Inequality, Education, and Skills: The Story of US Inequality

Ideas in the History of Chicago Economics

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March 4, 2022 (Draft March 4, 2022)

Why Do We Care About Inequality?

We all have an intuition inequality is important

- An important social and political issue

Income and welfare

- How much we have, as individuals or families, helps determine our welfare – how well (or poorly) we can live

Opportunities and achievements

- How much earn, our educational and career opportunities and achievements, can influence our well-being beyond wages and earnings

Before jumping to conclusions, however, ket's look at some of the data

- Much of what we think we know may not be right

Important Facts & Ideas About Inequality

U.S. INEQUALITY since 1980s

Some puzzles and popular (but wrong) narratives

1. Top 1% does *not* take everything – top grows, but so does bottom
2. Taxes are *not* regressive – tax policy has mitigated rising income inequality
3. Rising inequality *not* business and "capital" – labor and human capital

Why are these narratives so resonant today?

- Reflect a sense we all have – inequality has risen
- Incorrect narratives supported by (flawed) work (Piketty, Saez, Zucman)

Correct answers are important if we want the right policies

- Simple solutions (tax the rich, break up corporations) not supported by data
- More complicated – education and human capital
- Value in careful attention to *data*, *methodology*, and *theory*

This work is hard – good and careful work is always hard

Today: (3) Education, Skills, and Inequality

U.S. INEQUALITY since 1980s

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1. Top 1% does not take everything – top grows, but so does bottom
2. Taxes are not regressive – tax policy has mitigated rising income inequality
3. **Rising inequality *not* business and "capital" – labor and human capital**

Today, focus on (3): Education, Skills, and Inequality

- Causes and mechanisms of inequality crucial for policy
- If "monopoly power and top executive bonuses", might solve by breaking up corporations and taxing the rich
- If "education and skills" then focus on early childhood, families, human capital, schools

Evidence points to education and skills, not monopoly and executive pay

- *As causes for inequality* – monopoly power may (and does appear to be) very important for other reasons, just *not* inequality

Preview for Spring Mini-Course

U.S. INEQUALITY since 1980s

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Today, focusing on only (3)

- **Planning spring mini-course to examine some of the other issues**

Other resources

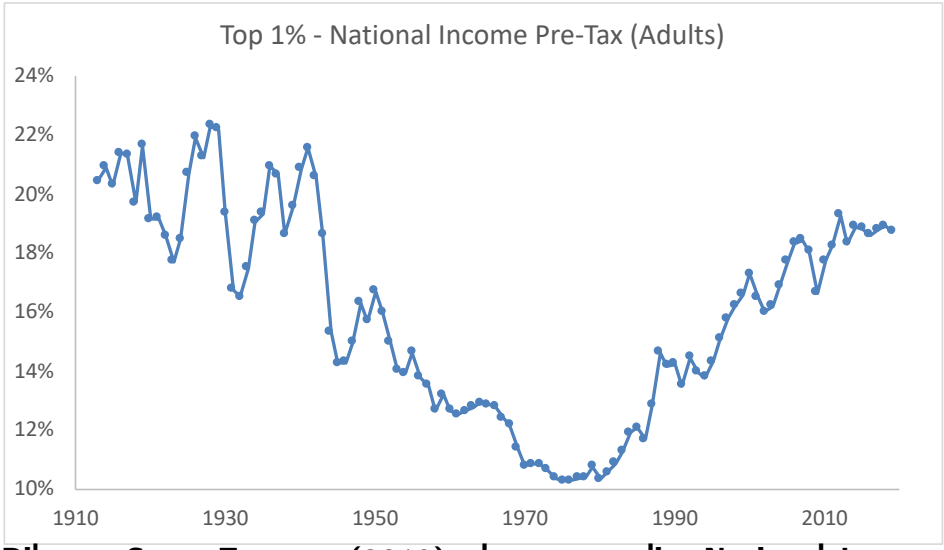
- These slides will be available on Harris *Center for Economic Policy* page, and http://www.hilerun.org/econ/chicagohistory/index.html
- Recent paper discussing some of these issues: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3985601

Outline

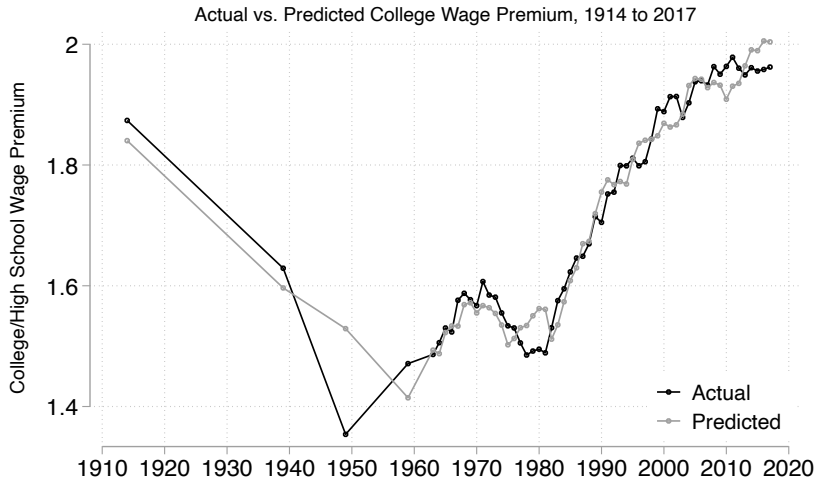
1. Narrative 3: All About Human Capital and Education (*Not* Financial Capital)
   - Long Sweep of Inequality: It is All Skills and Education
   - Recent Income Growth is Labor *Not* Capital
   - Conclusion: Focus on Education, Skills, Human Capital
2. Narrative 1: Puzzles, But Top 1% Does *Not* Take It All
   - Puzzle in Measuring Top 1% – Who Is Right?
3. Solving the Top 1% Puzzle: Methodology and Data
   - Framework
   - Metrics & Data Sources
   - Which Income? Labor Income vs Market Income vs Transfers vs Taxes
   - Measurement Unit (Person vs Household)
   - Consensus: Top 1% Share Has Increased, Less Than Piketty, Saez, Zucman
4. Narrative 2: Taxes Are Progressive
5. Conclusion

Outline

Long Sweep of Inequality: Education



Piketty, Saez, Zucman (2019), data appendix, National Income Pre-Tax, Equal Split Adults



Autor, Goldin, Katz. 2020. "Extending the Race between Education and Technology." *AEA Papers and Proceedings*

Look at Piketty & Saez "Top 1%"

- Overstates recent shares, but long history right

"Great Compression" and rebound of 20thc:

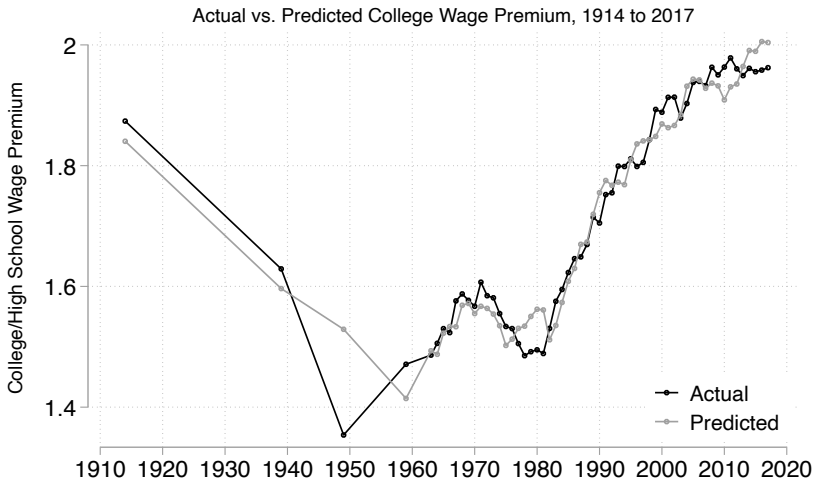
- Early 20thc: falling
- Middle 20thc: low
- Late 20thc (since 1980s) rising

Education "premium" matches inequality
Wage ratio: $W_{college}/W_{HS}$ – measured in logs

- In 1915, about 1.9 (exp(0.65)) – college earns 90% more
- By 1950, down to 35%
- By 2010, back up to 85%

Kevin Murphy (Chicago) and Lawrence Katz (Harvard) applied fundamental supply / demand framework to this problem (1992, *Qtly J of Econ*)

Strong Evidence: Inequality is Education-Related



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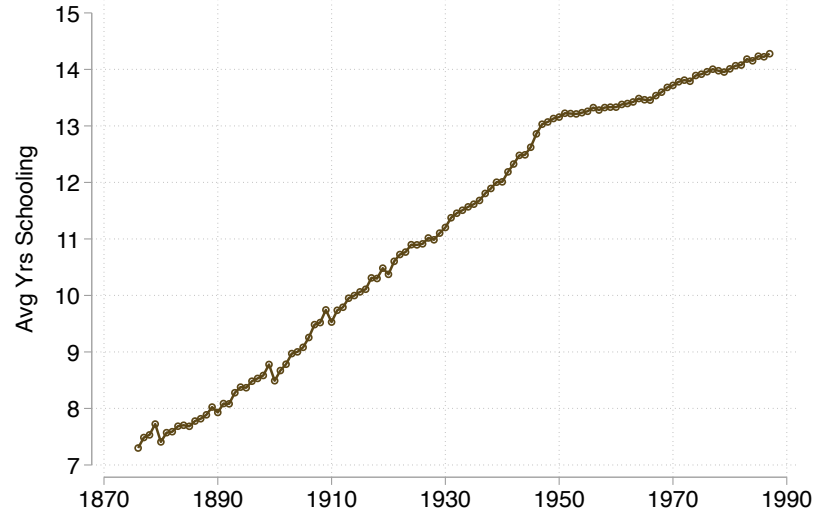


