, left alone, many of them become confused. Students do not make distinctions between different broad types of inequalities, such as income inequality, wealth inequality, or inequality of opportunity. They do not understand differences in the underlying causes of inequality, which vary depending on whether the topic is inequality across educational groups, gender-

based groups, or racial/ethnic groups. And, they make basic mistakes in reading articles or viewing data, such as mixing-up correlation with causation or looking at graphs with different scales. Fortunately, introductory economics courses have a chance to reach students early in their careers, and correct many of these deficiencies.

Indeed, recent events in the US compel us to cover inequality and its consequences in our introductory classes. The economic impact of the COVID-19 epidemic falls significantly more on minorities, women, people with lower income levels and people of color.² And, the disparities in poverty and opportunity rates between black and non-black populations is at the root of racial discrimination which re-ignited the BLM movement.³ Indeed, economic inequality is also related to other disciplines in Social Sciences, such as Sociology, Political Science and even Liberal Arts courses such as History and English. However, Economics faculty are well-equipped to cover the empirical outcomes and the underlying economic models – and lay out their strengths as well as short-comings.

Given that teaching about economic inequality is an important task, this article will first discuss when it makes sense to teach it. The article will then spend the majority of its time providing some tips for covering the material, as well as some suggested assignments.

When should we teach inequality?

Many of the introduction to economics courses are structurally very similar, focusing on delivering basic fundamentals and simple economic models with “representative agents.” With respect to inequality, a brief discussion often occurs at the beginning of the semester about the trade-off between efficiency and equity, and about how markets, left alone, deliver the most efficient outcome. The rest of the semester typically covers efficient economic models and the behavior of an average (representative) household or firm, without touching the relevant and important topic of income and wealth distribution and what happens to economic agents that are “not average.”

The lack of emphasis on inequality is partly due to the time constraint of the faculty who is trying to cover a very wide variety of topics (especially in introduction to economics courses where micro and macro are taught together in one semester) and partly due to how the course material has been written and structured. Recently, there have been open discussions between high profile economics faculty on how an introduction to economics course should be (re)structured.⁴

The good news is that during most introductory courses, students learn many tools that can help them understand the basics of economic inequality. For example, if the supply and demand for labor was covered, then the idea of productivity differences driving wage differences can be understood. As can discrimination, when identically productive workers are treated differently. And, if the idea of capital versus labor have been covered, wealth versus income inequality can be touched on. None of these ideas can be covered in a tremendous amount of detail, but the bones exist for a discussion.

Thus, our proposal is to add a short two-lecture module to the end of every introduction to economics course to provide basic information about the level and consequences of economic inequality in the US. The next section focuses on ways in which we have accomplished that in our classes.

How should we teach inequality?

This section lays out some of the basic logistics of the module, before turning to the meat of what exactly to cover. We conclude the discussion with some ideas for short empirical projects that can help students get their hands into data.

i) The Logistics and Design of a Model

This module is designed to be delivered in two 45-50 minute lectures. The first lecture will focus on several broad facts that describe the economy over the last four decades, the second will yield more detail on one of these facts, as chosen by the instructor. The lectures will not be a replacement for more in-depth “economics of inequality” courses, but rather a “preview”. Students who want to learn more on this topic will be encouraged to take the corresponding elective course in their department to advance their knowledge in this field. The module will equip the students with the necessary tools to navigate through available information and current (elementary) research in the field.

The following are some of the essential design properties of the proposed module:

- The module needs to be elementary. Since it will be part of an introductory class, the faculty cannot assume prior economic knowledge beyond that covered in the class.
- It needs to be data driven and based on sound economic research. Faculty will curate carefully selected, up-to-date research on the topic.
- It needs to be relevant to students.
- It needs to contain a hands-on component (we have suggested exercises below), exposing intro-level students to cutting edge, applied empirical research.

ii) The Structure and the Content of Teaching Material

One of the biggest problems faced by an instructor teaching about inequality is what to cover in the first place. Students will jump to different places on hearing the word inequality. Some might think immediately

about CEO pay, others about racial or gender inequality, and others about issues related to the fact that high-income kids go to higher-quality schools. It can therefore be helpful to begin with a quick discussion of what students think of when they hear the word “inequality.”

This discussion can be followed by the introduction of the concepts of **inequality in economic outcomes** versus **inequality in opportunity**. The gender wage gap or the growth of the income share going to the top 1 percent represent inequality in economic outcomes. The fact that parental income is correlated with child’s income is an example of inequality in opportunity. By the last two lectures of your intro class, students will probably be better equipped to think about inequality in outcomes – but many students default to the issue of opportunity. The discussion can help tease this issue out.

The next challenge is to cover some of the major inequalities students will encounter in the outside world. We suggest that during the first class you can accomplish cover some of these through the presentation of “stylized facts” – facts about the economy that are not controversial, even though the underlying causes and solutions to the inequality might be. For data reasons, it is often easiest to focus on the period since the mid-1970s, and we usually focus on the U.S. Four facts on economic outcomes and one fact on opportunity can introduce students to a world of economic thought.

1. The median male worker has not seen any real wage growth since the mid-1970s, while workers slightly higher up in the distribution (e.g., the 80th percentile) have seen growth.⁵
2. The median woman, working full-time and full-year, still only makes 80 percent as much as the median male, with little progress in the last two decades.⁶
3. The median Black worker has seen no progress in terms of earnings relative to the median white worker since the 1970s.
4. Very high-earning workers (often defined as the top 1 percent) have seen a large growth in income, much more than those around the 80th percentile and much, much more than those at the median.
5. A strong correlation exists between parent’s income and child’s educational attainment and income.

These five facts can be displayed quickly during the first class of the module in just five slides if desired (we have provided example slides with some sources in the Appendix). However, preceding these slides with a few key pieces of information can provide context.

First, depending on the mathematical prerequisites of the class, it can be useful to proceed the discussion with some information on measuring inequality. A primer on percentiles at least can be useful.

Second, a discussion of economic data can be useful. Data on workers from the main part of the income distribution can often be obtained from household surveys (we used the Current Population Survey) and discussion of these sorts of sources can be informative. For example, the CPS is a household-level survey of addresses, and ignores institutional populations. This precludes the data from allowing an analysis of inequality in incarceration, and the data will understate inequality in employment, since those in prison by definition are not working.

On the other hand, data on the Top 1 percent often come from estimates based on national accounts (we used the World Inequality Database), and students should know why a household survey is insufficient. In particular, pointing out that these household surveys are statistically unlikely to capture very high earners, and in any case top-code data would be important. Finally, data on economic mobility will likely come from Opportunity Insights, and a discussion of the administrative data they use can also be helpful. Again, we have included some example course material on each of these points. At the end of the first class, it can be useful to have students chime in on what they think might be driving the facts discussed, and if any of the facts were particularly surprising.

For the second lecture in this two-lecture series, we recommend focusing on a single one of the facts of the instructor’s choosing. Focusing on a single fact allows an important nuance of research on inequality to shine through -- economists do not always agree on causes. Using the lecture to present a few cutting-edge explanations can be more fruitful than providing a little detail on each fact.

Turning to what to cover, we have recommendations based on experiences teaching a full course on the Economics of Inequality in the U.S.

1. ***Falling Median Earnings among Men*** – The most common explanations for the absence of earnings growth for middle-income men are: 1) technological change/automation; 2) trade; and 3) declining bargaining power. If students have been exposed to the model of supply and demand for labor, then technology can be framed as having two effects. First, it increased the productivity and thus demand for higher earners more than lower-earning workers (“skill bias”). Second, it has tended to substitute and thus reduce demand for middle-income workers specifically (polarization). Case studies from [Fernandez \(2001\)](#) and [Autor et al. \(2002\)](#) can provide examples for class, and [Autor and Dorn \(2013\)](#) can yield some empirics on the effect of automation. On trade, the effect can be summarized most easily as a decrease in demand for domestic middle- and low-income workers who are more prevalent among our trading partners. Empirical work from [Autor, Dorn, and Hanson \(2016\)](#) providing some useful evidence from trade with China. Talking about bargaining power can be the hardest in an intro class. However, pointing out that unions negotiate for higher wages and providing data on the union wage premium and trends in unionization can make the point. Recent work by [Farber et al. \(2018\)](#) is especially useful.
2. ***Gender Wage Gap*** – When teaching about the gender wage gap, it can be useful to talk about two phases in time: 1) when it closed from 60 to 80 percent between the 1970s and 2000; and 2) the period since then, what the gap has been stuck at 80 percent. The closing of the gap was fueled mainly by increased education and work experience among women. The effect can broadly be framed as an increase in productivity due to “Human Capital”, or a boost in labor demand. Providing data from the census on women’s education and labor force participation is useful. [Goldin and Katz \(2002\)](#) on the Power of the Pill can help students see an interesting cause of educational change, and provides a nice way for them to think about how technology can alter the costs and benefits of education. [Greenwood, Sehardi, and Yorukoglu \(2005\)](#) can give good insight on how technological change in the household allowed married women to work more. Regarding the remaining gap, women’s responsibilities as caregivers are the most common explanation. [Goldin \(2014\)](#) attributes this to compensating differentials in a way that can be intuitive to students. And, using BLS data on the labor force participation of young mothers to young fathers can make it clear there is a work experience gap that develops around motherhood.
3. ***The Racial Wage Gap*** – Here, discrimination and the Human Capital gap are important topics to hit. In an introductory course, pointing out that discrimination occurs when workers are paid less than their marginal product is the natural point to start. Empirically, this definition means workers with similar productive characteristics in similar jobs should get paid the same amount regardless of race. Covering a few studies can be helpful to show the existence of discrimination, but also the trouble economists go through to identify it. [Bertrand and Mullainathan \(2004\)](#) is a classic experimental example, and [Fryer, Pager, and Spenkuch \(2011\)](#) a nice regression example. Turning to the Human Capital gap, using Census Data to show racial graduation rates and the difference in earnings between graduates and non-graduates is a good place to start. The discussion can then be extended to get into some of the underlying reasons for the Human Capital Gap. A common focus point might be ability to pay as captured by loan inequality, and [Scott-Clayton and Li \(2016\)](#) have some interesting data. Housing discrimination, residential segregation, and school quality could involve a more detailed discussion. A recent Newsday study out of Long Island by [Choi et al. \(2019\)](#) provides recent examples of housing discrimination and the resulting exclusion out of neighborhoods that might have higher quality schools.
4. ***The Rise of the Very Rich*** – When discussing the rise of incomes for the top 1 percent, a key distinction to have your students make is between labor and capital income. As [Piketty, Saez, and Zucman \(2019\)](#) point out, the rise in top income over the last several decades has been driven by both income sources, albeit at different times. Through the 1990s, it was mostly growth in labor income. The underlying causes of growth in labor income are not fully understood, so we usually give two examples of causes. One is so-called “Superstar Theory,” namely that technology allows people with marginally higher productivity to capture larger shares of markets than in the past. [Gabaix and Landier \(2008\)](#) provide a nice discussion in the context of CEO pay. The other is a potential failure of corporate governance,

