

# Social Data Science

Soc 114  
Winter 2026

Economic Opportunity Measured by Predictability

# Learning goals for today

By the end of class, you will be able to

- ▶ reason about economic opportunity
- ▶ reason about equal opportunity
- ▶ connect these to a data science idea: prediction

What does economic opportunity mean to you?

## Economic opportunity: Two definitions

**absolute mobility** out-earning your parents

**relative mobility** out-ranking your parents

# Absolute upward mobility: Out-earning your parents

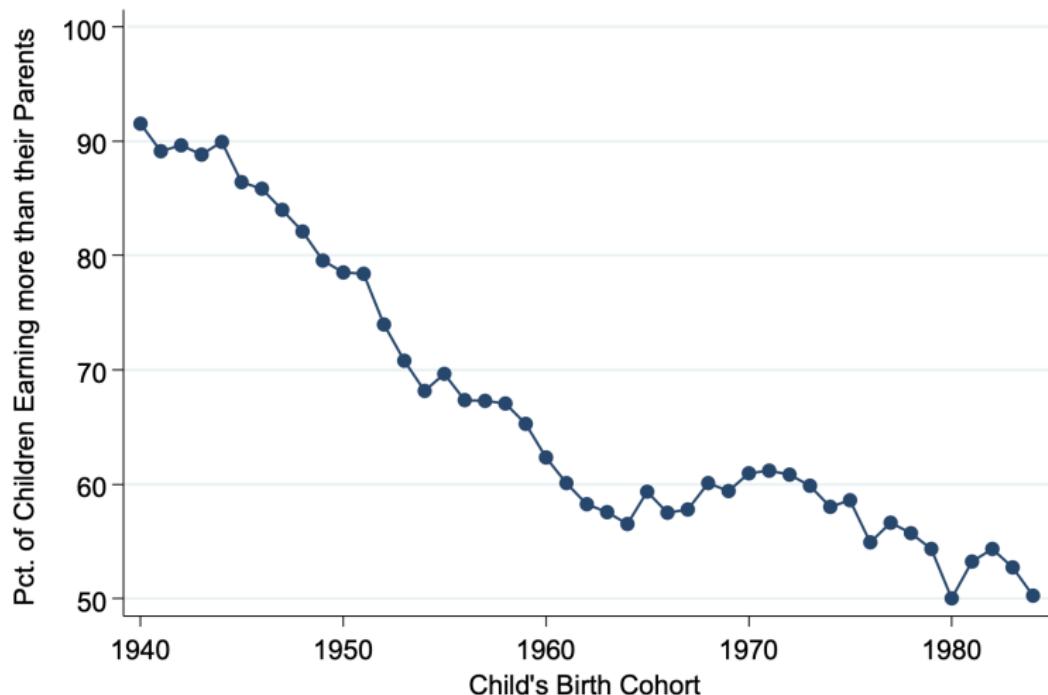
Chetty et al. 2017

What proportion earn more than their parents at age 30?