Years of Schooling, by Birth Cohort: Autor, Goldin, Katz. 2020. "Extending the Race between Education and Technology." *AEA Papers and Proceedings*

Education "premium" drives much of inequality

Wage ratio: $W_{college}/W_{HS}$ – measured in logs

- In 1915, about 1.9 (exp(1.65)) – college earns 90% more
- By 1950, down to 35%
- By 2010, back up to 85%

First half of 20th c: education grew strongly

- Technology was growing, increasing demand for skilled workers
- But supply of workers increased so much, pushed down wage
- "Great Compression" in middle of 20th c
- Until birth cohort 1949: flat

A Simple Supply & Demand Story

Technological change shifts demand curve out

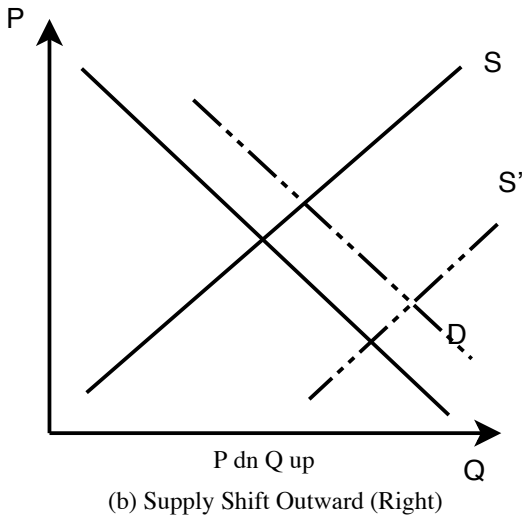
- $\rightarrow$ increased demand for skilled workers
- Occurs all the time – early and late 20th c

Increasing Supply of Skills (faster than Demand)

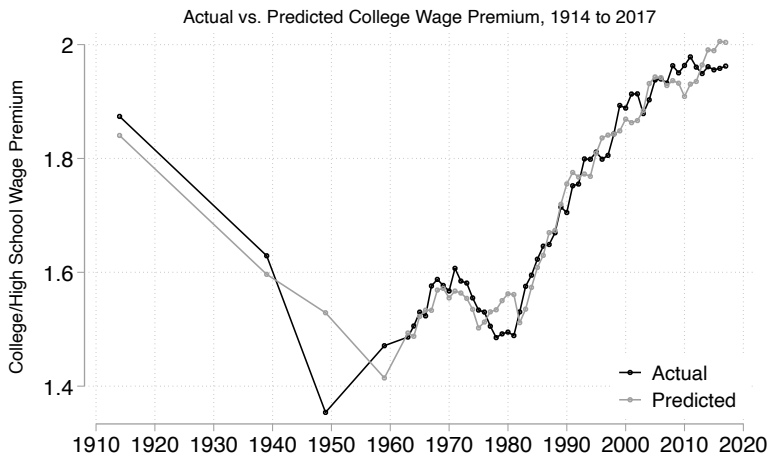
- IF supply shifts out faster , pushes wage down
- Seems to have happened 1900-1960

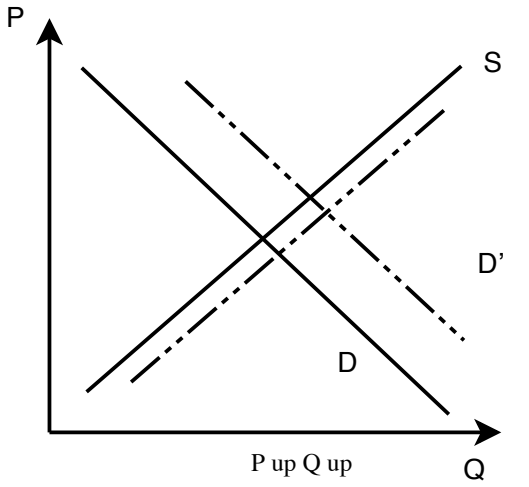
Increasing Demand for Skills (faster than Supply)

- Pushes college wage up (if supply shifts slowly)
- Presumably happening now (since 1980)



(b) Supply Shift Outward (Right)





(d) Demand Shifts Out

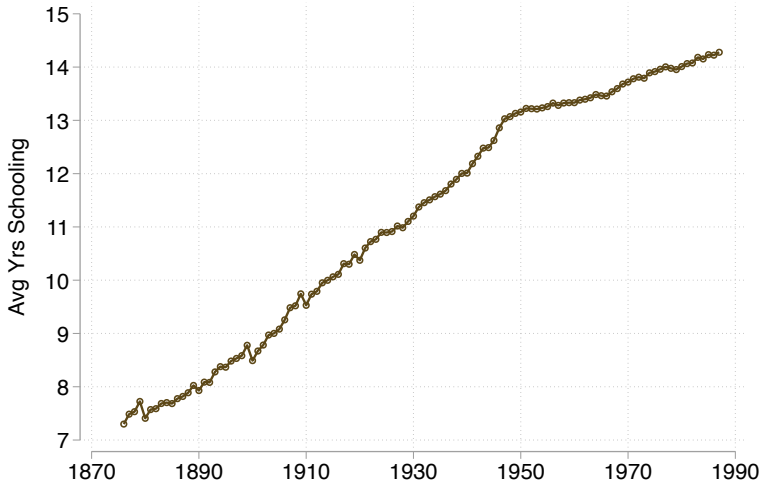
A Simple Supply & Demand Story

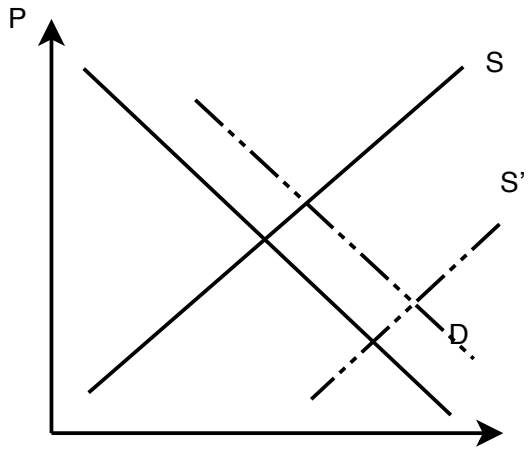
Puzzle: why did supply shift out in early, but not late?

- Workers respond to higher wages – both early and late 20^{th} c, workers shift *along* supply curve
- Don't confuse "moving along curve" and "shift of the curve" (I did in first thinking about this)

Shift of the curve is different – something shifted curve

- Change in preferences?
- Decreased costs of education?
- Probably – High School Movement





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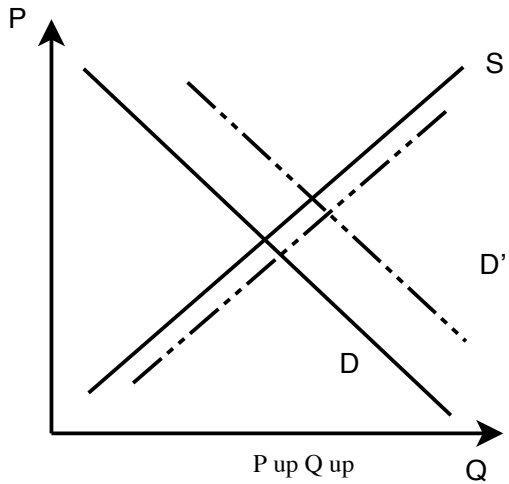


(d) Demand Shifts Out

Education, Skills, Human Capital: Good News / Bad News

Good News: It's Education, Skills, and Human Capital

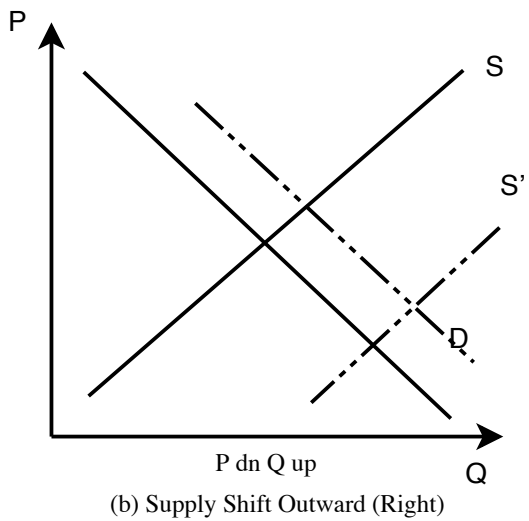
- This can be solved

Bad News: It's Education, Skills, and Human Capital

- It's not easy to solve

I am going to speculate (based more on gut feeling than hard evidence)

- Early 20th c: Easier to shift supply curve – provide HS and formal schooling – "build it and they will come"
- 21st c: Harder to shift supply curve – human capital and non-cognitive skills (grit, determination, just turning up at work) more important
- Early childhood crucially important



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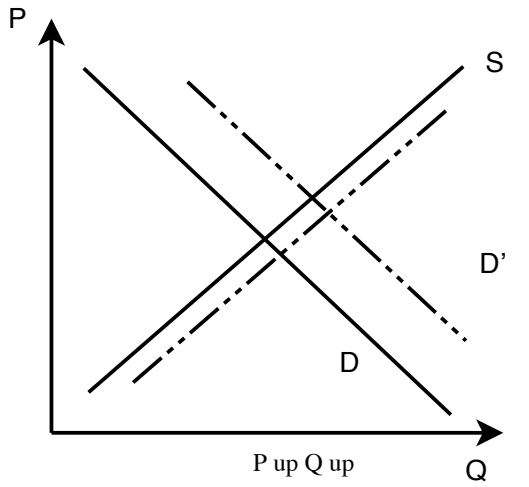


(d) Demand Shifts Out

If It Is Education, Then It Is Children & Families

James Heckman (at Chicago) has been working on this for many years

> *the shortfalls in achievement in the twenty-first century among all groups stem from shortfalls in education and on-the-job training as well as cognitive and personality traits – not in the rewards accorded those skills American society is divided into affluent haves and under-privileged have-nots, with differences in skills accounting for most of the disparity*

Three issues he emphasizes:

1. Soft skills matter
2. Skill formation in early childhood is critical
3. Families matter

Connection between early childhood environment and family, and later life outcomes, is very strong.

