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

Ideas in the History of Chicago Economics

Thomas S. Coleman

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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

  I. Top 1% does *not* take everything – top grows, but so does bottom

  II. Taxes are *not* regressive – tax policy has mitigated rising income inequality

  III. 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

Some puzzles and popular (but wrong) narratives

   I. Top 1% does not take everything – top grows, but so does bottom

  II. Taxes are not regressive – tax policy has mitigated rising income inequality

 III. **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

OUTLINE

   I. Introduce 3 Narratives - today we talk about only the 3rd (for more, come to mini-course in the spring)

     (A) Top 1%

     (B) Taxes

     (C) Capital vs Labor

  II. Narrative 3: Capital vs Labor

     (A) Evidence on College wage premium: Goldin & Katz; Autor, Goldin, Katz

     (B) Simple supply / demand theory

     (C) Evidence on labor (human capital) in top share: Smith et al.

 III. Narrative 1: Top 1% takes everything

 IV. Solution: Methodology and Data

     (A) Importance of methodology and data

  V. Narrative 2: Taxes Regressive

     (A) Evidence: Auten & Splinter, Smith et al., BEA, Burkhauser et al.

Preview for Spring Mini-Course
U.S. INEQUALITY since 1980s

Some puzzles and popular (but wrong) narratives

    I. Top 1% does *not* take everything – top grows, but so does bottom

   II. Taxes are *not* regressive – tax policy has mitigated rising income inequality

  III. Rising inequality *not* business and "capital" – labor and human capital

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
Contents

LaTeX Warning: Citation 'auten$_n ew_2 013' on page 29 undefined on input line 2819.
LaTeX Warning: Citation 'auten$_i ncome_2 009' on page 29 undefined on input line 2819.
LaTeX Warning: Citation 'guvenen$_l ifetime_2 017' on page 29 undefined on input line 2819.
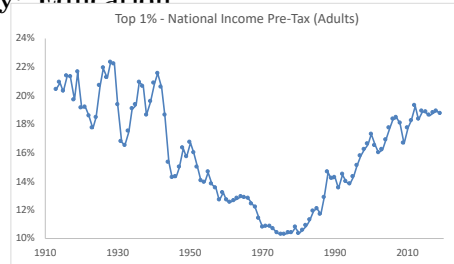LaTeX Warning: There were undefined references.

1 Narrative 3: All About Human Capital and Education (*Not* Financial Capital)

1.1 Long Sweep of Inequality: It is All Skills and Education

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Long Sweep of Inequality: Education

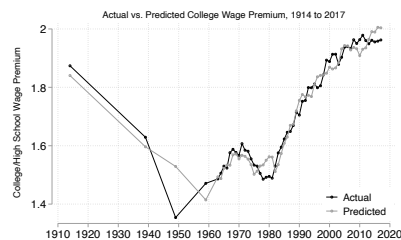Top 1% - National Income Pre-Tax (Adults)

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

Look at Piketty & Saez "Top 1%"

- Overstates recent shares, but long history right

"Great Compression" and rebound of 20$^{\text{th}}$c:

- Early 20$^{\text{th}}$c: falling
- Middle 20$^{\text{th}}$c: low
- Late 20$^{\text{th}}$c (since 1980s) rising

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

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
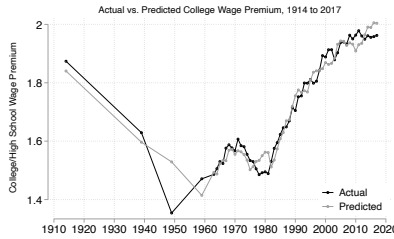- By 1950, down to 35%
- By 2010, back up to 85%

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

[?] online appendix at
[?]
[?]

Strong Evidence: Inequality is Education-Related

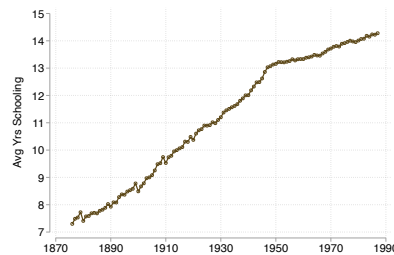Actual vs. Predicted College Wage Premium, 1914 to 2017

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%

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

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

[?, ?]