- ▶ among those born in 1940
- ▶ among those born in 1984

# Absolute upward mobility: Out-earning your parents

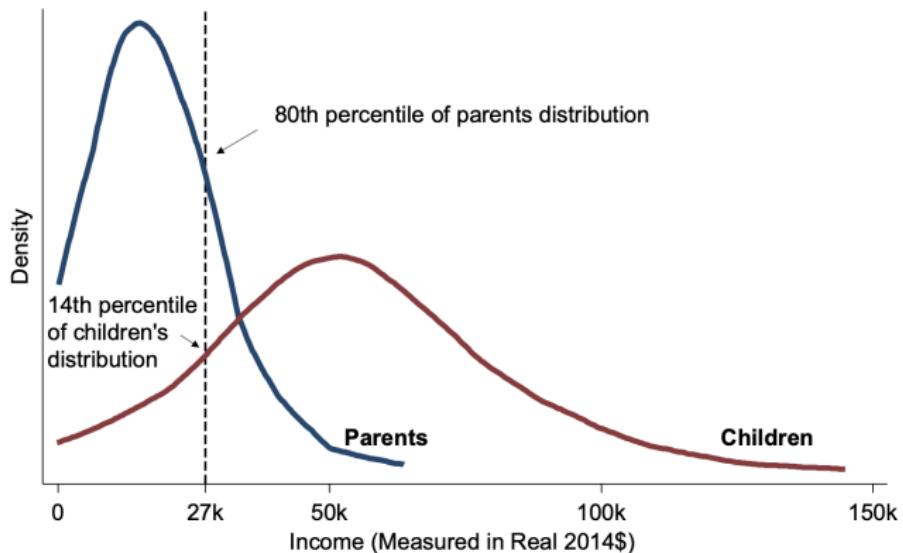
Chetty et al. 2017



# Absolute upward mobility: Out-earning your parents

Chetty et al. 2017

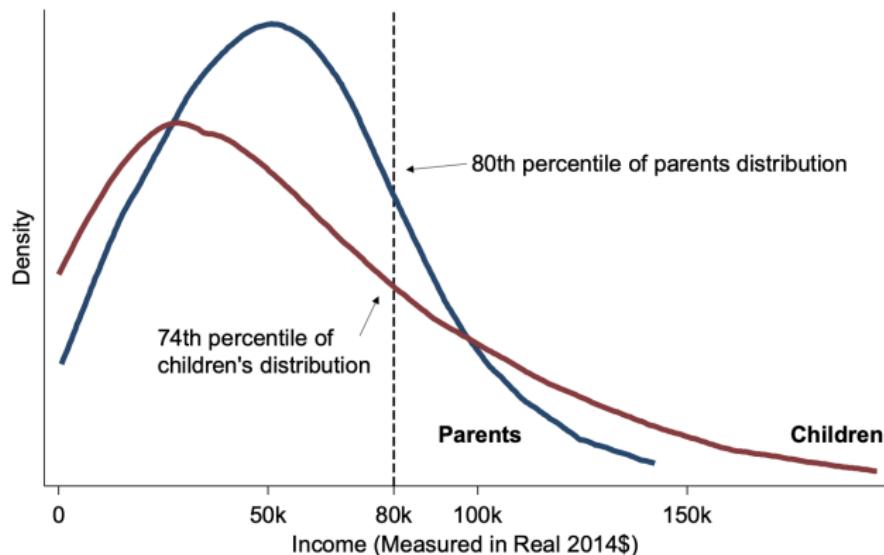
## B. Family Income Distributions: 1940 Birth Cohort