which has led to rising executive salaries often paid in the form of equity. More recently, Piketty, Saez, and Zucman point out that capital income growth has taken over. Here, one main point worth making is that capital is extremely concentrated, and has become even more so, as in [Saez and Zucman \(2016\)](#). If you have time, highlighting the growth in the capital share that may occur as a result of slowing growth in developed countries -- as highlighted in [Piketty's Capital](#) -- can give students a sense of the potential for future growth in inequality.

5. **Opportunity** – If focusing on inequality of opportunity, the first thing you want to establish is a definition of what equality of opportunity would look like. Having a discussion about what is within a person's control and what is outside of it is key. In the opportunity literature, what is within control is often referred to as “effort” and outside of it “circumstances” (see [Roemer and Trannoy, 2016](#)). Discussing with students the kind of things they think of as circumstances is important, as is discussing the extent to which “effort” is really within someone's control. For example, low-income kids tend to put less time into schoolwork, but more time into paid work (e.g., see [Porterfield and Winkler, 2007](#)). Would we say they are exerting less effort towards school work when their time must be split? Students will see that it's complicated. In the end, when we say we want equal opportunity, we usually mean that circumstances do not dictate economic outcomes. So, parents' income should not affect a child's propensity to go to college or their income as an adult. Once these definitions are laid out, using data from [OpportunityInsights.org](#) can be used to illustrate the lack of Equality of Opportunity within the U.S. We have provided an example module in the Appendix, courtesy of the researchers at Opportunity Insights.

iii) Examples of Empirical Research Projects

The assignments below are designed to accomplish two things. First, they all expose students to newspaper articles, think tank pieces, and perhaps some academic writing on the topic. Second, they force students to work with data, and produce a visualization to make their arguments. Below, we lay out one assignment for

each of the four facts on economic outcomes from the first lecture. We recommend picking the fact you focus on from the second lecture. If you focus on opportunity, we have included an assignment from Opportunity Insights in the Appendix.

a) Example Assignment: Occupational Wage Growth

To the Instructor: This assignment gives the students a chance to see the effects of Skill-biased Technological Change and/or Polarization first hand. The goal of the assignment is to have the students identify one occupation that has been negatively impacted by automation, and one that has benefited from technology. In completing the assignment, the student will be exposed to articles on economics, and will practice displaying data visually.

Example Assignment Prompt: As we learned in class, median incomes for full-time workers have been stagnant over the last several decades, but at higher points in the distribution they have risen. Two related explanations put forward by economists to explain this phenomenon are Skill-biased Technological Change and Polarization. In this short-paper assignment, your goal is to find evidence of: 1) a middle-income occupation where automation has tended to replace workers (Polarization); and 2) a higher-income occupation where technology may make workers more productive.

Example Assignment Details: The paper should include at most 2 pages of text 1.5 spaced, as well as one data-based figure. As evidence for the two occupations you choose, you should use one high-quality source each (i.e., two sources total). These sources can include government websites, academic papers, or policy briefs from non-partisan think tanks (e.g, The Pew Charitable Trusts, The Brookings Institute). The figure should show the trajectory of median earnings within the occupation over the last several decades, to see if the damaging or improving aspect of technology argued in your sources play out in the data (it is fine if they do not, although you may want to hypothesize as to why). The figures do not count against the page limit, and should include clearly marked labels on the axes, a legend if necessary, and a clear title.

b) Example Assignment: The Gender Wage Gap... Closing then Stalling

To the Instructor: The goal of this assignment is to expose students to economic articles and data, and familiarize them with constructing data visualizations in the context of the gender wage gap. In general, students will likely find that the closing of the gender gap during the 1970s, 1980s, and 1990s was driven by increased education, increased work experience, and/or a decline in occupational segregation. Explanations for the remaining gap often center on child care responsibilities (either by reducing work experience or by introducing a compensating differential for flexibility) or on outright discrimination.

Example Assignment Prompt: Even today, the typical woman working full time makes about 80 cents for every dollar made by a full-time working man. However, this gap was larger in the past. In 1975, the median full-time working woman made about 58 cents for every dollar a man made. In this short paper assignment, your goal is to offer: 1) an explanation as to why women have partially caught up to men; and 2) an explanation as to why women's income still lags behind men's. You should make an effort to tie your explanations to concepts learned during the semester.

Example Assignment Details: The paper should include at most 2 pages of text 1.5 spaced, as well as two data-based figures, one for each argument. To support your arguments and provide data, you need at least two high-quality sources. These sources can include government websites, academic papers, or policy briefs from non-partisan think tanks (e.g, The Pew Charitable Trusts, The Brookings Institute). The figures should augment the argument being made and can be drawn solely from the two sources required or from additional sources. For example, if you are arguing women make more because they enter high-paying STEM fields at a higher rate today than in the past, your figure might show the share of men and women majoring in STEM majors over time. The figures do not count against the page limit, and should include clearly marked labels on the axes, a legend if necessary, and a clear title.

c) Example Assignment: Identifying Discrimination

To the Instructor: The goal of this assignment is to

expose students to the definition of discrimination, and to how researchers go about identifying it. Students will be asked to find an article from a government source, think-tank, or academic journal on discrimination. They will then be asked to determine how the authors determined some effect (often lower income, but possibly something else like housing inequities) was discrimination. The assignment also allows the students to construct a data visualization.

Example Assignment Prompt: Discrimination occurs when two people of nearly identical characteristics receive differential because of some group characteristic (e.g., race). For example, a Black person with the same productive characteristics may be paid less than a similar white person. Identifying discrimination is difficult, because it requires comparing two otherwise similar individuals. Find a high-quality source purporting to identify discrimination, discuss how the authors attempted to identify, and argue whether or not you think they did a good job.

Example Assignment Details: The paper should include at most 2 pages of text 1.5 spaced, as well as one data-based figure illustrating the nature of the discrimination. Your source can include government websites, academic papers, or policy briefs from non-partisan think tanks (e.g., The Pew Charitable Trusts, The Brookings Institute). The figure does not count against the page limit.

d) Example Assignment: The top 1% income inequality

To the Instructor: The goal of this assignment is to expose students to economic articles and data, and familiarize them with constructing data visualizations in the context of income inequality at the top 1% level. The top 1% of American earners have nearly doubled their share of the national income since the 1970s, according to [Saez's analysis](#). Americans in the top 1 % average over 39 times more income than the bottom 90% and 85 times as much as the bottom 20% ([CBO data](#)). Even the after-tax income of the top 1% has been growing much faster than the rest, making this enormous gap even bigger.

Example Assignment Prompt: There is a significant gap between the incomes of the top 1% and the median income of the American population. This discrepancy

is also present, in varying degrees, across the US. This assignment will compare the income of a top 1% earner in your own county with the income of a median earner in your home county (or, if from abroad the county where your college sits). In this short paper assignment, you should: 1) determine the income gap between the 1-percent income in your county and the median; 2) determine how the median differs by race and gender within your county; 3) determine how a 1 percenter would need to spend their money in a day so that they did not accumulate any additional wealth (see [DeLong \(2019\)](#) for example); 4) determine how many minimum wage workers it would take in your county to hit the 1 percent income; and 5) analyze and critique a policy platform that attempts to address this sort of inequality.