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A Simple Supply & Demand Story

Technological change shifts demand curve out

- $\rightarrow$ increased demand for skilled workers
- Occurs all the time – early and late 20$^{\text{th}}$ 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)

Actual vs. Predicted College Wage Premium, 1914 to 2017
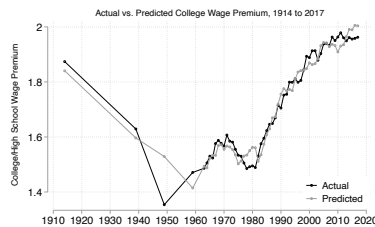
Puzzle: why did supply shift out in early, but not late?

- Workers respond to higher wages – both early and late 20$^{\text{th}}$ 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

P dn Q up

(b) Supply Shift Outward (Right)

P up Q up

(d) Demand Shifts Out

6
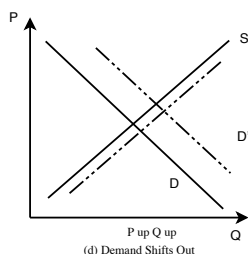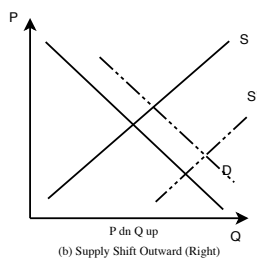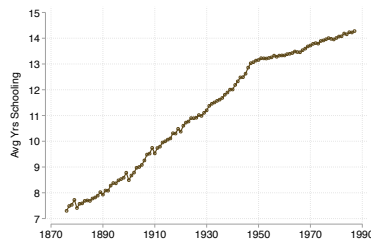
Education, Skills, Human Capital: Good News / Bad News

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 20$^{\text{th}}$ c: Easier to shift supply curve – provide HS and formal schooling – "build it and they will come"

- 21$^{\text{st}}$ 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

P dn Q up
(b) Supply Shift Outward (Right)

P up Q up
(d) Demand Shifts Out
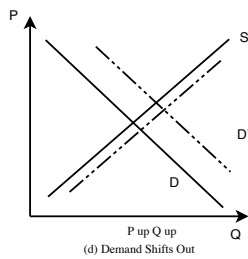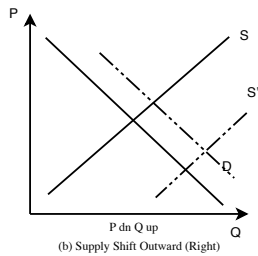
If It Is Education, Then It Is Children & Families

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:

I. Soft skills matter

II. Skill formation in early childhood is critical

III. 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)

1.2 Recent Income Growth is Labor *Not* Capital

Outline

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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

Top 1% pretax income share: labor vs. capital income

Source: Appendix Table II-B2b
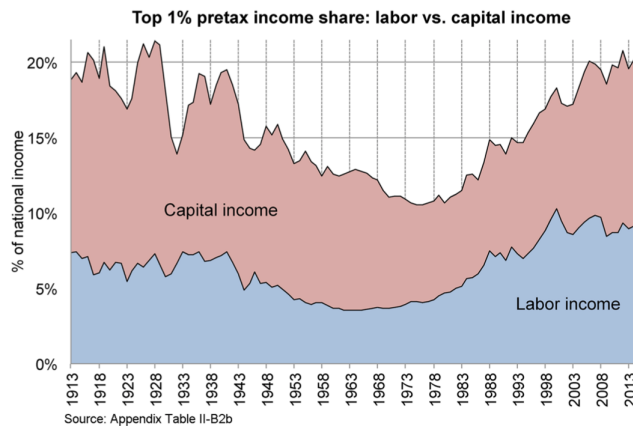
FIGURE VIII

The Capital Share across the Distribution

the capital share of national income ... has been rising in recent decades

In 2000, 23% of national income was derived from capital; this share increased to 30% in 2014. ... almost all the 2000–2014 growth of average national income per adult (0.6% a year on average over this period of time) stems from the rise of capital income: labor income per adult has grown by 0.1% per year, while capital income has grown by 2.2%.