# Absolute upward mobility: Out-earning your parents

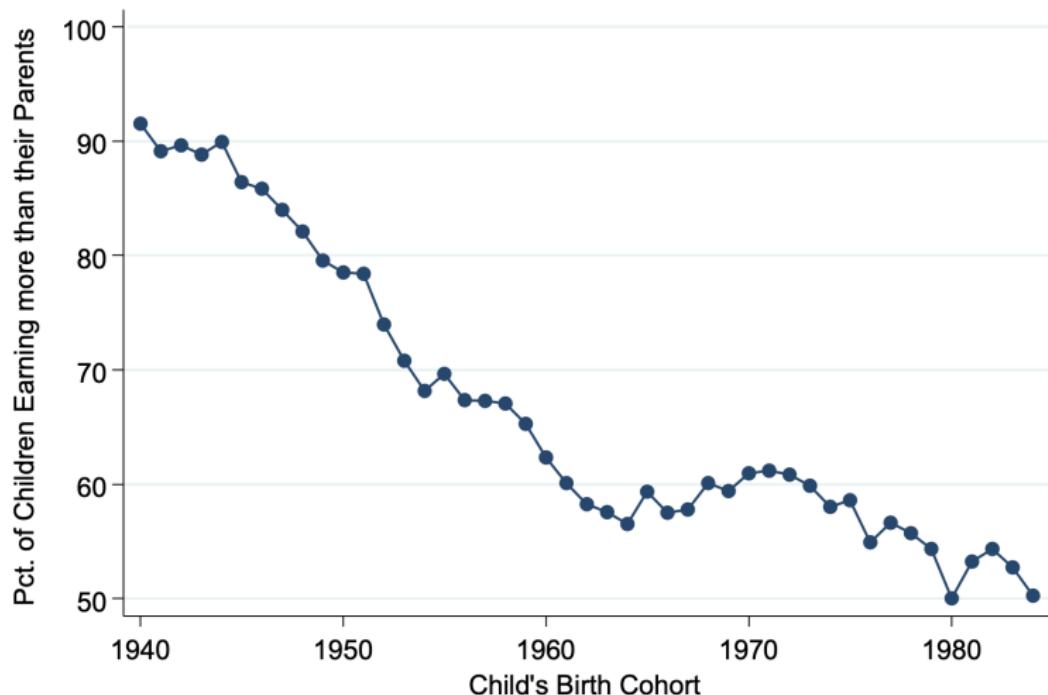
Chetty et al. 2017

## C. Family Income Distributions: 1980 Birth Cohort



# Absolute upward mobility: Out-earning your parents

Chetty et al. 2017

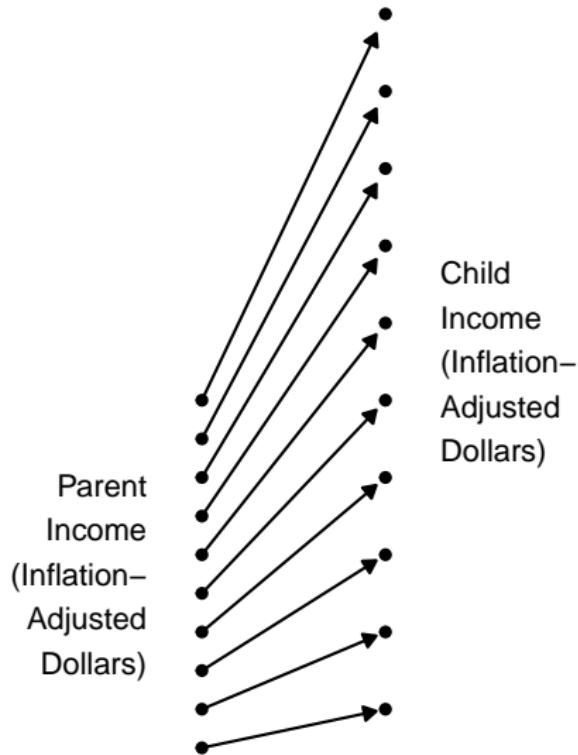


## Economic opportunity: Two definitions

**absolute mobility** out-earning your parents has fallen

**relative mobility** out-ranking your parents

	•	
	•	
	•	
	•	<b>absolute upward mobility</b>
	•	landing higher than your parents in dollars
Parent	•	Child
Income	•	Income (Inflation-
(Inflation-	•	Adjusted
Adjusted	•	Dollars)
Adjusted	•	
Dollars)	•	
	•	
	•	