Assignment Details: The paper should include at most 2 pages of text 1.5 spaced. You should also construct a data-based figure comparing income for the 1 percent in your county to the median Black female, white female, Black male, and white male. The figures do not count against the page limit, and should include clearly marked labels on the axes, a legend if necessary, and a clear title. For this assignment you will need utilize the following data sources:

1. Economic Policy Institute (<https://www.epi.org/chart/unequal-states-2018-table-a1-individual-income-and-tax-data-for-pennsylvania-by-size-of-adjusted-gross-income-tax-year-2015-2-2-2-2-2-2/>)
2. Opportunity Atlas (<https://www.opportunityatlas.org/>)
3. Economic Policy Institute – Minimum Wage Tracker (https://www.epi.org/minimum-wage-tracker/#/min_wage/)

Endnotes

- 1 Disagreements stem from disagreements over trends in inequality to whether or not inequality should be a focus of discussion. For example, see articles by [Piketty, Chancel, Alvaredo, Saez, Zucman \(2019\)](#), [Henderson \(2020\)](#), [Bershidsky \(2020\)](#), or [Gramm and Early \(2019\)](#). We even had a student e-mailing me a link to a [YouTube video of Milton Friedman from 1979](#) as a counterpoint, without really understanding the point being made..
- 2 See [Kapadia \(2020\)](#), [Sanzenbacher \(2020\)](#), and [Fisher and Bubola \(2020\)](#) for some analyses that illustrate these points.
- 3 [Chetty, Raj, Nathaniel Hendren, Maggie R. Jones, and Sonya Porter \(2020\)](#).
- 4 [Matthews \(2019\)](#) - The radical plan to change how Harvard teaches economics
- 5 One note: keeping the fact simple and focusing on males eliminates many other moving parts, and highlights the deteriorating position of workers who have not seen many other fundamental changes (unlike women, who achieved higher levels of education and work experience over this time period).
- 6 Again, focusing on those working full-time and full-year eliminates the moving part of growing hours.

Conclusion

Teaching about inequality in an introductory course is both imperative and difficult. We believe by focusing first on some agreed upon facts, and then focusing in on one of those facts you can achieve two goals. First, you can give your students some experience with data on inequality, and exposure to some statistics in a controlled environment. They may not agree on whether or not inequality is a problem, or what to do about it, but they will at least know the relevant trends and the current state of the world. Perhaps more importantly, you can show them how economics can help them think about one particular source of inequality. Hopefully the second lecture can push some students to think about economic policy options and how economics can be used for inclusive prosperity.

Can Erbil is a Professor of the Practice in Economics at Boston College. Contact: can.erbil@bc.edu

Geoffrey Sanzenbacher is an Associate Professor of the Practice in Economics at Boston College. Contact: geoffrey.sanzenbacher@bc.edu

Selected Resources, Readings and Data Sources to Build Your Own Module

There are many other excellent, publicly available sources for faculty to utilize when they are building their own modules. Some of the ones below may be helpful as readings an assignment to students. These are selected with considering that the students are in an introductory class and don't have much prior background in economics. We found them to be accessible, insightful and useful for a module like the one proposal in our policy brief.

1. [CORE-US – Chapter 19 – Economic Inequality](#)

This is an excellent source for anybody who wants to cover economic inequality in an introduction to economics course. It provides many teaching tools and also addresses difficult questions like “what (if anything) is wrong with inequality?” and “how much inequality is too much (or too little)?” – these are questions most of the introduction students are struggling with. Economic analyzes as well as empirical data are utilized to answer each question.

2. [Economic Policy Institute](#)

3. [Washington Center for Equitable Growth](#)

4. <https://inequality.org>

5. [Combating Inequality: Rethinking Policies to Reduce Inequality in Advanced Economies](#), Peterson Institute for International Economics Webcast, 2019

6. [How economic inequality harms societies](#), TED talk by Richard Wilkinson, 2011

7. [The Triumph of Injustice](#), by Gabriel Zucman, March 20th, 2020, Social Europe, podcast

8. [Tackling Inequality from the Middle](#), Dani Rodrik, Project Syndicate, 2019

9. [Why some countries grew rich](#), Suresh Naidu, 2015

10. [Good and Bad Inequality](#), Dani Rodrik, Project Syndicate, 2014

11. [The Inequality Trust](#)

12. [The Spirit Level: Why More Equal Societies Almost Always Do Better](#), Kate Pickett and Richard Wilkinson, 2009 – [Powerpoint slides](#)

13. [Suresh Naidu on Capitalism, Monopsony, and Inequality](#), MindScape Podcast, 2020

14. [Should we worry about income gaps within or between countries?](#), Dani Rodrik, Social Europe, 2019

15. [The New Economics: Data, Inequality and Politics](#), 2019, John Cassidy, The New Yorker

16. [Inequality is](#)

17. <https://www.millionairesforhumanity.com>

18. [How Pandemics Leave the Poor Even Farther Behind](#), IMF Blog, 2020

19. <https://www.project-syndicate.org/commentary/inequality-data-and-denialism-by-facundo-alvaredo-et-al-2019-12?barrier=accesspaylog>

20. <https://reason.com/2020/01/25/the-truth-about-income-inequality/>

21. <https://www.bloomberg.com/opinion/articles/2020-01-07/economists-debating-piketty-care-too-much-about-inequality>

22. <https://www.wsj.com/articles/the-truth-about-income-inequality-11572813786>

23. <https://www.barrons.com/articles/the-pandemic-is-weakening-americans-retirement-security-51588086298>

24. <https://progressless.org/2020/05/21/the-covid-19-recession-versus-the-great-recession-in-one-chart/>

Appendix

Below is an example of how such a module can be successfully integrated into a large introduction to economics course.

Application of the policy proposal

Economics in Action: Using Big Data to Solve Social Problems, Spring 2020 Module implemented in Econ1101.03 at Boston College

The Opportunity Insights has designed a one-week module, which can be inserted into any introductory economics course, based on Raj Chetty’s undergraduate course at Harvard “Using Big Data to Solve Economic and Social Problems”. In this module, students see key economic concepts in action and work with data directly. My Spring 2020 introduction to economics class at Boston College (255 students) was selected as one of the pilot courses and randomly assigned to the treatment group.

The module was taught with all the provided material from Opportunity Insights. The assignment consisted of two main parts.

Part I. The Opportunity Atlas

In Part I, students will use the Opportunity Atlas¹ and the underlying data to describe equality of opportunity in their hometown and across the United States. (If they grew up outside the United States, they may select a community in which they have spent some time, such as the town in which their college is located.)

Part II. Creating Moves to Opportunity (CMTO)²

In Part II, students will analyze experimental data from the Creating Moves to Opportunity Experiment (CMTO). In particular, they will analyze data from pilot studies conducted in partnership with the King County Public Housing Authority (KCHA) and the Seattle Public Housing Authority (SHA).

Readings, teaching/learning material and assignments were uploaded on the Canvas learning platform and students needed to complete the following steps:

- 1) Do the pre-readings.
- 2) Go over the teaching material and lecture slides (students can review the slide manual for more detailed information).
- 3) Read the detailed homework description.
- 4) Upload their document with their written answers to the questions in the homework assignment, along with any accompanying figures or tables.

Preliminary Assessment

Despite the COVID-19 interruption and the necessity to abruptly take the course online, I decided to cover the integrated module in our course, as previously planned. The module has been received overwhelmingly positively by many students. Below are several excerpts from student feedback:

- “This class has made me realize how much I genuinely enjoy and am interested in economics, and I want to thank you for that! Also, the *Economics in Action project* really got me thinking about the *disparities in economic mobility*..”
- “This was my first time learning about economics and I really loved exploring the subject. Adding in *current*

events related assignments made the topic tangible in my everyday life and *I started to talk about it with my brother (an econ major) every night at dinner.*”

- “Principles of Economics was genuinely my favorite class this semester and *I learned a lot of practical skills and lessons that will help me and (in the case of the current pandemic) already have helped me understand the economy and how it operates.*”
- “*...our big data project assignment helped students notice how economics is involved in our lives.*”
- “Prior to this course, I had never taken an economics course before; even with it being an odd semester time wise with coronavirus, I learned a lot of valuable information about economics and how the economy works. *All of this knowledge is useful; however, if I was to pick one thing that I believe is most valuable, it has to be what I learned about economic inequalities in the Economics in Action assignment. Through using the Opportunity Atlas, I was able to see how some communities are being left behind and do not have an equal opportunity at achieving the “American Dream”...*”

A survey-based assessment will be published by Opportunity Insights by the end of the next Fall semester when the pilot program concludes.

I. Pre-Reading

Economics in Action: Using Big Data to Solve Social Problems - Spring 2020 Module Prereading

Introduction

This week in class you will cover materials related to economic opportunity and upward mobility. The lectures and subsequent assignment explore a progression of research on the geography of opportunity in the United States and its implications for housing policy. This work is part of a broader effort being undertaken by economists and other social scientists to study the factors behind the fading of the American Dream, and potential solutions to revive it.