[?] p 595

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

Combining survey & administrative data: [**?**, **?**, **?**]

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

Wages and Busines Fiscal Income, Fraction of Top 1% Income
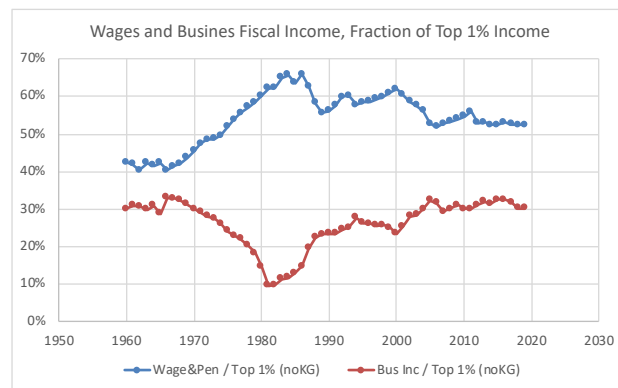
Dramatically shows effect of 1986 TRA

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

From PSZ2020AppendixTablesII(Distrib).xlsx Table TD2b

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

1.3 Conclusion: Focus on Education, Skills, Human Capital

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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

2 Narrative 1: Puzzles, But Top 1% Does *Not* Take It All

2.1 Puzzle in Measuring Top 1% – Who Is Right?

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Contents

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

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

	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%*

	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

I. Piketty & Saez ([**?**]) used IRS tax return data to measure share of income earned by Top 1% (and top 0.1%)

II. Their work considered groundbreaking for a number of reasons

   (A) Using administrative data – tax returns
       1. Accurate (under penalty of law)
       2. Good quality – what could be better than tax-reported income?
       3. Good coverage particularly at top of distribution – no problems with top-coding or other issues

   (B) Long history of "good quality" data (back to 1913)

   (C) Easy to explain

III. Some of the major results from their work

   (A) Top Share rose dramatically from 1970-2014: 10.0% to 22.0%
       1. Narrative of rising inequality
       2. Narrative that top are taking everything – Top 1% have taken virtually all the growth in income from 1979-2015

   (B) More recently (2001-2014) rising share of capital in income, particularly top income

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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?

Piketty & Saez (Average, $2018)				Auten & Splinter (Avg, $2018)		
	per 100 people	Top 1%	% share	per 100 people	Top 1%	% share
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Average Real Income Growth, 1979-2014	Bottom 50%	50-90th	90-99th	Top 1%
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	Piketty & Saez (Avg, $2018) Fiscal Income			Auten & Splinter (Avg, $2018) After-Tax per Person			Piketty & Saez (Avg, $2018) After-Tax per Adult		
	per 100	Top 1%	% share	per 100	Top 1%	% share	per 100	Top 1%	% share
1979	$4,522,500	$464,891	10.3%	$2,923,071	$210,870	7.2%	$4,425,300	$370,702	8.4%
2014	$5,920,500	$1,336,033	22.6%	$4,960,618	$428,505	8.6%	$6,955,700	$1,023,331	14.7%
Change	$1,398,000	$871,142	62.3%	$2,037,548	$217,635	10.7%	$2,530,400	$652,629	25.8%
% ch	30.9%	187.4%		69.7%	103.2%		57.2%	176.1%	

This table is in my spread-sheet /research/IncomeInequality/misc/EarningsData1.xlsx, sheet "ThreeNarrativesCalcs". Underlying data are from:

- PSZ: /research/IncomeInequality/misc/PSZ2020AppendixTablesII(Distrib).xlsx which is from http://gabriel-zucman.eu/files/ appendix (updated) to [?]

    - Fiscal Income (tax data) by tax return, Sheet TD3 "Average fiscal income by fiscal income group" - population "tax units"

    - After-Tax, Sheet TC3 "Average real national income by adult" - "population: equal-split individuals 20+"

    - They report $2018, using "$2018, national income deflator" which might be BEA Net National Product NNP - BEA table 1.7.3, row 10, 13-feb-2022

- Auten & Splinter: /research/IncomeInequality/misc/AutenSplinter-IncomeIneq_2019.xlsx (which seems to be same as 2020) from http://davidsplinter.com

    - After-Tax per Person overall (nominal, not per person) is sheet "C1-Incomes" Col Z and Col AC

    - Converted to per-capita using sheet "C0-Ref Stats" Col R "N. Indivs. (filers & non-filers)"