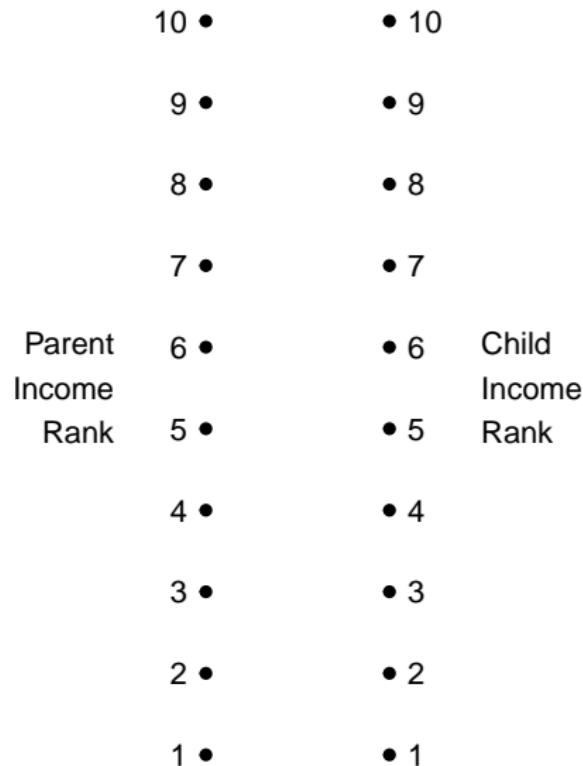
**absolute upward mobility**

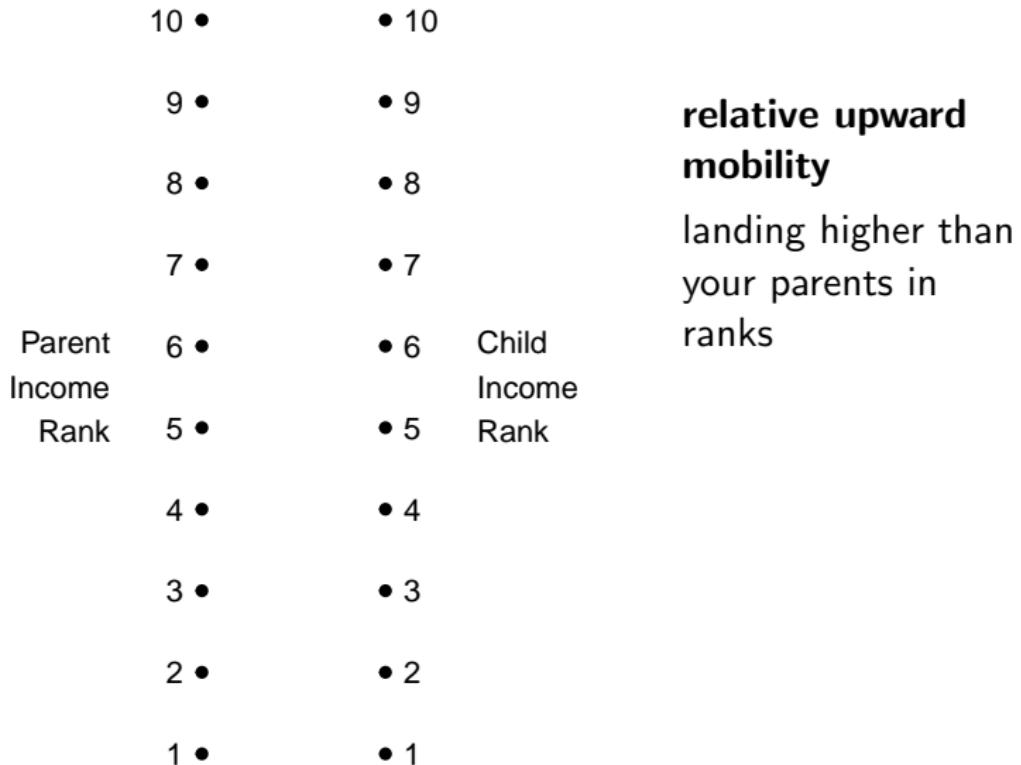
landing higher than your parents in dollars

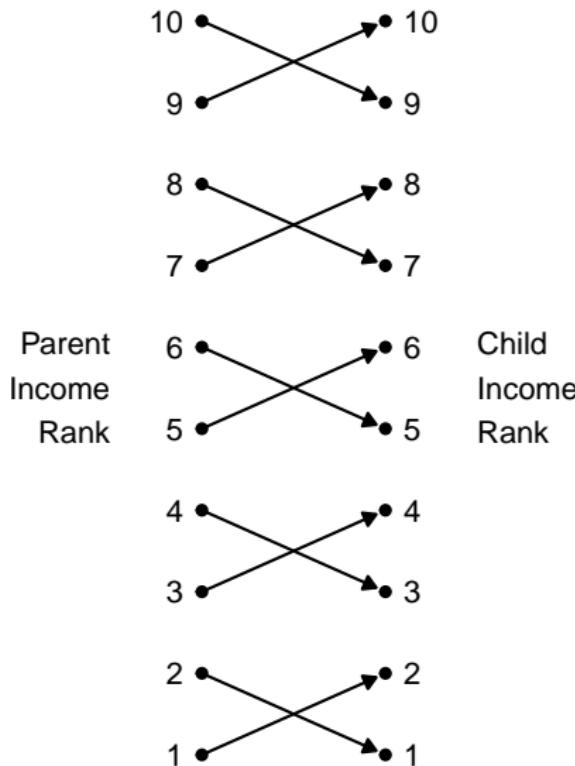
	•	
	•	
	•	
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Parent	•	Child
Income	•	Income (Inflation-
(Inflation-	•	Adjusted
Adjusted	•	Dollars)
Adjusted	•	
Dollars)	•	
	•	
	•	

