Principles of Macroeconomics: Returns to Human Capital

Class 10

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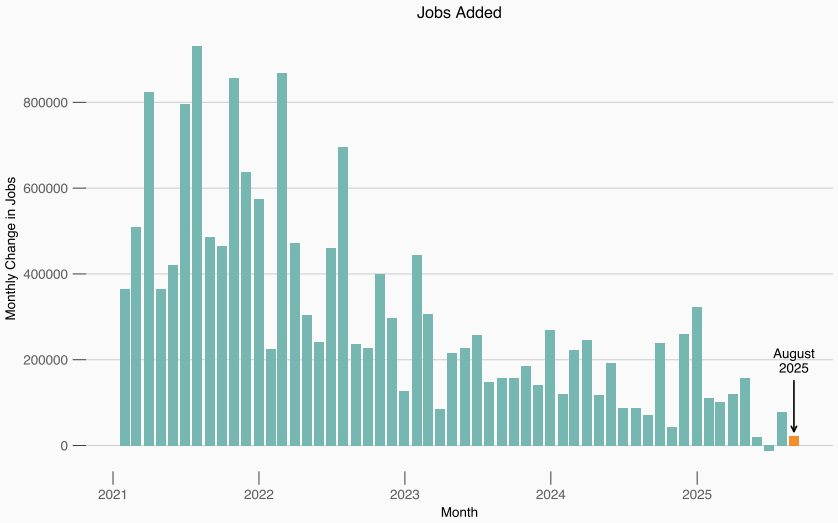
Overview

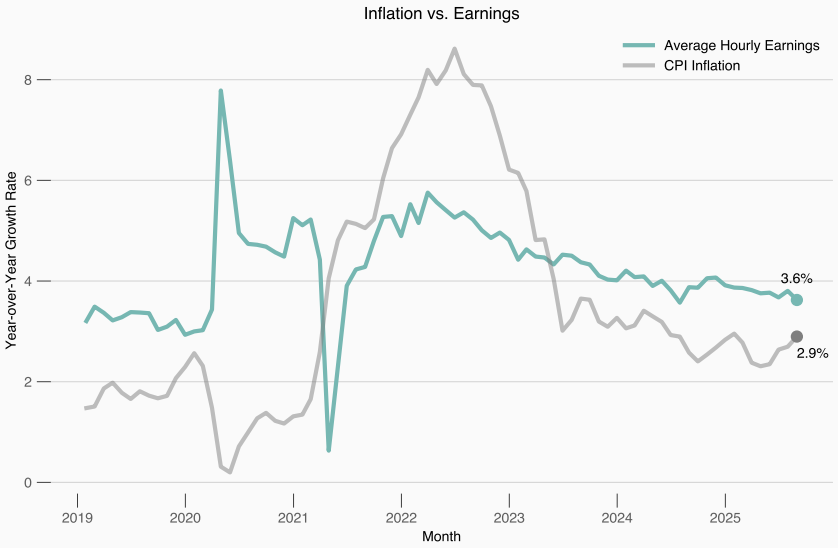
- Announcements:
  - LC 8, GH 8 due Friday at 11:59pm
  - Make sure you're team for the presentation is formed by tomorrow!
    - You don't need a specific issue yet – but start thinking about it
    - Look at the syllabus for the topics we will cover for ideas
- Topics:
  - On Tuesday, we covered most of chapter 8
  - Today: Look at most recent jobs report from the BLS
  - Talk about human capital accumulation
- Readings:
  - Chapters 8.1-8.2, chapter 5.1, chapter 2.1 (if you need a refresher on production possibility frontiers)

Jobs Added


Jobs Added
800000
600000
400000
200000
0
Monthly Change in Jobs
August
2025
2021
2022
2023
2024
2025
Month

Unemployment Rate – Why has it Hardly Moved Despite Low Job Growth?