    - Converted to $2018 using PCE Price Index from BEA table 2.3.4, 13-feb-2022

- So not comparable, but that is part of the point of this comparison – PSZ are narrow income definition (and some problems) while A&S are broader

PSZ growth 1979-2014 30.9%. AS growth 70.1%. GDP. Real per-capita Gross National Income 79.9%

Real Gross National Income:

- 1979: BEA Gross National Income: $6,751.7 (bn $2012). AS people Col R of Co-Ref Stats 224,079 ('000)

- 2014: BEA $17,423.1. AS people 321,400 ('000)

But note that, as [?] point out (in notes to their Table IV) that the "share of growth" computations "do not produce meaningful results because there are different adults in income groups every year ...". Or, as they say on p. 23: "It is important to note that such cross-sectional computations of the distribution of economic growth have the implicit assumption that it is the same people at the top of the income distribution over time. The beneficiaries of economic growth cannot be determined by comparing two cross-sections because the composition of income groups changes over time." They refer to work by [?] that follow a panel of individuals.

3 Solving the Top 1% Puzzle: Methodology and Data

3.1 Framework

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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
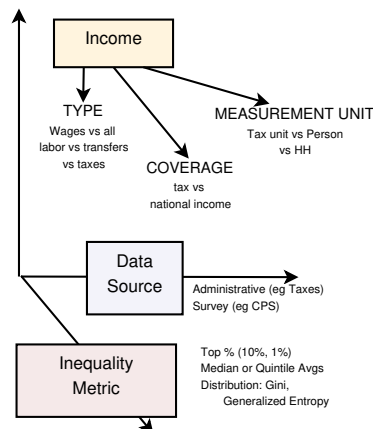
With this, seemingly-contradictory studies can be reconciled

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
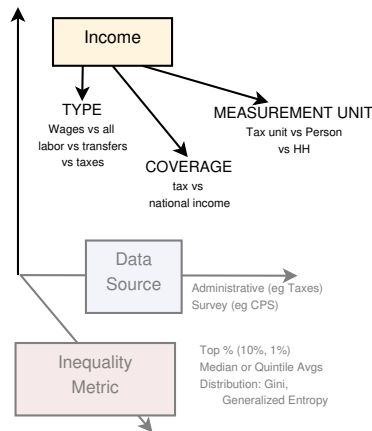
- Inequality has increased since 1970s, but less than claimed by some

- 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

3.2 Metrics & Data Sources

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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

Gini, Generalized Entropy (Theil measures, Log

- Gini

- Generalized Entropy & Theil measures

    - GE(0) or Theil L, mean log deviation: $\frac{1}{N} \sum \ln \left(\frac{\mu}{xi}\right) = \frac{1}{N} \sum \left[\ln (\mu) - \ln (x_i)\right]$
    - GE(1) is Theil T or Theil index
    - GE(2) is 1/2 coefficient of variation (SD/Mean)

- Decile ratios (80:20 or 90:10)

    - Avoids the very top and bottom, so avoid (hopefully) topcoding issues in surveys

- Decile income ratios (80:20 or 90:10)

    - Share of income earned by top 90% to bottom 10% (same as average income of top 90% to bottom 10%)
    - Note subtle difference from Decile Ratios, which only look at the quantile, where these shares look at the average income or total income earned by those in the top (or bottom) 10%
    - Includes the very top and bottom, so sensitive to skewness

- Decile (Percentage) shares

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

- Standard Deviation of Log Income

    - Used by Hoffman ([**?**]) but I can't find too many other references

Growth

- Median growth

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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

3.3 Which Income? Labor Income vs Market Income vs Transfers vs Taxes

Outline

Contents

What Income Do We Want? How Do We Measure?