		•
		•
		•
		•
		• Child
		• Income
		(Inflation-
10	•	• Adjusted
9	•	Dollars)
Parent	8	•
Income	7	•
(Inflation-	6	•
Adjusted	5	•
Dollars)	4	•
	3	•
	2	•
	1	•

- 10
  - 9
  - 8
  - 7 Child
  - 6 Income  
(Inflation-
  - 5 Adjusted  
Dollars)
  - 4
  - 3
  - 2
  - 1
- 10 •  
9 •  
Parent 8 •  
Income 7 •  
(Inflation- 6 •  
5 •  
Adjusted 4 •  
Dollars) 3 •  
2 •  
1 •

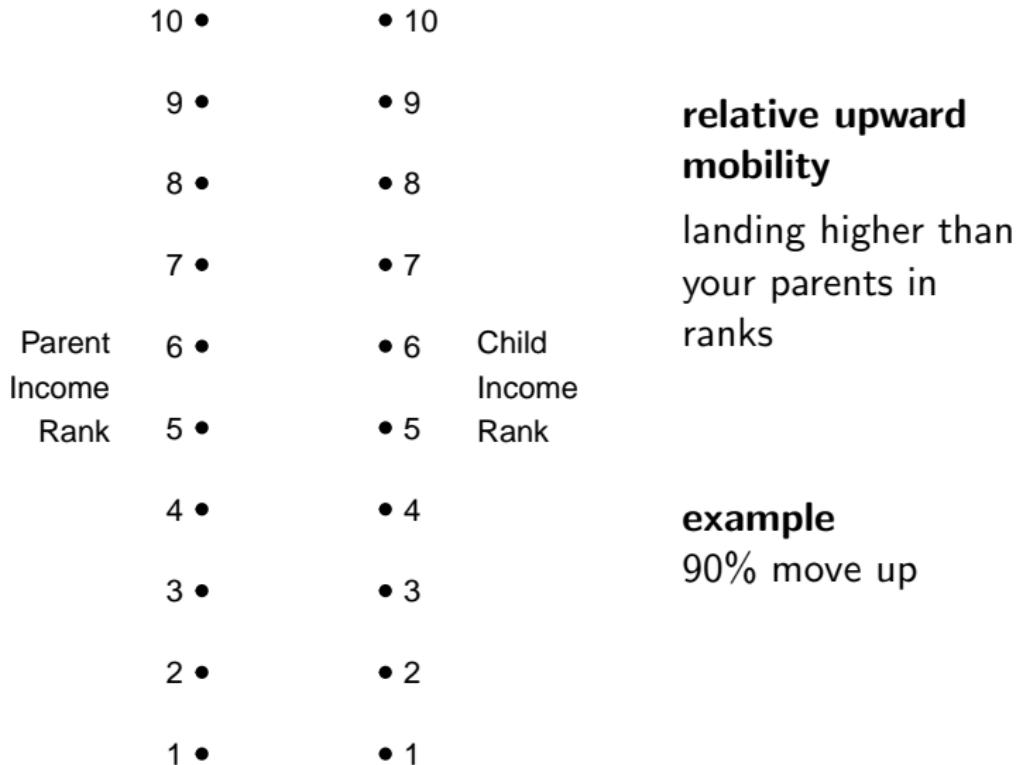


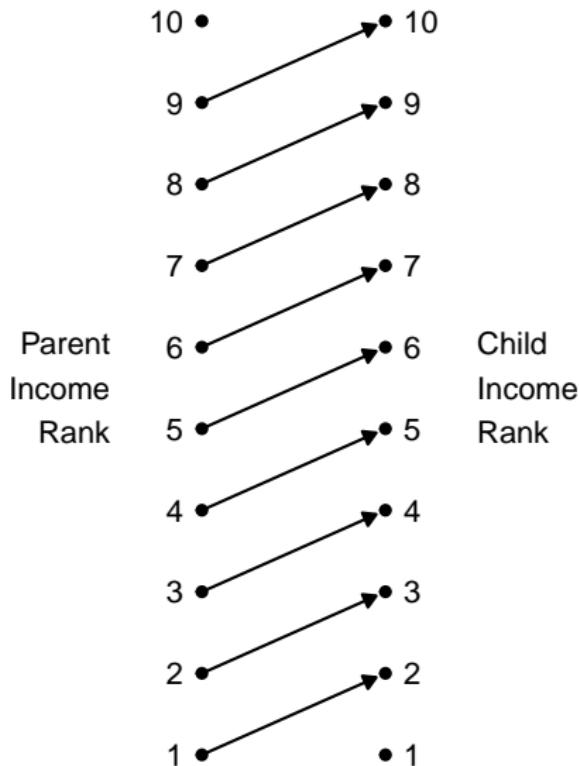




**relative upward mobility**  
landing higher than your parents in ranks

**example**  
half move up  
half move down

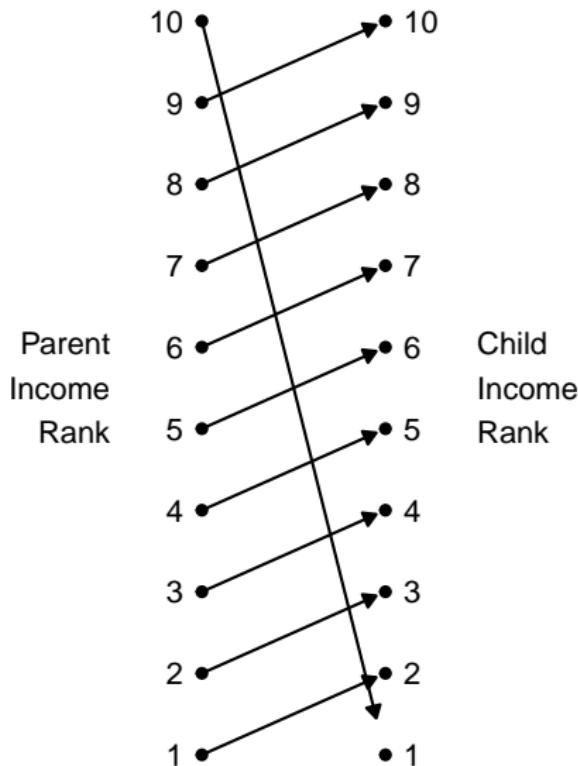