Wage Growth vs. Inflation



Human Capital

- Remember human capital? Skills, knowledge, experience a worker has
  - Acquired via investment – time and money spent in school and training programs, years spent on-the-job
  - It is an asset – we own our own human capital
  - Human capital is attached inseparably from the human – firms must pay for a worker's time

- We want to:
  (1) Quantify the value of human capital
  (2) Study what determines the returns to education

Present Discounted Value

- Suppose you will get $1000 in two years
- How much money would you accept today to give it up?
  - This is defined as the present discounted value
- Idea: If I give you the PDV today, you can invest that money and earn interest
  - In one year, then, you will have: $\text{PDV} \times (1 + r)$
  - In two years, you will have: $\text{PDV} \times (1 + r)^2$
- Indifference gives us the PDV formula:

$$\text{PDV} \times (1 + r) = 1000 \qquad \longrightarrow \qquad \text{PDV} = \frac{1000}{(1 + r)^2}$$

- Suppose that we get \$X today, \$Y in one year, and \$Z in two years. Then:

$$\text{PDV} = \$X + \frac{\$Y}{1+r} + \frac{\$Z}{(1+r)^2}$$

- Or suppose that we get \$X every year for 45 years:

$$\text{PDV} = \$X + \frac{\$X}{1+r} + \cdots + \frac{\$X}{(1+r)^{44}}$$

Applied to Human Capital

- Income is the return to human capital
- The value of your human capital stock is the PDV of your future income stream
- So let's calculate it:
  - Suppose we get an annual wage of \$63,000 every year for 45 years
  - Suppose that the interest rate is 3% every year
  - Then:

$$\begin{aligned} \text{PDV} &= \$63,000 + \frac{\$63,000}{1+0.03} + \cdots + \frac{\$63,000}{(1+0.03)^{44}} \\ &\approx \$1.6 \text{ million} \end{aligned}$$

What About for You Specifically?

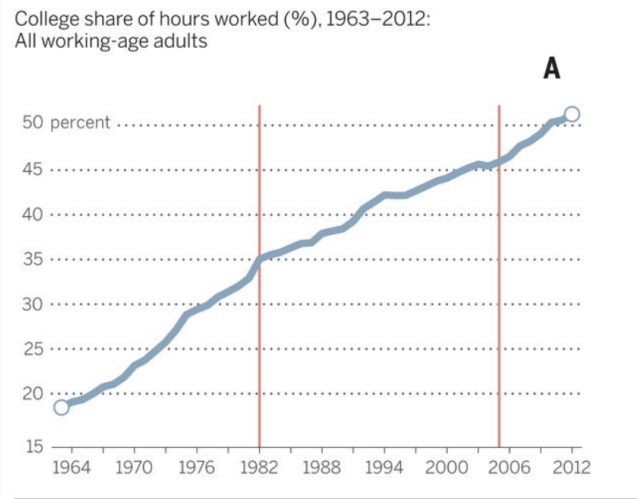
- Let's say you make what the average college graduate makes – \$70,000 a year. The average high school graduate makes about \$40,000 a year
- Let's calculate the *PDV* (net of your opportunity cost of a high school degree):

$$\text{PDV} = (70,000 - 40,000) + \frac{(70,000 - 40,000)}{(1+r)} + \cdots + \frac{(70,000 - 40,000)}{(1+r)^{44}}$$

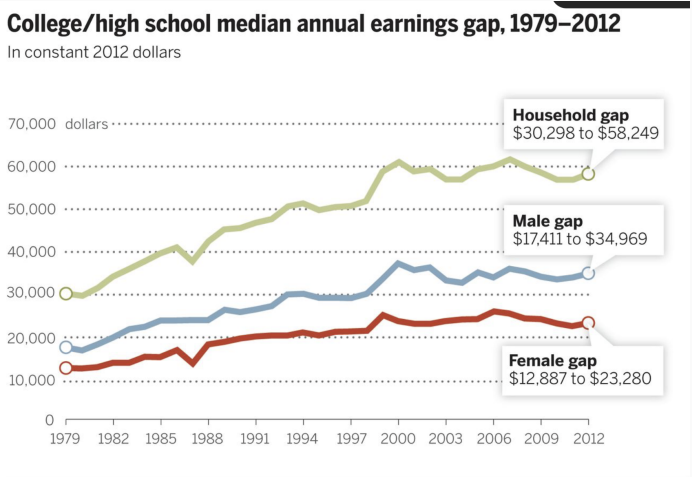
$$\approx \$760,000$$

- What's your cost of going to school?
  - 4 years of high school wages: \$160,000
  - Tuition and board: $\$86,045 \times 4 = \$344,180$
  - Total: \$504,180
- So your net present value (NPV) is: $\$760,000 - \$504,180 = \$255,820$

Number of College Educated Workers (Autor 2014)