- Early investments are self-reinforcing, so that a small investment early can have a large and lasting effect later in life
- Remediating poor early childhood environment (lack of early investment) becomes costly later (say in middle school or high school)

Outline

Recent Income Growth – Labor or Capital?

Piketty, Saez, Zucman claim virtually all income growth since 2000 is "capital":

> *almost all the 2000-2014 growth of average national income ... stems from the rise of capital income (PSZ 2018)*

and that most went to top 1%

- Share of top 1% income due to *Capital* vs *Labor*
- Since 2000, labor flat, capital increasing

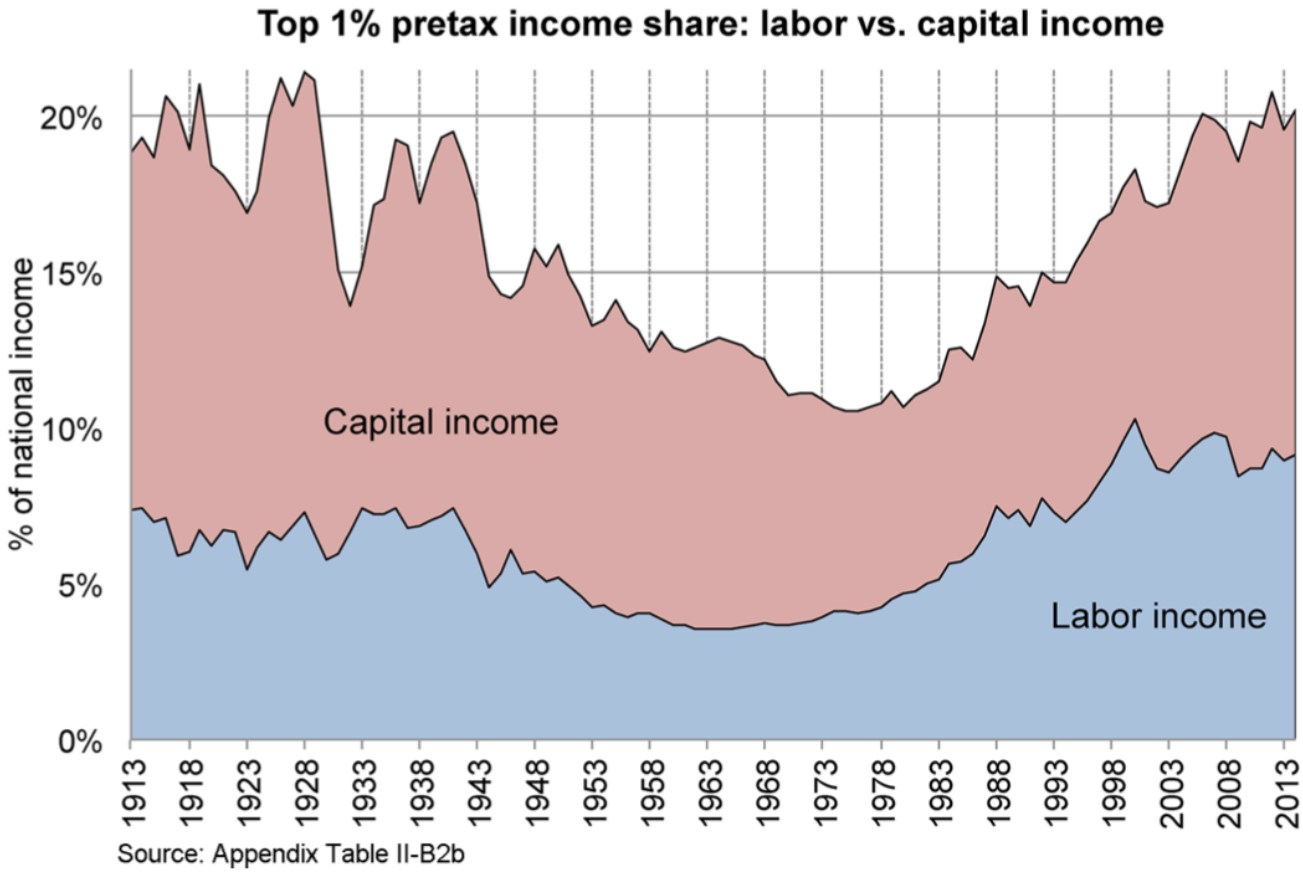


FIGURE VIII

Multiple Studies on Top Entrepreneurial Income

Smith, Yagan, Zidar, Zwick (2019 *QJE*)

- IRS personal tax returns (1040) – Statistics of Income – stratified sample
- IRS pass-through business income (S-corp 1120S, partnership 1065) matched with personal income(1040)

Guvenen & Kaplan (2017 WP, publication ??)

- IRS SOI & Social Security Administration labor income
- Complement SYZZ in finding surge of top pass-through income
  - IRS (all income) & SSA (wage income) diverge at very top - top 0.1%+

Part of an explosion of studies using administrative data

- Administrative data deepens our understanding
- Recent very good work on combining survey & administrative data
- Supplement rather replacing survey data (such as CPS)

CPS & IRS Top Share results largely consistent

- Bricker (2016 Brookings), Burkhauser et al. (2012 RES), Larrimore et al. (2017 WP, JPE?)

Not discussing today: Wealth shares

- Valuable new work combining survey (Survey Consumer Finances) and IRS
- Continues trend of finding problems with work of Piketty, Saez, Zucman

Understand Labor vs Capital: Corporate Structure & Taxes

Require background knowledge of *Corporate Structure* and *Business Taxation*

- Seems tedious, but actually interesting *and* important

What do you think of when I talk about a *Business* or *Corporation*?

- A company like IBM or Amazon or Google – large, many employees, owned arms-length by investors
- This is a *C Corporation* – a separate legal entity, taxed and managed separately from owners

Vast majority of businesses – and most top income earners – are *Pass-Through Entities*

- S-Corporations (LLC) or Partnership or Sole Proprietorship
- Activities such as lawyer, doctor, dentist, consultant

What is S-Corp and Partnership or Sole Proprietor?

- Usually (but not always) small.
- Usually closely-held – managed by the owner(s)

Not hard to start – I have started a Ltd. (UK), a Co. (US), and an LLC (US)

Pass-Through Taxation vs C-Corp Taxation

For discussion of Labor vs Capital, two crucial facts

- Pass-Throughs Important: Large fraction (more than half?) of business income
- Pass-Throughs taxed at *Individual* level (regular 1040) rather than at *Entity* level (corporation)

An S-Corp (LLC) is a legal entity (separate from the owner) but for *Tax* purposes it does not exist