**relative upward  
mobility**

landing higher than  
your parents in  
ranks

**example**  
90% move up



**relative upward  
mobility**

landing higher than  
your parents in  
ranks

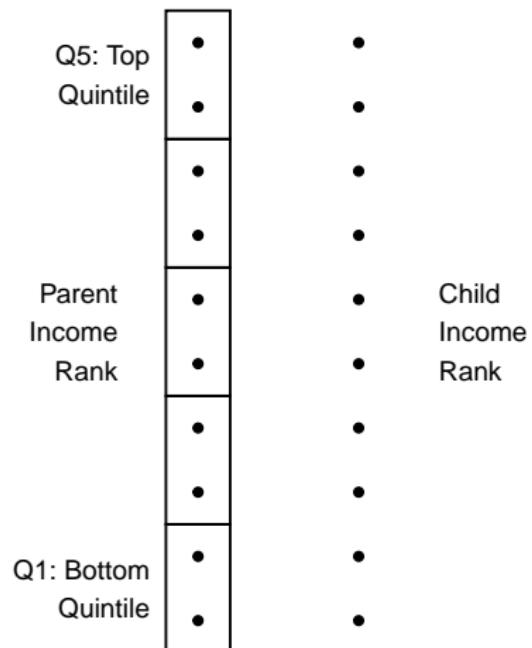
**example**  
90% move up

# Relative upward mobility: Reaching the top

Chetty et al. 2014

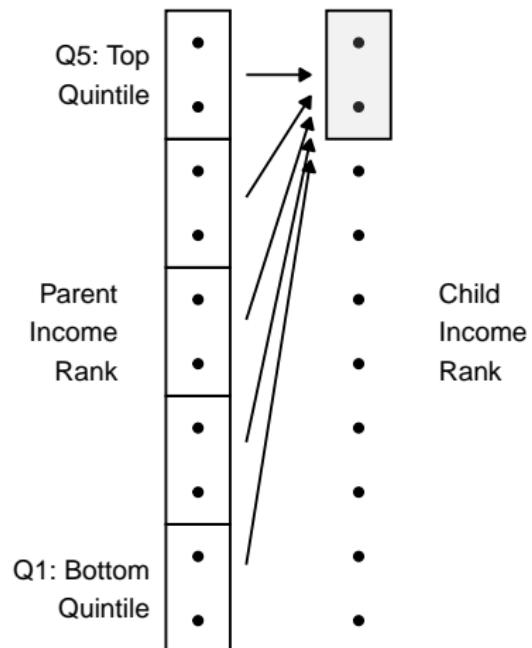
# Relative upward mobility: Reaching the top

Chetty et al. 2014



# Relative upward mobility: Reaching the top

Chetty et al. 2014



# Relative upward mobility: Reaching the top

Chetty et al. 2014