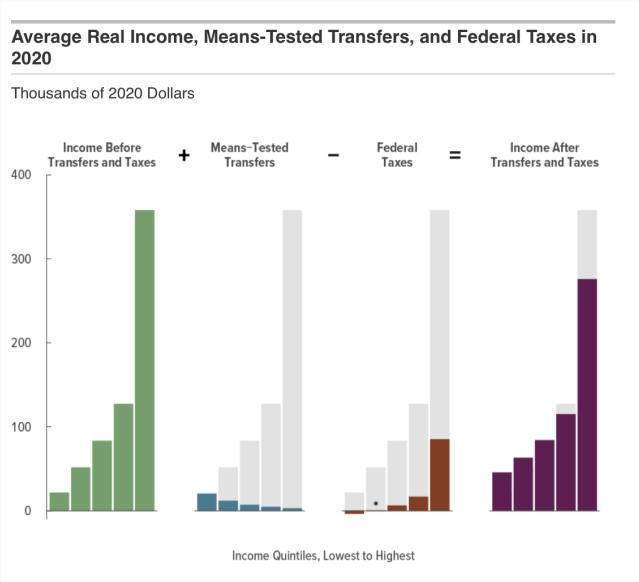


College vs High School Pay Disparity (Autor 2014)

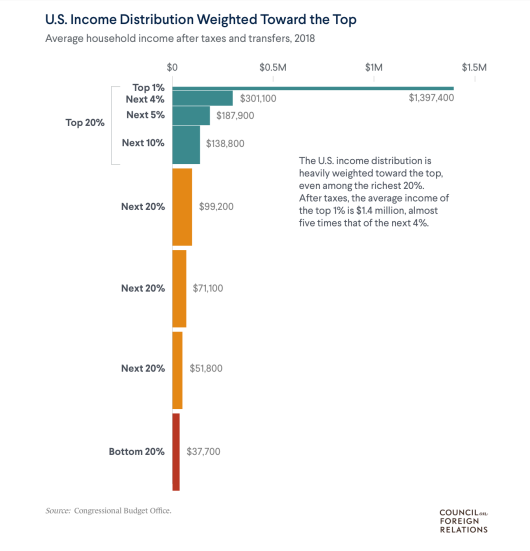


- Suppose the supply of workers with a college degree rises
- Then the wage decreases
- How to explain the increasing wage premium?
  - Demand for workers must be increasing
  - Firms invest in complementary capital – computers, IT, etc
  - This increases the marginal product of labor
  - This will increase wages
  - We call this type of investment skill-biased technical change
- There's thus a race between education and technology
  - If demand increases a lot, then college wages rise and technology wins

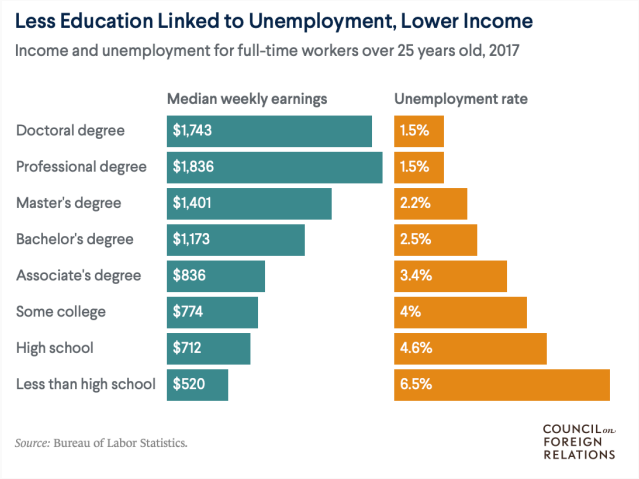
Where Does Income Go? (2020)



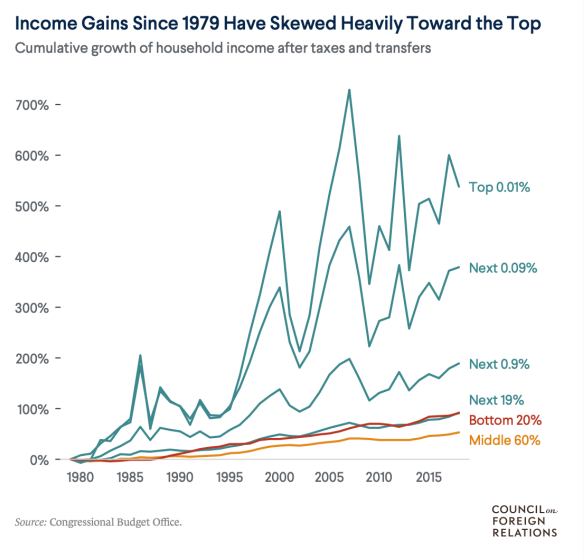
Income Inequality (2018)