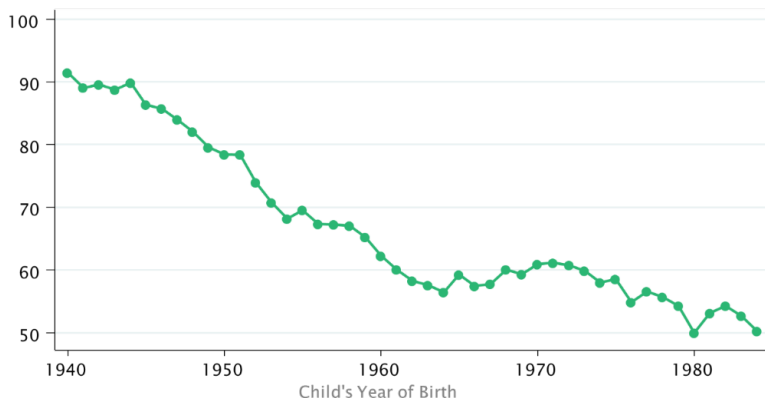
Fading American Dream

One of the defining features of the “American Dream” is the ideal that children have a higher standard of living than their parents. We can measure the extent to which this is the case using anonymized tax records to compare children’s incomes with their parents’.

This analysis reveals that rates of absolute upward mobility are declining. The fraction of children who grow up to earn more than their parents did has fallen from approximately 90% for children born in the 1940s to 50% for children born in the 1980s. This trend is displayed in the graph below, which plots the percent of children who grow up to earn more than their parents by their birth year.

The Fading American Dream

Percent of Children Earning More than Their Parents, by Year of Birth

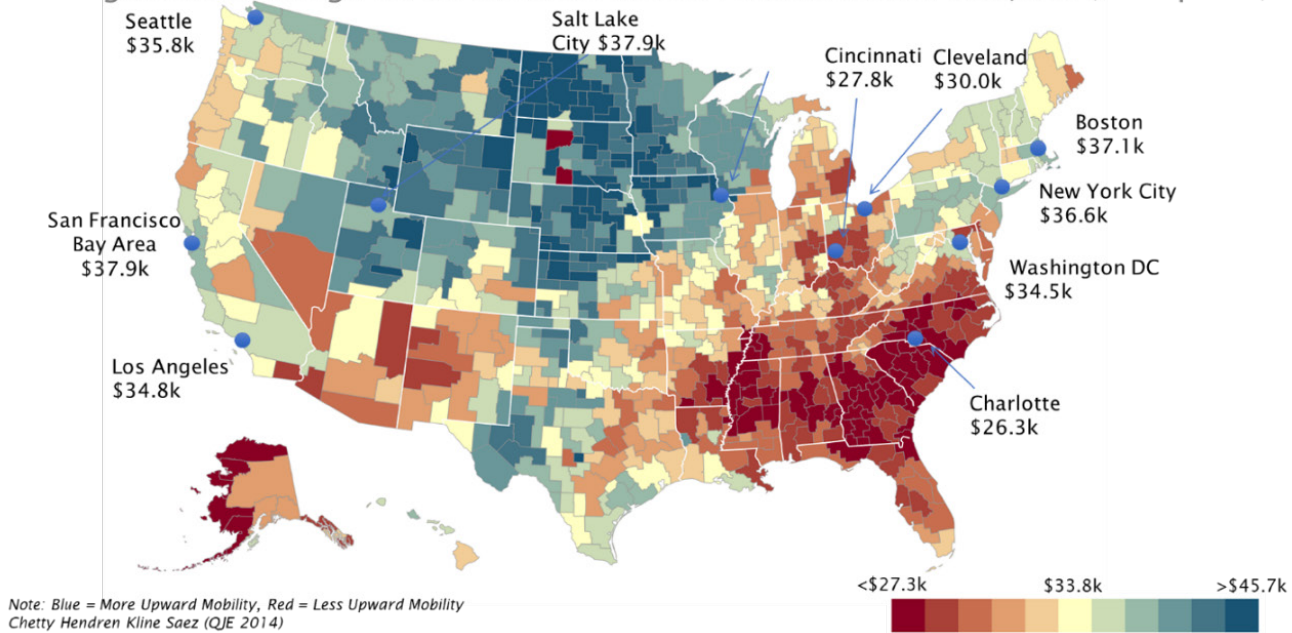


The Geography of Opportunity

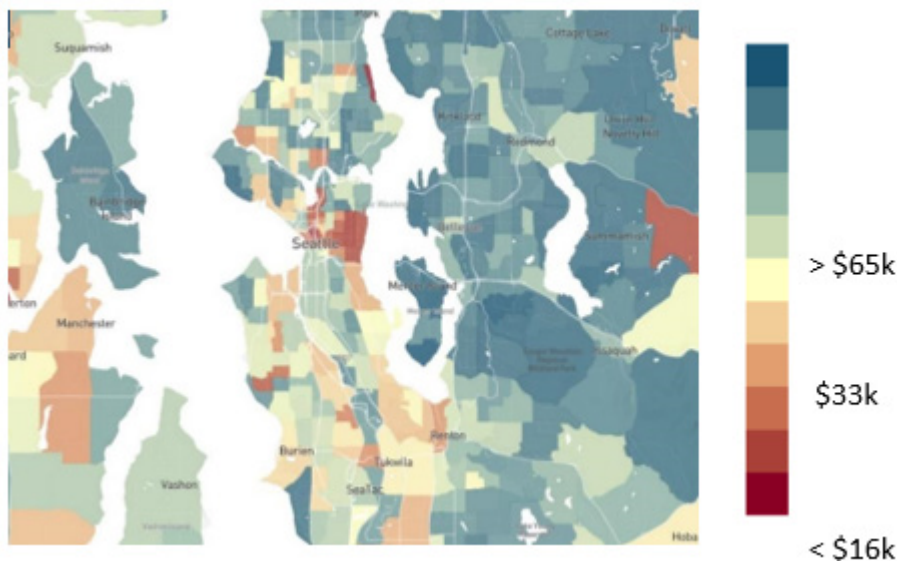
This pattern of declining upward mobility is not uniform across the entire United States. In other words, in some parts of the country the American Dream is alive and well, while, in others, it is out of reach. This regional variation is displayed in the map below, which maps average incomes at age 35 for children with parents who earn \$25,000. It appears that some areas in the country offer children a lot of opportunity, while others appear to trap children in poverty.

The Geography of Upward Mobility in the United States

Average Income at Age 35 for Children whose Parents Earned \$25,000 (25th pctlile)



Zooming in to an even finer scale, we can see that the high level of variation in upward mobility that we observe nationally exist within cities as well. In other words, children who grow up a few miles apart in families with comparable incomes grow up to earn very different amounts in adulthood. There is similar variation in a spectrum of other outcomes – from earnings to teenage birth rates – across nearby neighborhoods, not just in Seattle but in most cities in America. In rural areas too, neighboring towns often exhibit sharply different outcomes for local children.



Race and Opportunity

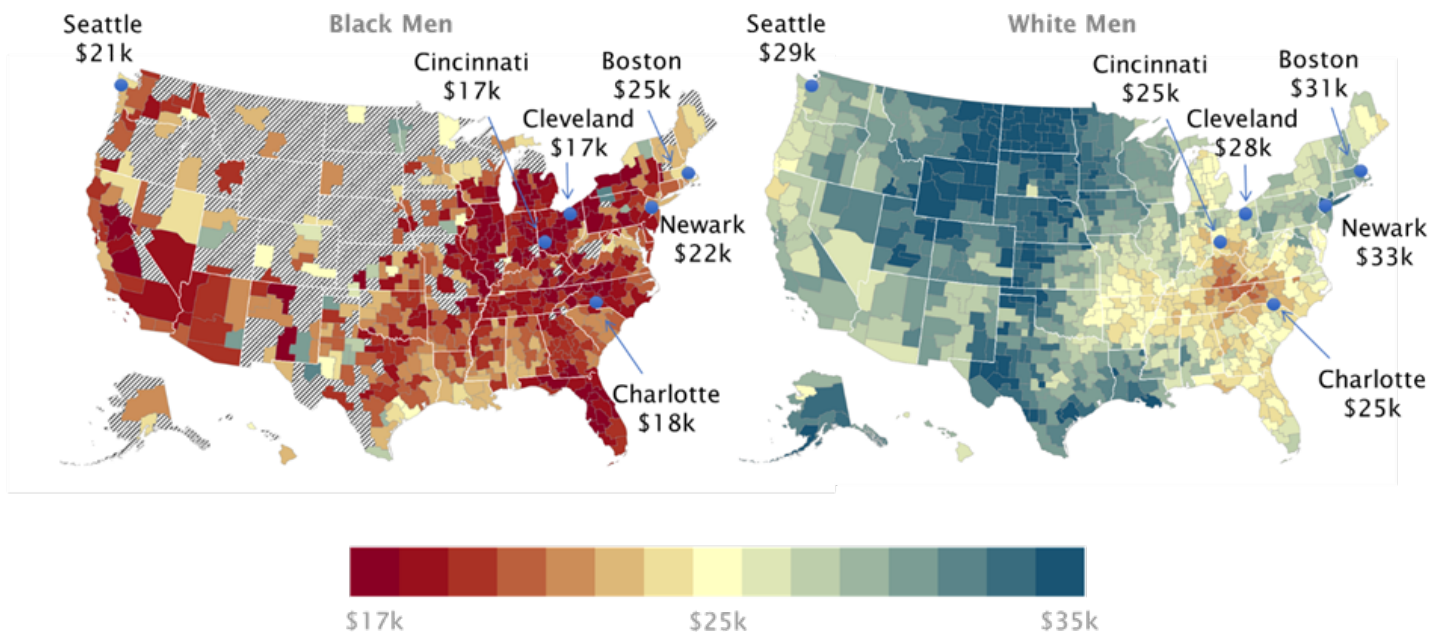
Levels of upward mobility appear to mirror patterns of racial demographics in the United States: areas with relatively large Black populations – such as the Southeast – offer poor outcomes, while the Midwest offers some of the best. Because African Americans, on average, have lower rates of upward mobility than white Americans, it is possible that the patterns of upward mobility shown in the map are largely due to the racial composition of the country.