- All profits flow through to the owner's personal income tax form

Important implications

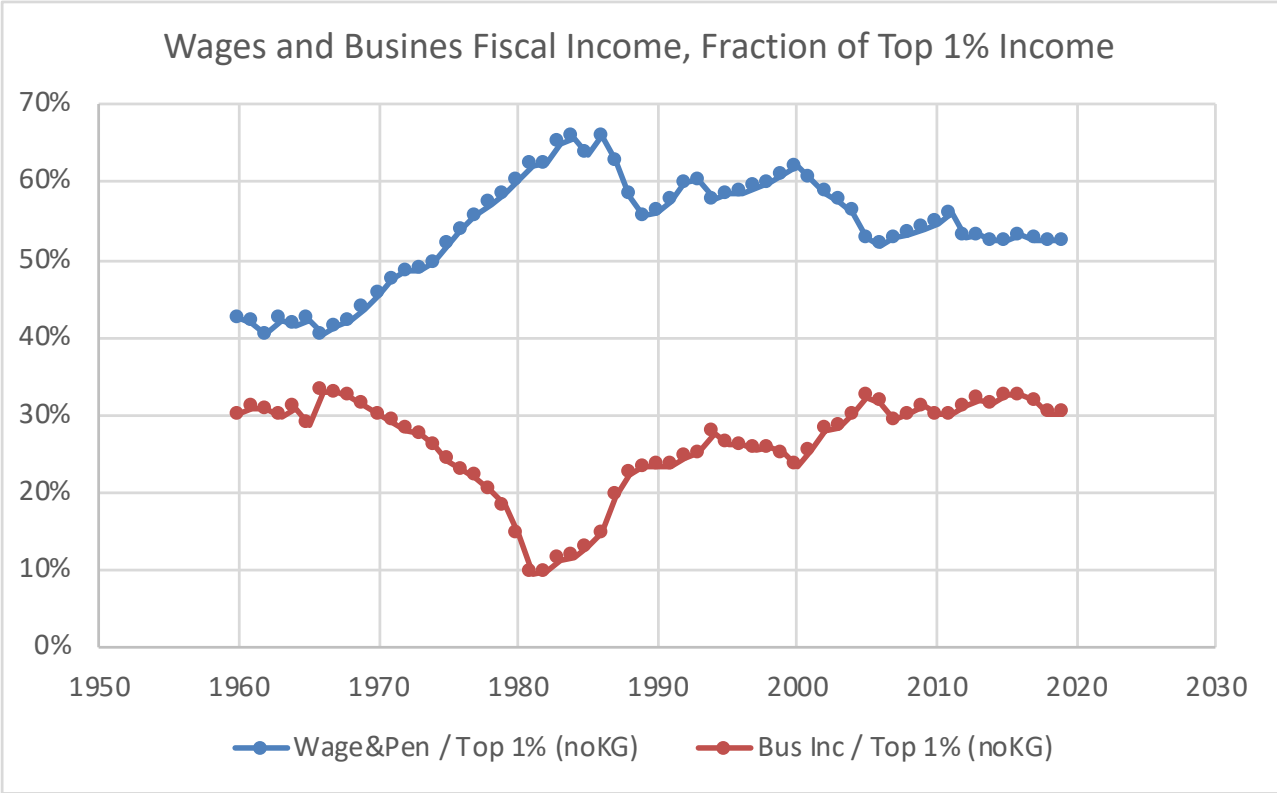
- Depending on tax rates for C-Corp vs Individual, may make sense to set up business as C-Corp or Pass-Through
  - Before 1986 TRA: C-Corp better deal
  - After 1986 TRA: Pass-Through (S-Corp, Partnership) better
  - After 1986, many businesses re-organized, and personal income (particularly Top 1%) went up – due to tax rules, not economics
- Owners of Pass-Through don't really care if pay themselves high wage (low profit) or low wage (high profit)
  - Distinction between wages and profits sort-of disappears

Piketty, Saez, Zucman don't seem to understand these issues

Wages & Business Income in Top 1%

From PSZ data on Top 1% source of income

- 1960-1986: rise of wages
- 1986-present: rise of business income



Dramatically shows effect of 1986 TRA

- SYZZ argue much of post-1986 (and post-2000) growth in business (pass-through) income is returns to human capital

Smith, Yagan, Zidar, Zwick Argue it is Labor

Recent work by Smith, Yagan, Zidar, Zwick (QJE) argues much of top income is returns to human capital. "Three Facts" about growth of top entrepreneurial income:

- Late 20th c, large rise in wage income, then nonwage income post-2000
- "the vast majority of rising top nonwage income came in the form of business income"
- "within business income, most of the growth took the form of pass-through income"

SYZZ show that most (75%) of pass-through is attributable to human capital

- Supports the argument that much rising inequality (since 1970) due to human capital: rising relative demand for skills
- Argues against "Capital in the 21st Century"

Argues pretty strongly that recent rise is labor (not capital)

- Piketty, Saez, Zucman seem mistaken

Outline

Conclusion: Focus on Education, Skills, Human Capital

An important set of facts and ideas, that we should all know

- Not the only cause, by any means
- But apparently an important cause

Does not lead to easy solutions

- Educations, Skills, Human Capital take time and investment

Good policy requires good evidence and theory

Outline

Puzzles in Measuring Top 1% – Who Is Right?

Well-known Piketty & Saez results:

- Earnings of top 1% from 10% to 23%
- The top 1% took roughly 60% of the growth in earnings

	Piketty & Saez (Average, $2018)		
	per 100 people	Top 1%	% share
1979	$4,522,500	$464,891	***10.3%***
2014	$5,920,500	$1,336,033	***22.6%***
Change	$1,398,000	$871,142	***62.3%***

But Auten & Splinter find very different:

- Earnings of top 1% from 7% to 9%
- The top 1% took roughly 11% of the growth in earnings

Auten & Splinter (Avg, $2018)		
per 100 people	Top 1%	% share
$2,923,071	$210,870	***7.2%***
$4,960,618	$428,505	***8.6%***
$2,037,548	$217,635	***10.7%***

And things get worse – much worse – measure income *growth*

Average Real Income Growth, 1979-2014	Bottom 50%	50-90th	90-99th	Top 1%
PSZ Fiscal Income	-37.8%	6.5%	54.0%	187.4%
AS After-tax	59.3%	68.8%	83.2%	104.6%

- Bottom half: did average go *down* by 37.8% or *up* by 59.3%?
- Clearly not *down* by almost 40% – just silly

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Who Is Right? Short Answer & Long Answer

Short Answer: Auten & Splinter are right

- Top 1% rose, but not so much; Bottom grew, but much less than top

Long Answer: Takes us on a long & wonderful journey to understand income

- What is income? Wages only? Labor income? All earnings? Transfers?
  - No right or wrong. Depends on *why* we are looking at income? Job prospects? How much we can consume?
- Income for who? The individual who earns income? The family? Tax unit?
- How do we measure? Administrative (tax returns)? Survey (CPS)?
- Taxes – before or after? Are taxes progressive or regressive?

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Outline

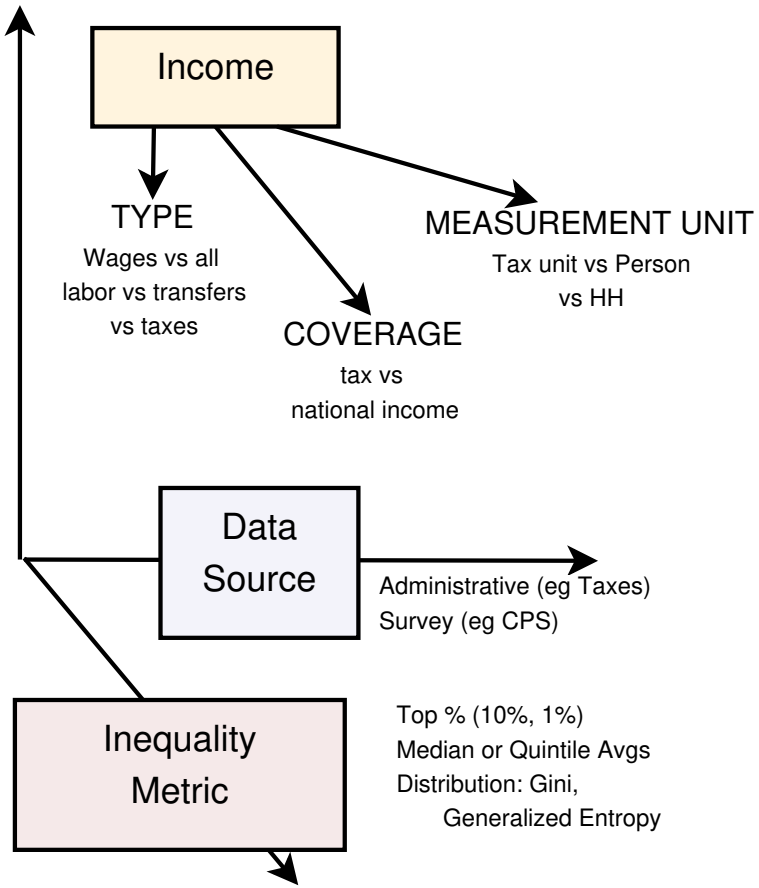
Three Pillars of Income Distribution Framework

Analytical & methodological framework in which to place empirical studies

- Necessary for comparing across studies – and understanding results

Three pillars for Framework

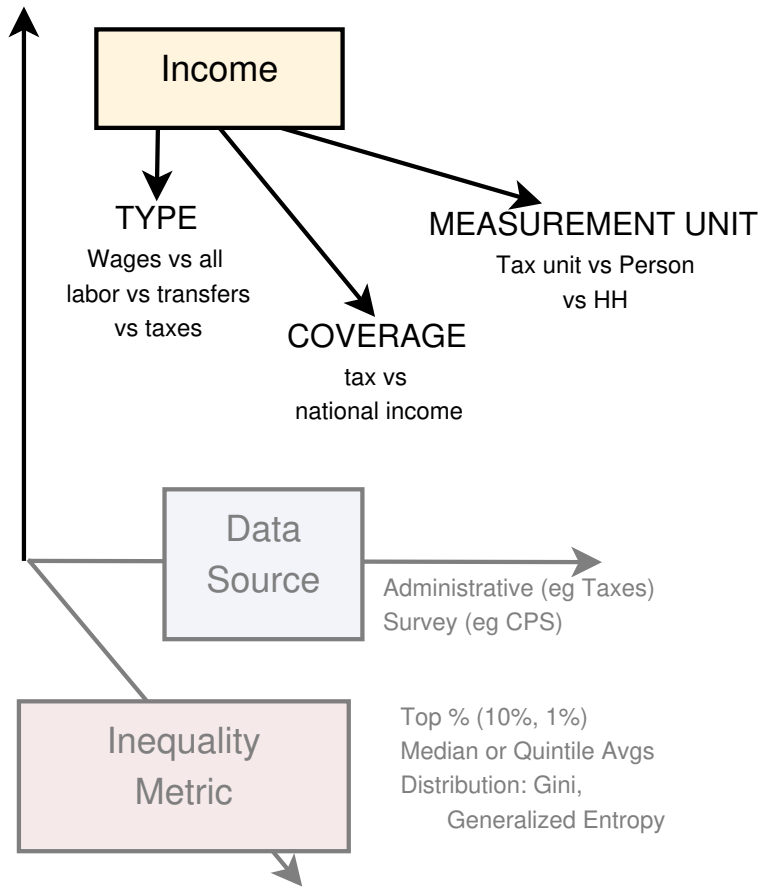
- Metric – e.g. Top 1%, or Gini
- Source – e.g. CPS (survey) or Tax data (administrative)
- Income – the important one
  - Type: wages vs all labor earnings vs transfers vs taxes
  - Coverage: tax income (60% of national income) or all income
  - Measurement / Sharing Unit – Tax return vs person vs household – very tricky here



With this, seemingly-contradictory studies can be reconciled

Punchline: It is Income Definition and Measurement Unit

- Metric – Important but easy
- Source – seems important but not
- Income definition – the big one – often "depends on the question" (rather than "right" vs "wrong")
- Measurement Unit – obscure & confusing but crucial – both empirically & for economic analysis



My conclusion?