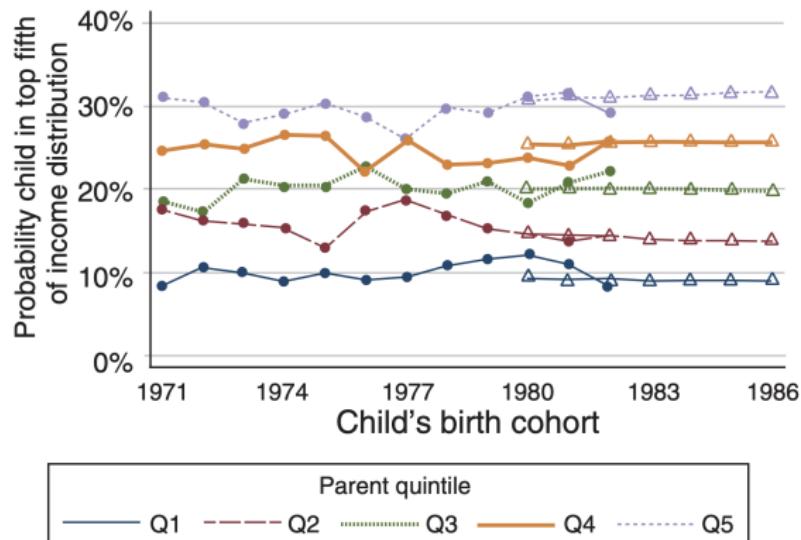


FIGURE 3. PROBABILITY OF REACHING TOP QUINTILE AT AGE 26 BY BIRTH COHORT

## Economic opportunity: Two definitions

<b>absolute mobility</b>	out-earning your parents	has fallen
<b>relative mobility</b>	out-ranking your parents	roughly constant

What does **equal** opportunity mean to you?

Now, the premise that we're all created equal is the opening line in the American story. And while we don't promise equal outcomes, we've strived to deliver equal opportunity – the idea that success doesn't depend on being born into wealth or privilege, it depends on effort and merit.