In order to determine if this is the case, researchers recreated the two maps, separately for white and Black men. This analysis reveals several important patterns. First, much of the map on the left is grayed out in areas where no Black children are present in the data, revealing extreme spatial segregation. Secondly, there is very little overlap in outcomes between white men and black men – indeed, it appears as though the two maps have been created on two different color scales. This is because in 99% of neighborhoods in the United States Black boys grow up to earn less in adulthood than white boys from families with comparable income. In other words, some of the “best” places for Black boys, like Boston, where black boys growing up in low income families grow up to earn \$25,000 on average, are worse than some of the worst neighborhoods for white boys. Lastly, we see that racial demographics account for only *some* of the patterns in outcomes that we observe nationally. Even when controlling for race, the Midwest appears to offer relatively good outcomes, the Southeast relatively bad.

Please read the following [New York Times article](#) covering this subject.

Two Americas: The Geography of Upward Mobility For Black vs. White Men

Average Income at Age 35 For Men Whose Parents Earned \$27,000 (25th percentile)



Note: Blue = More Upward Mobility, Red = Less Upward Mobility
Source: Chetty, Hendren, Jones, Porter 2018

Causal Effects

This geographic variation in upward mobility could be driven by two very different sources. One possibility is that neighborhoods have **causal effects** on residents' upward mobility. If this were the case, then moving a given child to a “better” neighborhood would improve their outcomes. Another possibility is that the observed geographic variation is due to systematic differences in the types of people living in each area – *different types of people choose to live in different types of places*. Distinguishing between these two explanations is crucial to determining whether changing neighborhood environments is an effective way of improving economic mobility or whether policymakers should focus on other types of interventions.

The U.S. Department of Housing and Urban Development set out to answer this question in 1994 with their Moving

to Opportunity (MTO) experiment, in which they tested whether providing low-income families assistance for moving to better neighborhoods could improve their economic and health outcomes.

The MTO experiment ran in five large U.S. cities between 1994 and 1998, and randomly divided approximately 4,600 participating families living in high-poverty public housing projects into three different groups:

- an **experimental voucher group** that was offered a subsidized housing voucher that came with a requirement to move to a census tract with a poverty rate below 10%,
- a **Section 8 voucher group** that was offered a standard housing voucher with no additional contingencies,
- and a **control group** that was not offered a voucher (but retained access to public housing).

Initial results suggested that the MTO treatment had no impact on the earnings of the adults who moved. Researchers later revisited these results, this time looking at the impacts for *children* who moved. Using a longitudinal dataset to explore the present-day incomes for children who were below 13 when they moved, they found that moving to lower-poverty neighborhoods increased the incomes of children in the experimental voucher group. This suggests that place indeed has a **causal effect** on kids' outcomes.

It is important to note that the MTO experiment was relatively small: it ran in five cities, with only 4,600 participants. In order to test whether *all* neighborhoods have causal effects on kids' outcomes, researchers used de-identified tax records on more than five million children whose families moved across counties between 1996 and 2012. This analysis confirmed that the area where a child grows up has a significant causal effect on their prospects for upward mobility

Increasing Upward Mobility

Given the fact that the neighborhood in which a child grows up has a substantial impact on their later outcomes, one might consider two types of approaches to increasing upward mobility. The first focuses on reducing residential segregation. The United States government spends approximately \$45 billion per year on affordable housing programs, including \$20 billion on Housing Choice Vouchers, a program that provides rental assistance to low-income families. Though the voucher program allows families to rent units in any neighborhood within their housing authority's jurisdiction, most of the 2.2 million families with vouchers currently live in relatively high-poverty, low opportunity neighborhoods. Researchers recently tested a new program, Creating Moves to Opportunity (CMTO), designed to reduce the barriers that families face in moving to higher-opportunity neighborhoods in the Seattle Metro area. The program increased the number of families who moved to high-opportunity neighborhoods by 40 percentage points, which suggests that addressing the barriers that families face in moving to higher-opportunity places may help to increase upward mobility.

Increasing access to high-opportunity areas is an effective lever for reducing segregation and increasing access to higher mobility. But it is not a scalable approach for increasing upward mobility in the long run. By studying the places that produce the best outcomes for low-income children, one may be able to replicate those successes in other areas through place-focused investments. Early evidence suggests that neighborhoods with higher rates of upward mobility also tend to have more two-parent households, better schools, lower poverty rates, and more social capital. While these findings are only correlations, they can begin to give us a sense of the types of policies that might help to increase upward mobility in areas where it is low, reviving the American Dream.

Finally, please watch the following video (<https://www.youtube.com/watch?v=7jymU4TuBiI>) of economist Dr. Ioana Marinescu explaining the nature of big data and its usefulness in social policy research.

II. Assignment

Economics in Action: Using Big Data to Solve Social Problems

Empirical Project: Exploring the Opportunity Atlas and Creating Moves to Opportunity

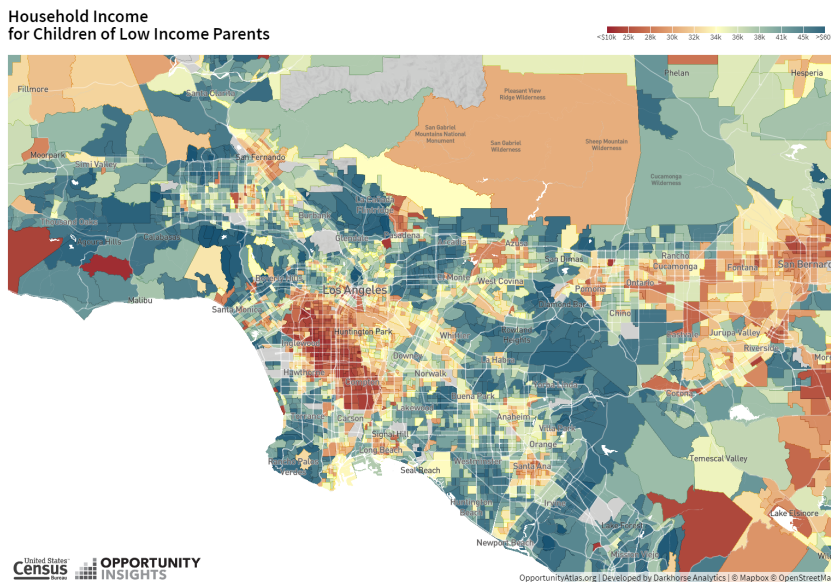
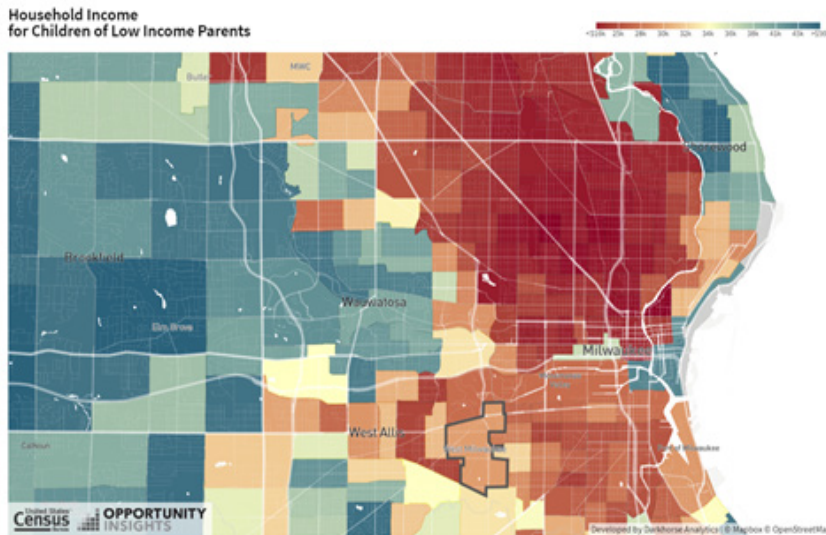
Please produce a document with your written answers to the questions below, along with any accompanying figures or tables.

Part I. The Opportunity Atlas

In Part I, you will use the [Opportunity Atlas](#) and the underlying data to describe equality of opportunity in your hometown and across the United States. (If you grew up outside the United States, you may select a community in which you have spent some time, such as the town in which your college is located.)

1. Start by looking up the city where you grew up on the Opportunity Atlas. Zoom into the Census tracts around your home.

Include a map of the Census tract(s) in your hometown using the “Download as Image” feature in the bottom left. Examples for Milwaukee, WI (where Raj Chetty grew up) and Los Angeles, CA are shown below.



Then, describe what you see, and what data are being visualized. Examine the patterns for a number of different groups (e.g., lowest income children, high income children) and outcomes (e.g., earnings in adulthood, incarceration rates). Choose one or two of these to include in a paragraph description to accompany your map.