- Empirical studies consistent when compare same income definition and measurement unit
  Except Piketty, Saez, Zucman – problems
  - Inequality has increased since 1970s, but less than claimed by some
  - Income growth throughout distribution, not only at the top
  - At top: growth largely driven by human capital (not financial capital)
  - At bottom: growth supported by government transfers

Outline

Metrics: Many Ways to Measure – But Straightforward

Overall Distribution

- Gini, Generalized Entropy & Theil measures (mean log deviation, coeff of var'n)
- Decile ratios (80:20 or 90:10)
- Standard Deviation of Log Income

Growth

- Median or other quantiles
- Average of quantile income

Decile (Percentage) shares, Top %

- Percent of total income earned by top 10% or 1%, or bottom 10%
- Very popular now

Data Sources: Survey vs Administrative

Some big (and important) innovations, particularly past 20 years

- Administrative datasets, such as IRS (Tax) or SSA (earnings)

Two biggest sources

- CPS: Current Population Survey.
  - Monthly (weekly earnings) and annual (annual earnings – ASEC)
  - Relatively small sample (30k per month?)
  - Top-coding problems – top incomes masked for confidentiality
- IRS: Tax data
  - Large sample, well-measured at the top
  - ***Important***: Income definition changes over time (consistency problems)
  - ***Important***: Taxable income may not match what we want to measure (e.g. tax-exempt income)

My reading of literature:

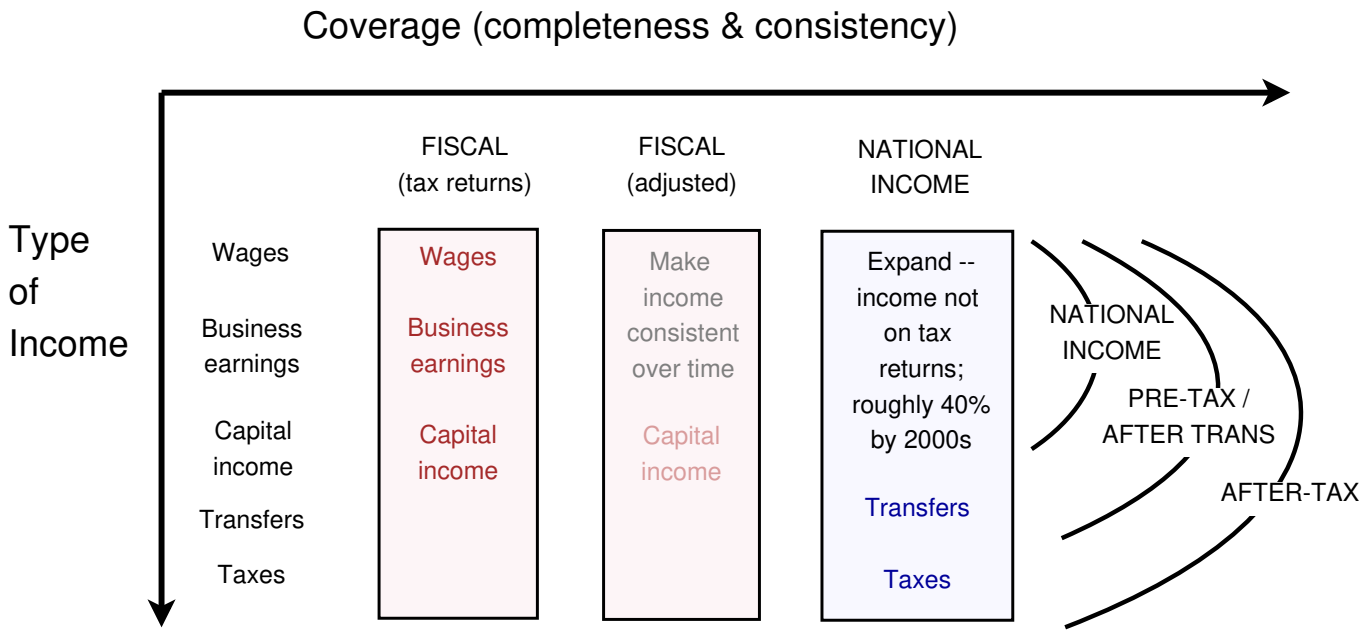
- Expect possible large differences due to source, but actually no big differences
- Differences due to: 1) Income type (e.g. wages vs all earnings vs after tax & transfers); 2) Coverage (how much of economy is covered); 3) Consistency of measurement over time

Outline

What Income Do We Want? How Do We Measure?

Consider two dimensions:

1. *Type* – e.g. wages vs capital
2. *Coverage* – how much captured



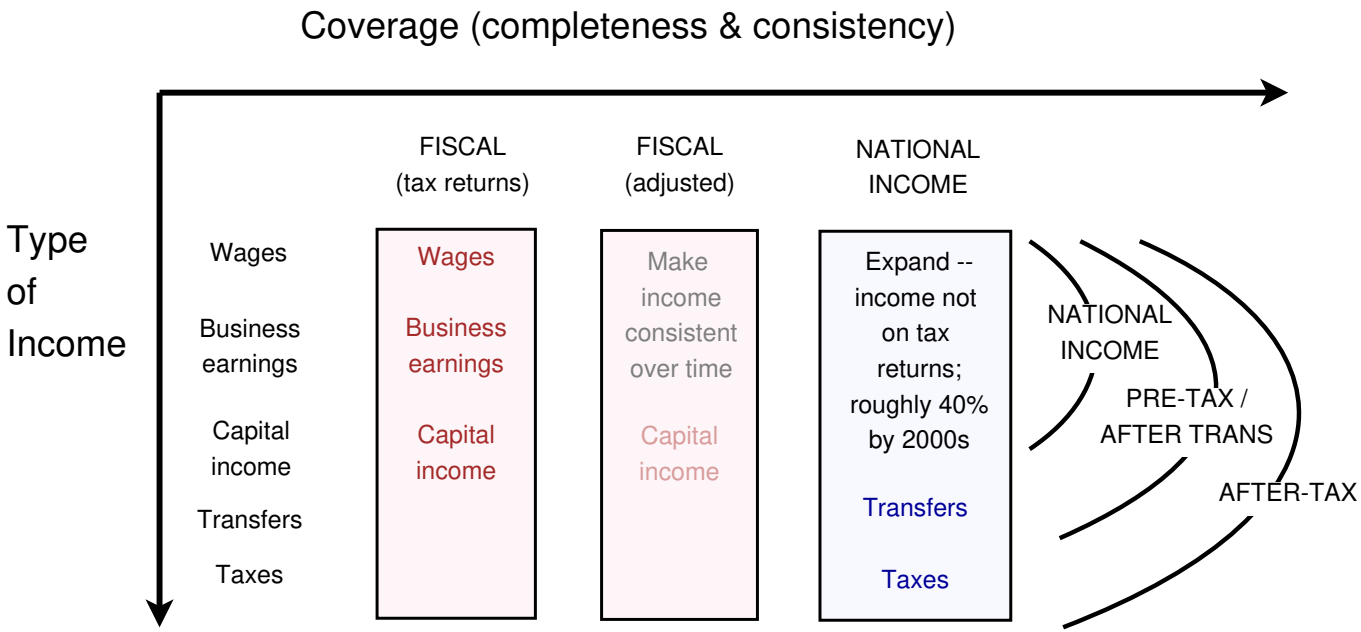
Type: different types for asking different questions

- Equality of job market opportunity and outcome: wages
- Equality of welfare and well-being: total income including transfers and taxes

What Income Do We Want? How Do We Measure?