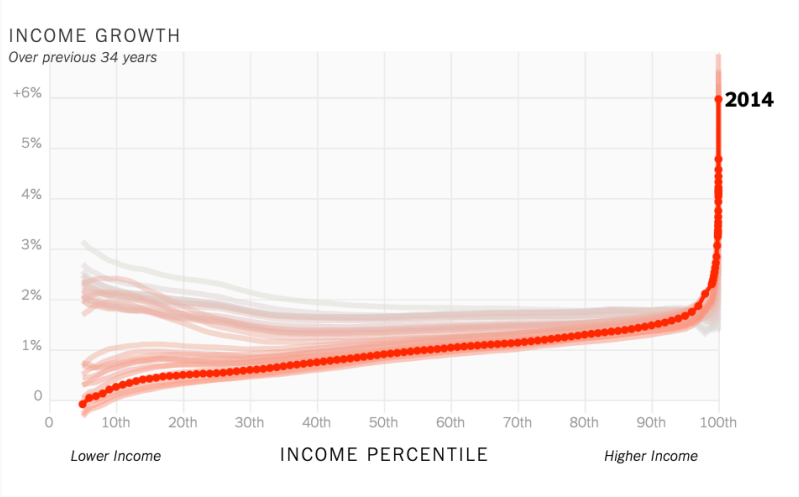
By Education (2017)



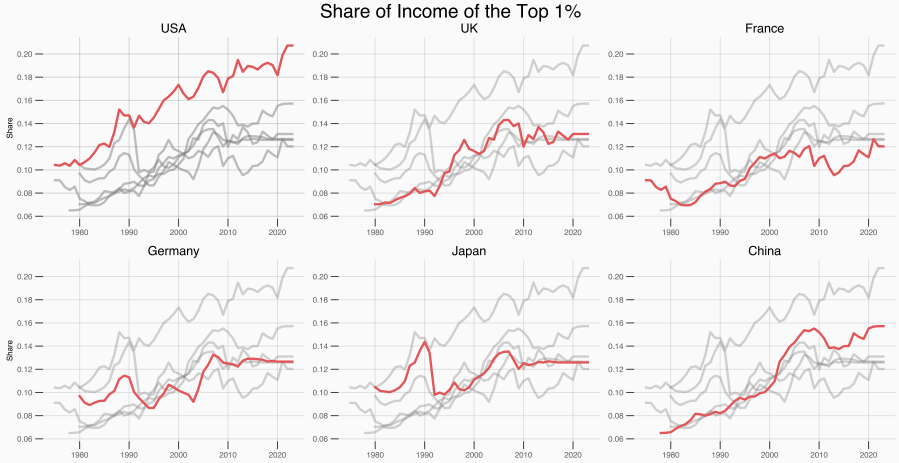
Where has Income Gone Overtime?



Income Growth by Percentile over Time (NYT 2017)



Is it just the US?



Why is this Happening?

- Many reasons income inequality may be increasing:
  - College graduates keep making more
  - Bargaining power of workers has fallen (union power has declined)
  - Income includes profits – if profits have increased then those that own firms increase their income
  - Globalization hit the middle class manufacturing jobs hard
  - Technological change might amplify the income of a select few workers and firms
- Does income inequality even matter economically?
  - Potentially indicate monopsony power or another inefficiency like misallocation
  - Could potentially dampen aggregate demand if high income households aren't consuming or investing
  - Could also just be the middle of a transition period where the market is rewarding those that are finding high returns – in this case, the market is working efficiently

Summary

- Jobs report has useful stuff in it
- College gives a good return on investment
- Income inequality is increasing in the US
  - Should we do anything about it? Maybe, maybe not
  - If we should, *what* should we do?
- Remember: homework due Friday night
- Remember: Groups formed and on the Google Sheet by Friday night
- Read chapter 5.1 (and 2.1 if you want)