2. (To answer this question, read the [full paper](#) or the [Atlas FAQ](#)) What period do the data you are analyzing come from? Are you concerned that the neighborhoods you are studying may have changed for kids now growing up there? What evidence do Chetty et al. (2018) provide suggesting that the results remain reliable?

3. Now using the [data explorer](#), open the histogram tool. How does average upward mobility (as measured by child household income in adulthood), pooling races and genders, for children with parents who are low income in your home Census tract compare to mean upward mobility in your county, your state and in the U.S. overall? Do kids where you grew up have better or worse chances of climbing the income ladder than the average child in America?

4. Next, describe whether the patterns you have looked at above are similar by race. If there is not enough racial heterogeneity in the area of interest (i.e., data is missing for most racial groups), then choose a different area to examine.

5. Now, turn to the scatterplot tool. Using the Census tracts in your home county, can you identify any **covariates** which help explain some of the patterns you have identified above? Some examples of covariates you might examine include rental prices, poverty rates, fraction of children with single parents, job density, etc. For 2 or 3 of these, report estimated **correlation coefficients** along with their **95% confidence intervals**.

6. How might you test for the causal impact of some of the covariates you identified above? What would be the “ideal experiment,” however implausible? Note that this is a difficult question and only intended to get you thinking about causal inference!

Part II. Creating Moves to Opportunity

In Part II, you will analyze experimental data from the Creating Moves to Opportunity Experiment (CMTO). In particular, you will analyze data from pilot studies conducted in partnership with the King County Public Housing Authority (KCHA) and the Seattle Public Housing Authority (SHA). Each **Public Housing Authority** (KCHA and SHA) handled recruitment into the experiment and randomization separately, although they followed the same procedure.

Families with at least one child below age 15 who submitted applications for **Section 8 housing vouchers** were asked if they would like to participate in the experiment. Families who said yes were then randomly assigned to two groups: (i) a control group that received the standard services for families with a Section 8 voucher and (ii) an experimental treatment group that was offered an additional suite of services oriented to help families move to **high-opportunity areas**.

These additional services included information about opportunity areas, assistance in identifying available units and in getting in contact with landlords, and some financial assistance for moving expenses. Importantly, treatment group families were not required to use these services and were not required to move to higher opportunity places if they did not want to do so.

For more information about the study, see the websites for [Opportunity Insights](#), [Creating Moves to Opportunity](#), and the [Poverty Action Laboratory](#), or the following [press coverage](#). Your analysis of these data is at the cutting edge of

affordable housing policy. CMTO is currently in the pilot phase in Seattle and King County, but conversations are now underway to expand it to many other cities across the U.S., shown in the map below.



1. Open `cmto.xlsx` in Excel. In your own words, describe what the `pha`, `treatment_group`, `received_cmto_services`, `leased_up`, and `leased_up_opp` variables mean.
2. Provide evidence that the housing authorities really did randomly assign families to treatment and control groups. Reports means of 5 or 6 relevant characteristics for families in the control group.

Note: Part of this question is to get you to think about which variables should be **balanced** in a **randomized experiment**. You need to read carefully through all the variables in Table 1 and decide which 5 or 6 you will summarize.

Excel Instructions:

First, apply a filter to the variable labels by highlighting the second row (click on the '2' in the upper left to select the entire row), then clicking on the Data menu at the top of the screen applying 'Filter.' Filter by `treatment_group` (0 represents the control group, 1 represents the treatment group.) Then, for each group, highlight a column containing a variable that you would like to analyze by clicking the letter at the top of the column. E.g., to analyze `hoh_age`, click 'J.' The entire column should be highlighted, and the average will appear in the bottom right.

3. Estimate the compliance rate for the CMTO experiment. That is, what is the effect of being assigned to the treatment group on the probability of receiving CMTO services? Note that in CMTO, no one in the control group accidentally received CMTO services.

Excel Instructions:

Filter by `treatment_group=1` and record the average of `received_cmto_services` as displayed in the bottom right when column D is highlighted.

4. A natural, but incorrect, way of analyzing data from an experiment with **noncompliance** is to compare outcomes for those who actually received the treatment and those who did not receive the treatment. Another incorrect way of

analyzing data from an experiment with non-compliance is to drop observations in the treatment group that did not receive the treatment and drop observations from the control group who actually received the treatment. Explain why these two approaches would lead to biased estimates.

5. What is the **intent-to-treat (ITT) effect** of the CMTO services on signing a lease in a high opportunity area? Since this experimental data, this statistic can be calculated by finding the difference between the probability of signing a lease in a high opportunity area conditional on being assigned to treatment and the probability of signing a lease in a high opportunity area conditional on being assigned to the control group.

Excel Instructions:

First, filter by `treatment_group=1` and record the average of the `leased_up_opp` variable. Then, filter by `treatment_group=0` and record the average of the `leased_up_opp` variable again. Then, calculate the difference between the two averages and record the ITT effect of being assigned to the treatment group.

Glossary

95% confidence intervals The 95% confidence interval for a sample estimate refers to the range in which the true population estimate falls 95% of the time.

Balanced If randomization is done correctly in a randomized experiment, variables relating to characteristics of participants before treatment begins (or immutable characteristics) should be balanced, or close to the same between treatment and control groups.

Census tract Geographical units consisting of about 4,200 individuals, defined for purposes of conducting the U.S. Census.

Correlation coefficients The correlation coefficient is a value between -1 and +1 that characterizes the relationship between two variables. A correlation coefficient of -1 means that the variables are perfectly negatively correlated; a correlation coefficient of +1 means that the variables are perfectly positively correlated.

Covariate A covariate is a variable that is possibly predictive of the outcome under study, e.g., the average rental prices in a neighborhood might be predictive of upward mobility in that neighborhood.

High-opportunity areas High-opportunity areas are tracts or groups of tracts for which we estimate that low-income children grow up to have relatively higher incomes as adults.

Intent-to-treat (ITT) effect The intent-to-treat effect is the effect of being assigned to the treatment condition, which is a weighted average between the outcomes of those assigned to treatment who do and do not actually take up the treatment.

Noncompliance Noncompliance occurs when participants in an experiment are assignment to the treatment group but do not take up the treatment, or more rarely, when participants are assigned to the control but still receive treatment.

Public Housing Authority Public Housing Authorities or Public Housing Agencies (PHAs) are local organizations

that administer housing choice vouchers under Section 8 and provide other housing-related services to low-income individuals.

Randomized experiment In a random experiment, researchers randomly assign individuals to the treatment and control groups, and compare the outcomes of these two groups over time. If randomization is successful, and the sample size is sufficiently large, the treatment and the control groups should be comparable on other characteristics prior to the treatment group receiving treatment.

Section 8 housing vouchers The Section 8 housing voucher program provides housing subsidies to low-income families to help them find “decent, safe, and sanitary housing.” Families receiving vouchers are responsible for finding a housing unit and local Public Housing Agencies (PHAs) pay the subsidy directly to the landlord.

Tract, county, and state FIPS codes FIPS code, or “Federal Information Processing Standard” codes are a standardized way of numerically encoding each of these respective geographic entities. Tract FIPS codes have up to 6 digits, county FIPS codes have up to 3 digits, and state FIPS codes have up to 2 digits. Note that you need to concatenate these three FIPS codes to uniquely identify each tract.

Data Description, File: *cmto.xls*

The data consist of $n = 820$ families in a simulated dataset that preserves the key features of the Creating Moves to Opportunity Experiment, but does not contain actual information from real households to protect their privacy.

Table 1 Variable Definitions in *cmto.xls*

Variable	Definition
(1)	(2)
<i>household_ID</i>	Household identifier
<i>pha</i>	0 = King County Public Housing Authority 1 = Seattle Public Housing Authority
<i>treatment_group</i>	1 = if randomly assigned to treatment group 0 = if randomly assigned to control group
<i>received_cmto_services</i>	=1 if received at least some CMTO Services, = 0 if did not receive any CMTO Services
<i>total_time_meetings</i>	Hours spent in CMTO services (e.g., visiting housing locations)
<i>leased_up</i>	=1 if household signed lease, = 0 otherwise

Variable	Definition
(1)	(2)
<i>leased_up_opp</i>	Opportunity areas are census tracts with high upward mobility rates; tracts were chosen based on estimates of mean household income of children from low income families, as well as practical considerations for PHA operation. =1 if household signed lease in high opportunity area. =0 otherwise
<i>hoh_age</i>	Head of household's age (at baseline)
<i>child_count</i>	Number of children (at baseline)
<i>child_age</i>	Average age of children in the household (at baseline)
<i>speaks_english</i>	= 1 if head of household speaks English (at baseline), = 0 otherwise
<i>born_abroad</i>	= 1 if head of household was born abroad, = 0 if born in the U.S.
<i>working</i>	= 1 if head of household working (at baseline), = 0 otherwise
<i>homeless</i>	1 = if homeless at baseline, 0 otherwise
<i>hh_income</i>	Household income (\$) at baseline
<i>origin_pop2010</i>	Origin tract population in 2010 Census
<i>black</i>	1= race is African American/Black, 0 = otherwise
<i>white</i>	1= race is White, 0 = otherwise
<i>asian</i>	1= race is Asian, 0 = otherwise
<i>latino</i>	1= race is Latino, 0 = otherwise
<i>other_race</i>	1= race is other, 0 = otherwise
<i>high_school_diploma_or_GED</i>	1= high school diploma or GED, 0 = otherwise
<i>less_than_HS</i>	1 = education is less than high school 0 = otherwise
<i>associates_or_some_college</i>	1 = associates degree or some college attainment 0 = otherwise