Consider two dimensions:

1. *Type* – e.g. wages vs capital
2. *Coverage* – how much captured



Coverage: how much of the relevant income is captured by our source

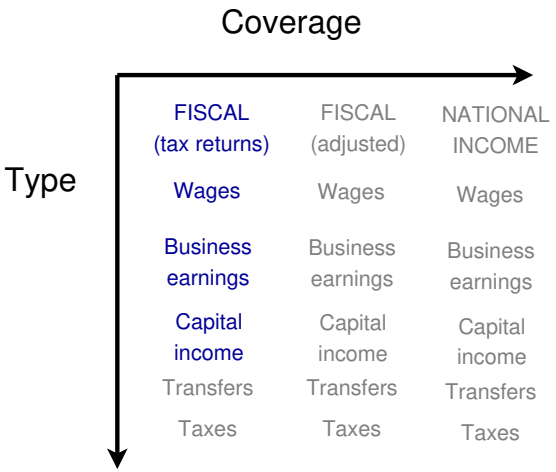
- Tax (Fiscal) income covers roughly 60% of total national income
- Equality of welfare and well-being: total income including transfers and taxes

Examine Piketty, Saez, Zucman vs Auten & Splinter to understand issues

Details on Piketty, Saez, Zucman vs Auten & Splinter

PS Fiscal: tax returns, not corrected for tax law (or marriage rate) changes

- Original tax return (administrative) analysis – reinvigorated inequality measurement
- Focused on "Top 1% share" – grew from 10.3% to 22.6%
- Look at "Overall" and "Bottom 50%" – fundamental problems
- Overall misses large components of income – grows too slowly – overall GDP & Nat Inc grows about 76%
- Bottom 50% "down 37.8%" is just silly – that never happened



Avg Real Grth, 1979-2014	Overall	Bottom 50%	50-90th	90-99th	Top 1%
PS Fiscal	30.9%	-37.8%	6.5%	54.0%	187.4%
PSZ Pre-Tax	57.2%	0.9%	43.2%	78.8%	175.6%
PSZ After-tax	57.2%	19.6%	48.5%	74.5%	176.1%
AS Pre-Transf	70.9%	26.9%	63.3%	93.2%	157.1%
AS Transf	80.2%	58.5%	71.2%	95.7%	156.8%
AS After-Tax	70.9%	59.3%	68.8%	83.2%	104.6%

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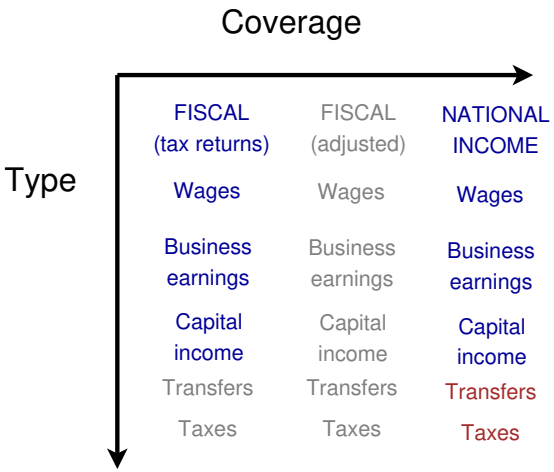
PSZ Pre-Tax: expand coverage (along horizontal), including income not collected on tax returns (and marriage) – but no correction for tax law changes

- Addresses many criticisms of original analysis
- Income per *adult* not per person – adjusts for marriage rates by not family size
  - "Overall" grows 57% but if adjust by no. of *people* then up to 70%

PSZ After-Tax: expand *type* of income (down vertical) by including transfers and taxes

- Best measure of the economic resources available for consumption, savings
- Shows "progressivity" – bottom 50% goes from 0.9% to 19.6% growth due to taxes & transfers



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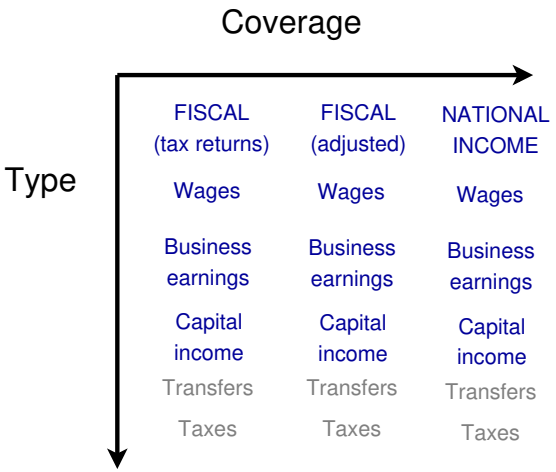
Details on Piketty, Saez, Zucman vs Auten & Splinter

AS Pre-Tax: as for PSZ, expand coverage, but differs from PSZ in two important respects, both on coverage

- Adjusts *Fiscal* (tax) income, changes in income definition & incentives, particularly TRA86
  - Before 1986: strong incentive for businesses to keep income in Corp (Sched C)
  - After 1986: strong incentive for *pass-through* business (Sched S or partnership)
  - Change *reporting* of income as personal, not change in underlying business
  - Small businesses (doctors, dentists, plumbers) are important in US economy
- Expanding from *fiscal* to *NI* – many small differences, seem more careful than PSZ
- "Bottom 50%" 26.9% vs PSZ 0.9% – my judgment: AS more reliable



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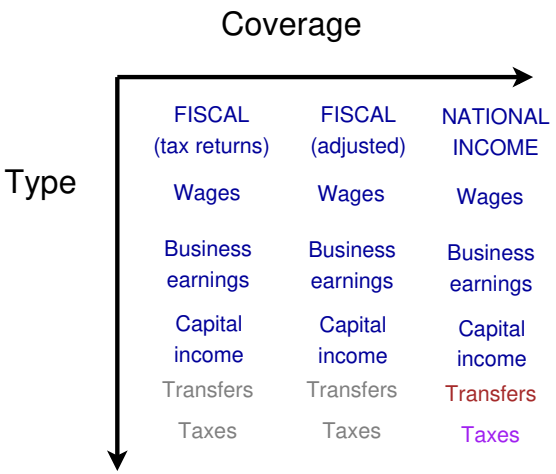
Details on Piketty, Saez, Zucman vs Auten & Splinter

AS Transf: includes transfers (cash & non-cash) – Social Security, refundable tax credits, Medicaid, SNAP

- Overstates national income (transfers are credited, but not paid by taxes)
- Better measure of economic income (before taxes)

AS After-Tax: nets out taxes

- "Bottom 50%" grows substantially, top 1% reduced
- Shows taxes as progressive, largely because of transfers and reduced taxation at bottom of distribution
- Other work indicates importance of *Earned Income Tax Credit* – acting as government subsidy to low-wage work



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Outline

Why Unit – Return vs Person vs Household – Is Important

Measurement / Sharing Unit **Critically Important** – But messy and confusing

TAX RETURN EXAMPLE: Change filing states → Change Top 1% Share

- ***Fraction by Return***: Simply filing different forms changes Top 1% Share
- Before: 4 tax units, 2 lo & 2 hi, 2 people each, 67% income in Top Half
- After: have the bottom 2 units file single – no other change
  - 6 tax units, but people pushed up: 75% income in Top Half

Bottom Files Jointly Tax Unit	*1*	*2*	*3*	*4*	Fraction 2/4
Income in Top 50%	$10	$10	$20	$20	40/60
People in Top 50%	2	2	2	2	4/8

Bottom Files Singly Tax Unit	*1a*	*1b*	*2a*	*2b*	*3*	*4*	3/6
Income in Top 50%	$5	$5	$5	$5	$20	$20	45/60
People in Top 50%	1	1	1	1	2	2	5/8

Why important? US marriage rates at bottom have gone down (top remained)

	1960	2015	
Everyone	69%	39%	Exactly as in tables
Top 1%	90%	86%	

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Writing Income Distribution to Highlight Income / Sharing Unit

To illuminate problem, need to write out income distribution:

$$\textit{Total Income} = \sum_{t=1}^{N} \underbrace{I(t)}_{\textit{income unit}} \cdot \underbrace{w(t)}_{\textit{size adjust}} \cdot \underbrace{g_n(t)}_{\textit{count units}} \cdot \underbrace{g_I(t)}_{\textit{unit wt}}$$

- $I(t)$ is the income, measured for a *Tax Return* or *Household* or *Person*
- $g_n(t)$ allows us to count tax returns ($g_n(t) = 1$) or people ($g_n(t) = n$, *1 or 2 or 3 people)*
- $w(t)$ controls how income is "shared" across unit
  - $w(t) = 1$ "full sharing" (each person gets full tax return income) seems odd, but simply assumes full returns to scale
  - $w(t) = 1/n$ "equal sharing" seems natural, but $\Rightarrow$ no RTS within tax unit (household)
  - $w(t) = 1/\sqrt{n}$ "square-root sharing" is commonly used in empirical work
- $g_I(t)$ needed to ensure total income sums properly: $w(t) \cdot g_n(t) \cdot g_I(t) = 1$
- Of course, need to re-rank (sort) incomes by $I(t) \cdot w(t)$

Allows us to examine and compare sorting / ranking / Top share by *Tax Returns* vs *People*

- Provides framework for argument between Auten & Splinter vs Piketty, Saez, Zucman
- PS(2003) use $g_n(t) = 1$ & $w(t) = 1$: Unit = *Return*: Ranking and Shares by *Tax Return*
- PSZ(2019) use $g_n(t) = n$ & $w(t) = 1/n$: Unit = *People*: Ranking and Shares by *People*
- A&S use $g_n(t) = n$ & $w(t) = 1$: Unit = *People*: Ranking Income by *Tax Return* and Shares by *People* – equivalent to full sharing or full economies of scale

Example of *Returns* vs *People* – People More Appealing

$$\textit{Total Income} = \sum_{t=1}^{N} \underbrace{I(t)}_{\textit{income unit}} \cdot \underbrace{w(t)}_{\textit{size adjust}} \cdot \underbrace{g_n(t)}_{\textit{count units}} \cdot \underbrace{g_I(t)}_{\textit{unit wt}}$$

- Income $I(t)$ measured for the *Tax Return* (Tax Unit)

Counting Unit = *Return*

Returns	*1a*	*1b*	*2a*	*2b*	*3*	*4*	%
Income	\$5	\$5	\$5	\$5	\$20	\$20	45/60
$w(t)$	1	1	1	1	1	1	
$g_n(t)$	1	1	1	1	1	1	3/6
$g_I(t)$	1	1	1	1	1	1	

- Measures fraction of *returns* in Top 50%
- Not "wrong" but probably not what we think of as "Top Share"

Counting Unit = *People*, Full Sharing

People	*1a*	*1b*	*2a*	*2b*	*3*	*4*	%
Income	\$5	\$5	\$5	\$5	\$20	\$20	40/60
$w(t)$	1	1	1	1	1	1	
$g_n(t)$	1	1	1	1	2	2	4/8
$g_I(t)$	1	1	1	1	1/2	1/2	

- Measure fraction of *People* in Top 50%
- Probably closer to what we think of, but a little odd to assign (share) full income

Assigning (sharing) full income to everyone on tax return ($w(t) = 1$) seems a little odd

- But, effectively, do that in original tax return analysis ("Unit=Return")

Example: Individual return @\$18, joint return @\$20.