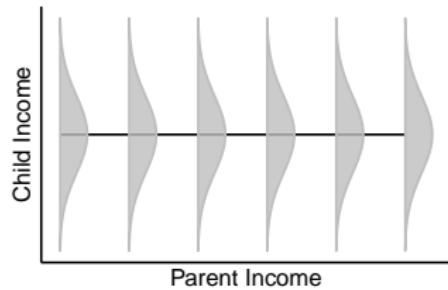
— Barack Obama, [Remarks on the Economy](#), Dec 2013. [\[Video\]](#)

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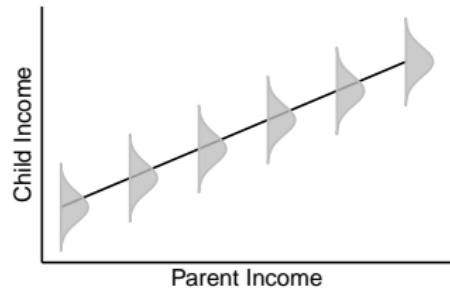
— Barack Obama, [Remarks on the Economy](#), Dec 2013. [\[Video\]](#)

How would you quantify opportunity using data science?

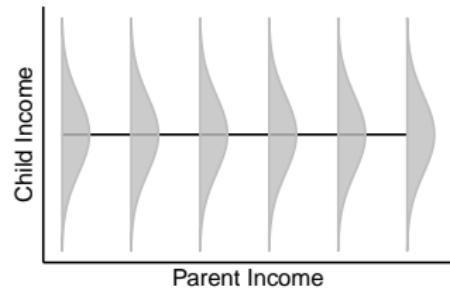
## Equal Opportunity



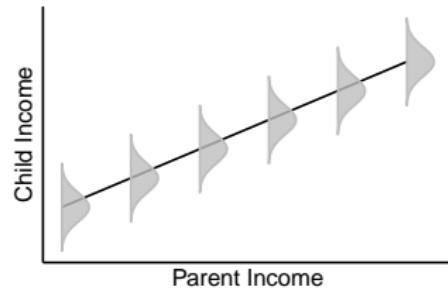
Unequal Opportunity



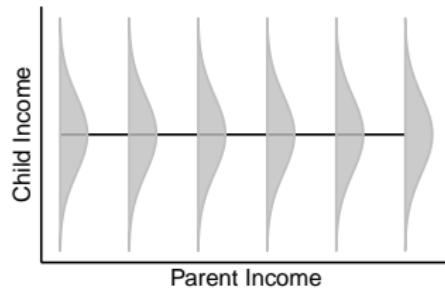
Equal Opportunity



## Unequal Opportunity



## Equal Opportunity



Child outcomes are **predictable**  
given family background

Child outcomes are **unpredictable**  
given family background

	Respondent Education
	Parent Education
	Grandparent Education
	Sex
	Race
Case 1	
Case 2	
Case 3	
Case 4	
Case 5	
	Grandparent Income
	Parent Income

Respondent Income


Respondent Education

Parent Education

Grandparent Education

Sex

Race

Grandparent Income

Parent Income

Case 1  
Case 2  
Case 3  
Case 4  
Case 5

Respondent Income


Learn a  
prediction  
function →

Respondent Education

Parent Education

Grandparent Education

Sex

Race

Grandparent Income

Parent Income

Case 1  
Case 2  
Case 3  
Case 4  
Case 5

Respondent Income


Learn a  
prediction  
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Respondent Education

Parent Education

Grandparent Education

Sex

Race

Grandparent Income

Parent Income

Case 1  
Case 2  
Case 3  
Case 4  
Case 5

Case 6  
Case 7  
Case 8

? ? ?

Case 1								
Case 2								
Case 3								
Case 4								
Case 5								
Case 6								
Case 7								
Case 8								

Learn a  
prediction  
function →

Predict for  
new cases →


?	?	?

**Holdout Set**

**Learning Set**

Case 1  
Case 2  
Case 3  
Case 4  
Case 5

Case 6  
Case 7  
Case 8

	Respondent Education	Parent Education	Grandparent Education	Sex	Race	Grandparent Income	Parent Income
Case 1							
Case 2							
Case 3							
Case 4							
Case 5							

Predict for  
new cases →

?	?	?
---	---	---

Learn a  
prediction  
function →

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# The challenge

How well can you predict respondent incomes?

Get started [here](#)

# Learning goals for today

By the end of class, you will be able to

- ▶ reason about economic opportunity
- ▶ reason about equal opportunity
- ▶ connect these to a data science idea: prediction