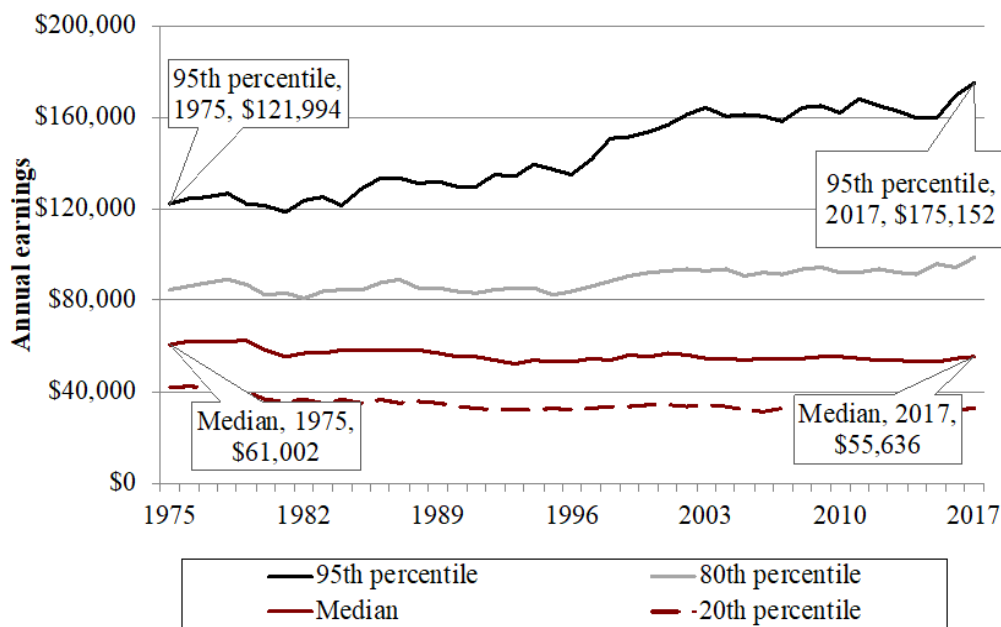
Variable	Definition
(1)	(2)
<i>four_year_college_or_more</i>	1 = four-year college or more 0 = otherwise

Note: This table describes the variables included in cmto.xls.

The complete set of course material can be found here: www.opportunityinsights.org/course

Sample Lecture Slides on Stylized Facts

Stylized Fact #1: Inequality in real income from work among full-time, full-year employed men has increased, *with the median and below falling.*

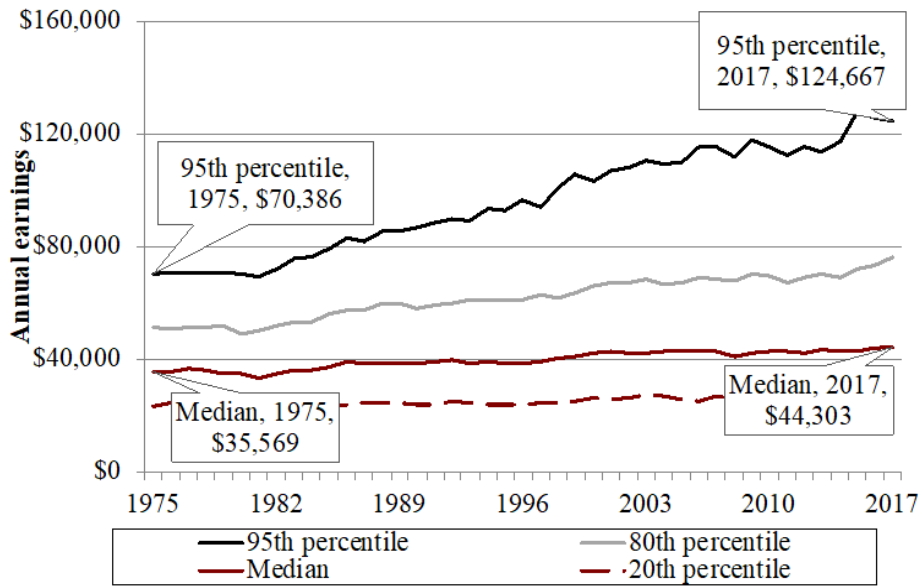


Note: Excludes self-employed individuals and unpaid workers for family businesses. All workers were between 25 and 54.
Source: Author's calculation from the *Current Population Survey Integrated Public Use Microdata Series (CPS-IPUMS)*.

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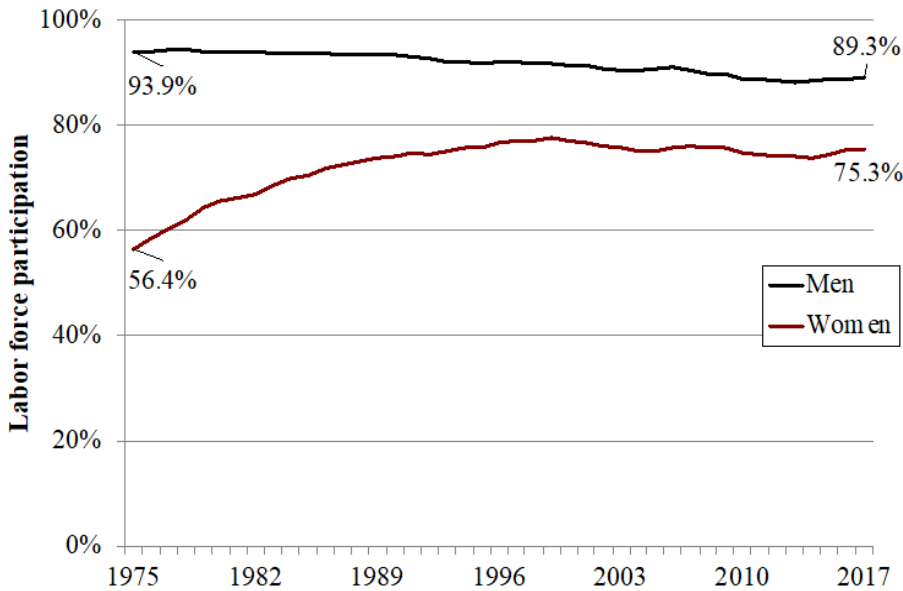
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Stylized Fact #2: Unlike men, full-time, full-year working women have seen wage and salary increases across the board (although inequality increased)...



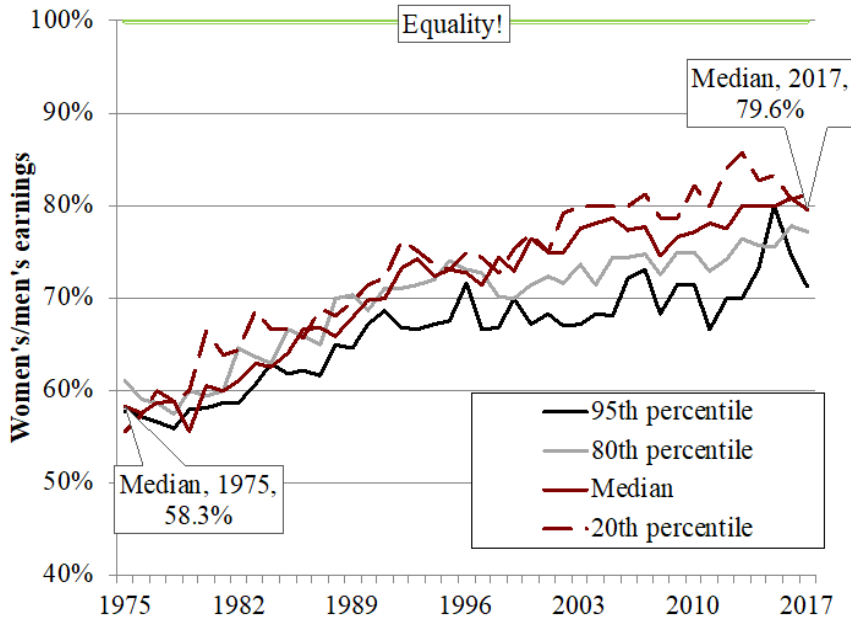
Note: Excludes self-employed individuals and unpaid workers for family businesses. All workers were between 25 and 54.
 Source: Author's calculation from the *Current Population Survey Integrated Public Use Microdata Series (CPS-IPUMS)*.

Stylized Fact #2 (cont): ...that have been accompanied by large increases in labor force participation relative to men...