- Individual return ranked below joint return
- "Equal sharing" of joint income (\$10 each) would rank individual return higher

Adjusting for Economies of Scale (Square-Root)

Number of household members [a]	Household income [b]	Household income per person [b]/[a]	Equivalence scale [b]/sqrt([a])
1	100,000	$ 100,000	$ 100,000
2	100,000	$ 50,000	$ 70,711
3	100,000	$ 33,333	$ 57,735
4	100,000	$ 25,000	$ 50,000
5	100,000	$ 20,000	$ 44,721
6	100,000	$ 16,667	$ 40,825

Number of household members [a]	Household income [b]	Household income per person [b]/[a]	Equivalence scale [b]/sqrt([a])
1	57,735	$ 57,735	$ 57,735
2	81,650	$ 40,825	$ 57,735
3	100,000	$ 33,333	$ 57,735
4	115,470	$ 28,868	$ 57,735
5	129,099	$ 25,820	$ 57,735
6	141,421	$ 23,570	$ 57,735

- There are economies of scale when multiple people share a household
  - Example: the rent on a two-bedroom apartment is generally less than twice the rent of a one-bedroom apartment
- Standard practice: to calculate per-person income from household income, the equivalence scale divides by the square root of the number of household members
- It is possible to use more sophisticated equivalence scales – References??

Continuing with Income Sharing = 1

$$\textit{Total Income} = \sum_{t=1}^{N} \underbrace{I(t)}_{\textit{income unit}} \cdot \underbrace{w(t)}_{\textit{size adjust}} \cdot \underbrace{g_n(t)}_{\textit{count units}} \cdot \underbrace{g_I(t)}_{\textit{unit wt}}$$

Assigning (sharing) full income to everyone on tax return ($w(t) = 1$) seems a little odd

- But, effectively, do that in original tax return analysis ("Unit=Return")
- Important for understanding debate between Piketty, Saez, Zucman vs Auten & Splinter

Example: Individual return @$18, joint return @$20.

- Individual return ranked below joint return
- "Equal sharing" of joint income ($10 each) would rank individual return higher

Counting Unit = *Return*, no re-ranking

Returns	*1*	*2*	*xa*	*xb*	*3*	*4*	%
Income	$10	$10	$18	$18	$20	$20	58/96
$w(t)$	1	1	1	1	1	1	
$g_n(t)$	1	1	1	1	1	1	3/6
$g_I(t)$	1	1	1	1	1	1	
n	2	2	1	1	2	2	

- $20 Returns at Top by Return Income

Counting Unit = *People*, yes re-ranking

1	*2*	*3*	*4*	xa	*4*	%
$5	$5	$20	$20	$18	$18	56/90
1	1	1/2	1/2	1	1	
1	1	1	1	1	1	3/6
1	1	2	2	1	1	
2	2	2	2	1	1	

- $18 Returns "richer" per person

Some Common Alternatives

$$\textit{Total Income} = \sum_{t=1}^{N} \underbrace{I(t)}_{\textit{income unit}} \cdot \underbrace{w(t)}_{\textit{size adjust}} \cdot \underbrace{g_n(t)}_{\textit{count units}} \cdot \underbrace{g_I(t)}_{\textit{unit wt}}$$

Tax Returns

- Original Piketty Saez (2003): $I(t)$ *by return*; $w(t) = 1; g_n(t) = 1$
- Piketty, Saez, Zucman (2019): $I(t)$ *by return*; $w(t) = 1/n; g_n(t) = n$
- Auten & Splinter (2018): $I(t)$ *by return*; $w(t) = 1; g_n(t) = n$
- Auten & Splinter (2019): $I(t)$ *by return*; $w(t) = 1/\sqrt{n}; g_n(t) = n$
- CBO: $I(t)$ *by return*; $w(t) = 1/\sqrt{n}; g_n(t) = n$ (I think)

CPS and other survey data:

- Bureau of the Census HH income $I(t)$ *by household*; $w(t) = 1; g_n(t) = 1$
- Census Personal Income: $I(t)$ *by individual*; $w(t) = 1; g_n(t) = 1$
- Ellwell, Burkhauser, others: $I(t)$ *by household*; $w(t) = 1/\sqrt{n}; g_n(t) = n$

Currently working (with help from Alejandra) on building a database of various studies

How to Think About Alternatives

$$Total\ Income = \sum_{t=1}^{N} \underbrace{I(t)}_{\text{income unit}} \cdot \underbrace{w(t)}_{\text{size adjust}} \cdot \underbrace{g_n(t)}_{\text{count units}} \cdot \underbrace{g_I(t)}_{\text{unit wt}}$$

Less about "Right vs Wrong" than "What does this tell us?"

- I would say analysis by tax return (original P&S, $I(t)$ *by return*; $w(t) = 1; g_n(t) = 1$) not very useful

Different views focus on different questions:

- Welfare and Consumption: look at household or tax unit income, count by individuals, size adjust / share in some way:
  $I(t)$ *by return*; $w(t) =?; g_n(t) = n$, income including transfers, after taxes
  - Size adjustment makes a difference ($w(t) = 1$; $w(t) = 1/n$; $w(t) = 1/\sqrt{n}$) but I think differences not large
  - Difference between PSZ ($w(t) = 1/n$) vs AS ($w(t) = 1$) seems to be more about income defintion
  - Census published HH income measures use $I(t)$ *by HH*; $w(t) = 1; g_n(t) = 1$ which has same issue as original PS – why houses rather than people?
- Labor market outcomes, look at $I(t)$ *by individual*; $w(t) = 1; g_n(t) = 1$, Labor market or earnings
  - Focus on individuals and market outcomes rather than welfare

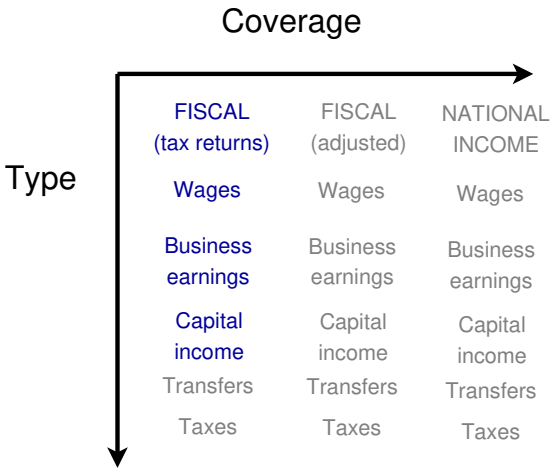
Sharing: Piketty, Saez, Zucman vs Auten & Splinter

PS Fiscal: original method, simply count tax returns

- Some returns for 1 person, some 2, some 3+
- Half of returns in top 50%, may be more than half of people (more people married at top)
- Problem with comparing across time: marriage rates falling at lower end, not at top – pushes income into top

PSZ EqSplit: same income (type and coverage) but different sharing & grouping

- Now group by individuals (so same number of *people* in bottom and top 50%)
- Share (split) income among people – split equally 50/50 (no returns-to-scale)
- Only count adults – ignore changes in HH size
- Honestly, I don't fully understand why top growing so fast – maybe changing HH size?