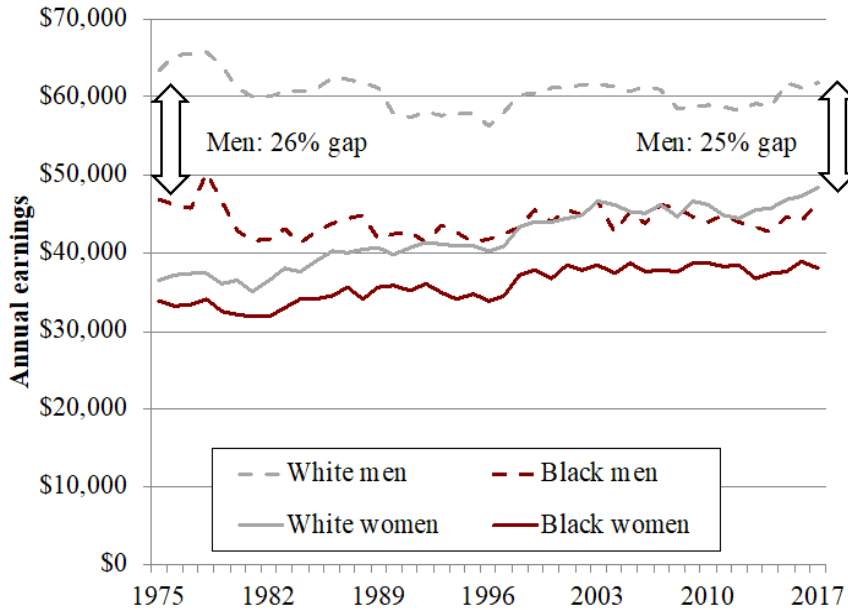
Note: All individuals sampled were between 25 and 54.
 Source: Author's calculation from the *Current Population Survey Integrated Public Use Microdata Series (CPS-IPUMS)*.

Stylized Fact #2 (cont): ...but women have not caught up to men in earnings and, if anything, the earnings ratio between men and women has stalled out.



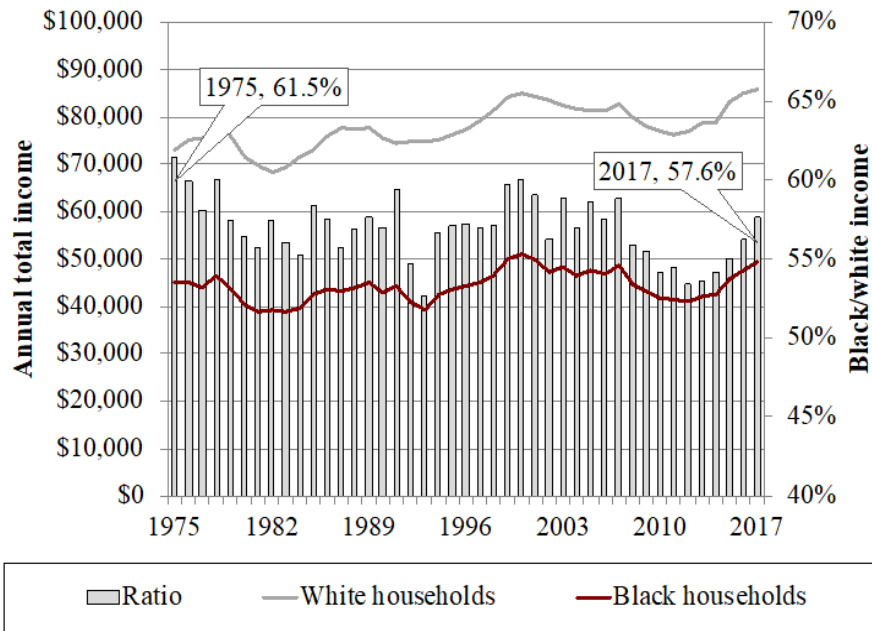
Note: Excludes self-employed individuals and unpaid workers for family businesses. All workers were between 25 and 54.
 Source: Author's calculation from the Current Population Survey Integrated Public Use Microdata Series (CPS-IPUMS).

Stylized Fact #3: The income gap between black and white workers has been shockingly persistent...



Note: Excludes self-employed individuals and unpaid workers for family businesses. All workers were between 25 and 54.
 Source: Author's calculation from the Current Population Survey Integrated Public Use Microdata Series (CPS-IPUMS).

Stylized Fact #3 (cont): ...and is more pronounced at the household than at the individual level.

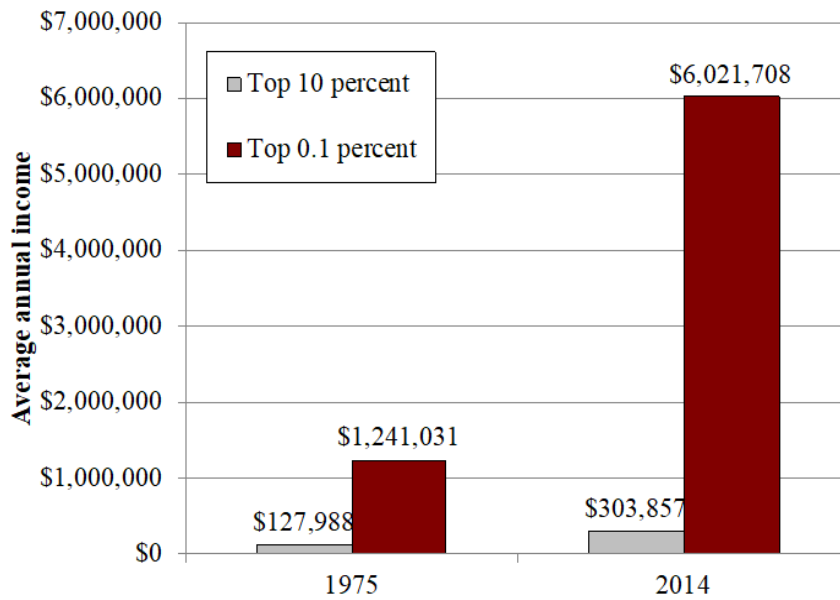


Note: Includes all households where the “householder” was between age 25 and 54. Income amounts are pre-tax and include all sources. Source: Current Population Survey, 2016 (representing calendar year 2015).

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Stylized Fact #4: The very top of the income distribution has seen especially large increases in income.

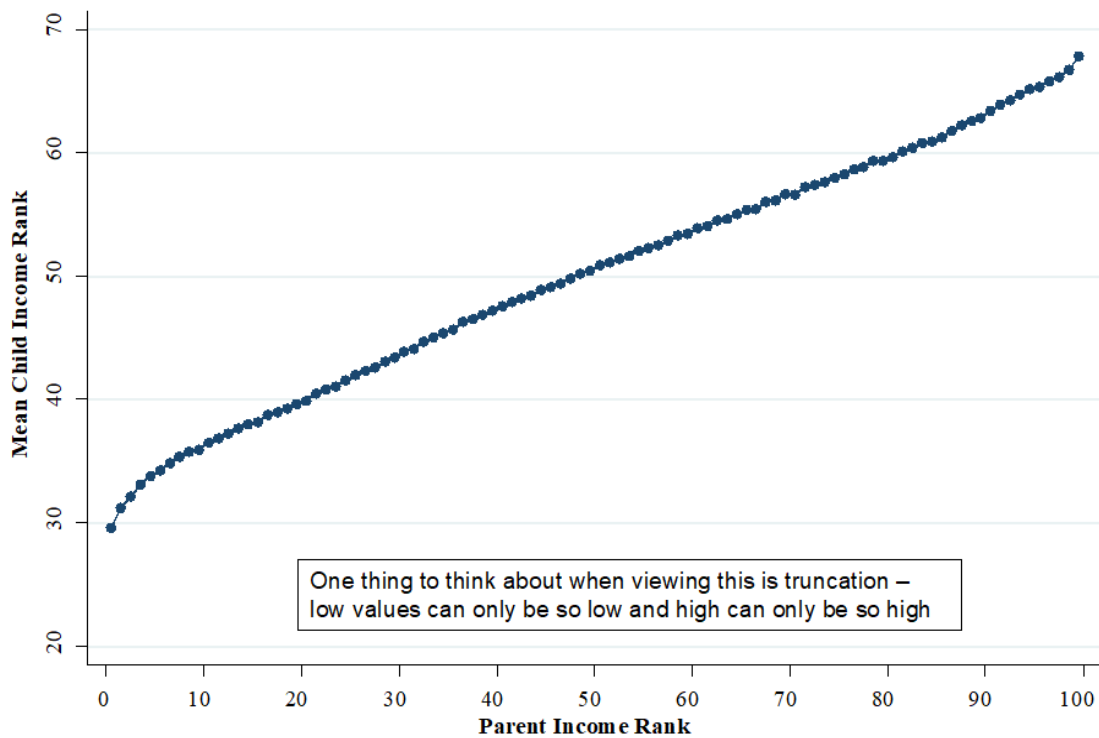


Source: Piketty, Saez, and Zucman (2017).

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Stylized Fact #5: A strong correlation exists between parent's income and child's income.



Source: Equality of Opportunity Project, www.equality-of-opportunity.org.

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Endnotes

- 1 Raj Chetty & John N. Friedman & Nathaniel Hendren & Maggie R. Jones & Sonya R. Porter, 2018. “**The Opportunity Atlas: Mapping the Childhood Roots of Social Mobility**,” Working Papers 18-42, Center for Economic Studies, U.S. Census Bureau.
- 2 <https://www.nytimes.com/2019/08/03/opinion/sunday/poverty-seattle.html>