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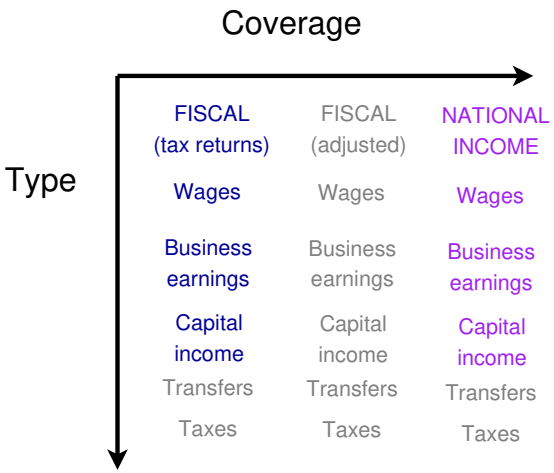
PSZ Pre-Tax: expand coverage (along horizontal), including income not collected on tax returns (and marriage) – but no correction for tax law changes

- Shows how just expanding coverage changes
- Much income from bottom not collected by tax returns



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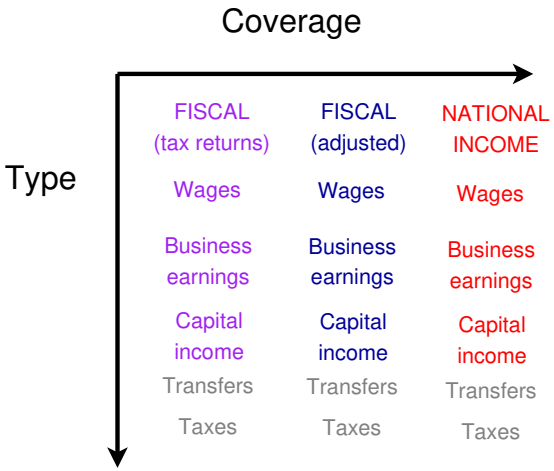
PSZ Pre-Tax: expand coverage (along horizontal), including income not collected on tax returns (and marriage) – but no correction for tax law changes

- Starts with non-adjusted fiscal income, expands coverage

AS Pre-Tax: also expands coverage, differs from PSZ three ways:

- Starts from *adjusted* fiscal income, making it consistent over time (changes in tax law)
- Different (I think better) assumptions about expanded coverage – e.g. underreported income
- Counts number of individuals in HH – includes children. Shares by $\sqrt{n}$
  - Income *per person* grows faster than income *per adult* – HH size has gone down
  - GDP per capita grew 76%



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Broad Agreement – Top Has Grown (But Bottom Also)

Top 1% share has increased since 1970s

- Originally – "Fiscal Income" – large increase
- Other researchers find lower Top 1% share than PSZ across the board

Bottom has grown, but less than top

- Supported by taxes and transfers

	Average Growth			Top 1% Share	
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Top 1% share has increased since 1970s

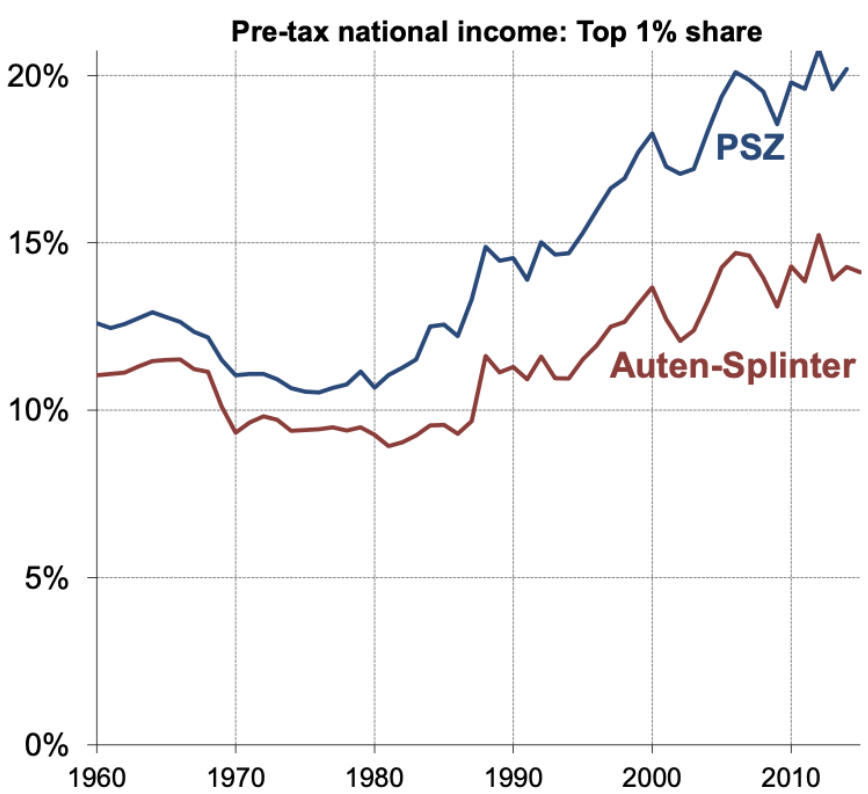
- Originally – "Fiscal Income" – large increase
- Other researchers find lower Top 1% share than PSZ across the board

Bottom has grown, but less than top

- Supported by taxes and transfers

	Average Growth			Top 1% Share	
	Overall	Bot 50%	Top 1%	1979	***2014***
PSZ Fiscal	30.9%	-37.8%	187.4%	10.3%	***22.6%***
PSZ Before-Tax	57.2%	0.9%	175.6%	10.8%	***18.9%***
AS Before-Tax	70.9%	26.9%	157.1%	9.5%	***14.3%***
BEA Before-Tax					***14.5%***
PSZ After-Tax	57.2%	19.6%	176.1%	8.4%	***14.7%***
AS After-Tax	70.9%	59.3%	104.6%	7.2%	***8.6%***
BEA After-Tax					***12.4%***

Summary Comparison



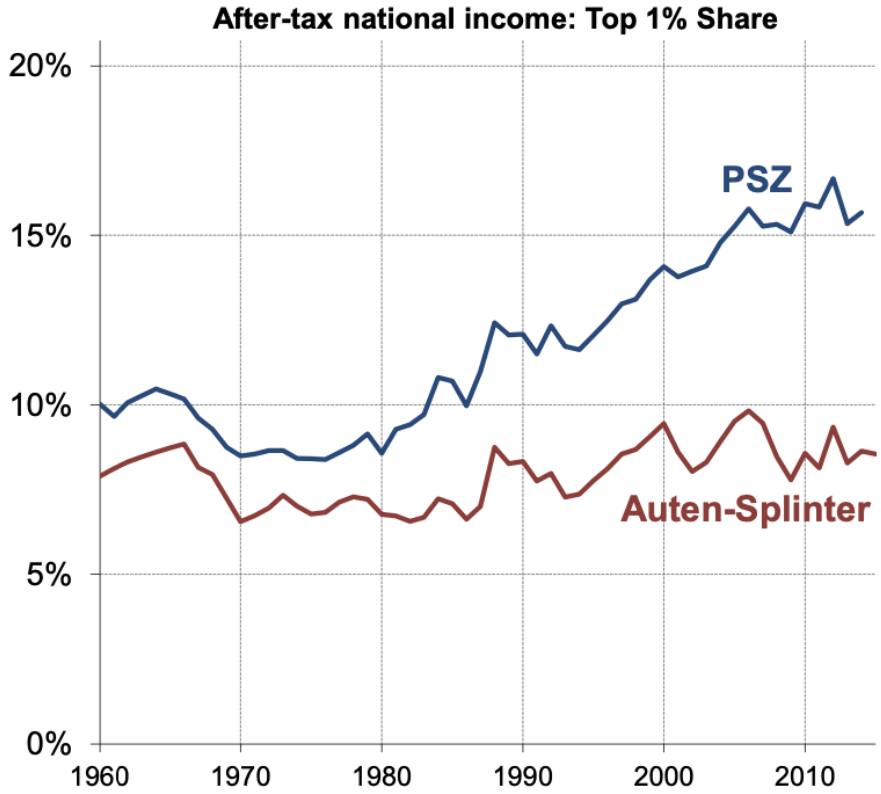


Figure 1: Top 1% shares of national income

Notes: Adjustments used to estimate Auten-Splinter pre-tax and after-tax income are listed in Tables 1and 2 and described in detail in the online appendix.

Sources: Authors' calculations, and Piketty, Saez, and Zucman (2018, PSZ in figure).

Outline

Taxes Have Become More Progressive

This is not what most people (myself included) believe

- But it does seem to be true – supported by multiple studies
- Blue shows before tax
- Violet shows after tax
- Both Piketty, Saez, Zucman and Auten & Splinter show more growth in bottom 50% *after* taxes & transfers
- I think Auten & Splinter are more reliable, and show a bigger effect

Avg Real Grth, 1979-2014	Overall	***Bottom 50%***	50-90th	90-99th	Top 1%
PSZ Pre-Tax	57.2%	***0.9%***	43.2%	78.8%	175.6%
PSZ After-Tax	57.2%	***19.6%***	48.5%	74.5%	176.1%
AS Pre-Tax	70.9%	***26.9%***	63.3%	93.2%	157.1%
AS After-Tax	70.9%	***59.3%***	68.8%	83.2%	104.6%

Supported by evidence from multiple other studies

Outline

Missing

Wealth Distribution

- Important work recently
- Smith, Zidar, Zwick (WP?) is good
- Highlights flaws in work by Saez & Zucman's (surprised?)

Income mobility over the lifetime

- I like work by Auten, Gee, other co-authors. Also Guvenen, Kaplan, others.
- I am sure many others

Intergenerational mobility (parents / children)

- Prof Heckman, Xi Song know much more about this than I do

Today is about Data, Methodology, Theory

U.S. INEQUALITY since 1980s

Some puzzles and popular (but wrong) narratives

1. Top 1% does *not* take everything – top grows, but so does bottom
2. Taxes are *not* regressive – tax policy has mitigated rising income inequality
3. Rising inequality is *not* business and "capital" – it is labor and human capital

Why are these narratives so resonant today?

- Reflect a sense we all have – inequality has risen
- Incorrect narratives supported by (flawed) work

Correct answers are important if we want the right policies

- Simple solutions (tax the rich, break up corporations) not supported by data
- More complicated – education and human capital
- Value in careful attention to *data*, *methodology*, and *theory*

This work is hard – good and careful work is always hard