Consider two dimensions:

I. *Type* – e.g. wages vs capital

II. *Coverage* – how much captured

Coverage (completeness & consistency)
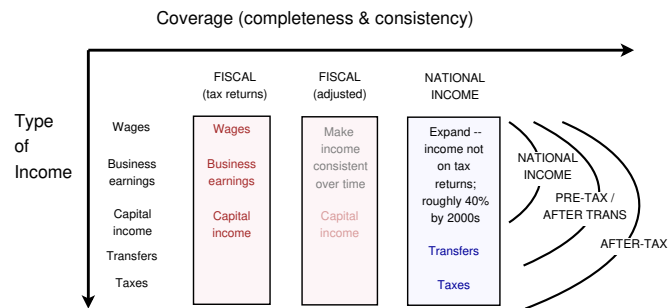
Type: different types for asking different questions

- Equality of job market opportunity and outcome: wages

- Equality of welfare and well-being: total income including transfers and taxes

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

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

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

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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[?, ?]
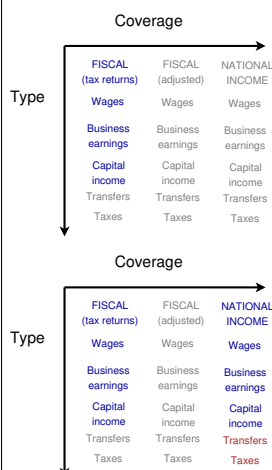
From sheet /research/IncomeInequality/misc/FixlerTables.xlsx

From Smith et al. "Capitalists in the 21st c" pp 1685-1686
From Auten & Splinter 2019 Tables 1 & 2
TOTAL INCOME = WAGES + BUSINESS INCOME + OTHER CAPITAL INCOME

INCOME DEFINITION	DIRECTLY OBSERVED TAX RETURN - "FISCAL INCOME"	AUTEN & SPLINTER Corrected Fiscal Income	IMPUTED NATIONAL INCOME	PRE-TAX / AFTER TRANSFER	AFTER TAX
		OVERALL - correct sample (non-filers …) - count by individuals and share income (PSZ equal-split; AS family size)			
Wage Income	1040 wage, salaries, tips	Add tax-exempt combat pay, gambling losses	Imputed unreported earnings		
	Pension distributions	Taxable S&L tax refunds	Payroll taxes		
	Annuities	IRA contributions subtracted to be consistent with excluded employee contributions	Imputed non-taxable employee benefits (e.g. employer-provided health care)		
			Portion of sales and excise taxes		
Pass-Through Business Income	S-corporation	Loss-limits for other business income applied to pre-TRA86	Imputed unreported income from unincorporated businesses		
	Partnership		Portion of sales and excise taxes		
	Sole Proprietor's		Portion of corporate taxes		
C-Corp Business Income	C-corporation dividends	Add back excluded dividences (pr-1987)	Imputed C-corporate retained earnings		
		Net operating loss carryovers	Portion of sales and excise taxes		
			Portion of corporate taxes		
Other Capital Income	Interest	Add tax-exempt interest	Imputed rental income		
	Rents & Royalties	Loss-limits for rents applied to pre-TRA86	Portion of sales and excise taxes		
	Estate & trust income	Various capital gains, ordinary gains from sale of business subtracted	Portion of pension income		
Transfers				Cash & Non-Cash	
				Social Security benefits	
				Unemployment benefits	
				Other cash transfers	
				Medicare, Medicaid, food stamps	
Taxes					Federal, S&L, property, et
					Gov't deficit, consumption

3.4 Measurement Unit (Person vs Household)

Outline

Contents

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 Half67% 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%	

Writing Income Distribution to Highlight Income / Sharing Unit
To illuminate problem, need to write out income distribution:

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

- $I(t)$ 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 ⇒ 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
  - A&S perform sensitivity analysis with $g_n(t) = n$ & $w(t) = 1/\sqrt{n}$, square-root
  - PSZ don't seem to understand the issues (cf fn 2 of their AEA Papers & Proceedings)

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

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

- 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

	1	2	3	4	Sum
Income	$10	$10	$20	$20	$60
No. Returns	1	1	1	1	4
No. People	2	2	2	2	8
In Top 50%?	N	N	Y	Y	
Income in Top 50%	0	0	$20	$20	$40

	1a	1b	2a	2b	3	4	Sum
Income	$5	$5	$5	$5	$20	$20	$60
No. Returns	1	1	1	1	1	1	6
No. People	1	1	1	1	2	2	8
Top 50% Ret?	N	N	N	Y	Y	Y	
Income Top 50%	0	0	0	$5	$20	$20	$45
Top 50% People	N	N	N	N	Y	Y	
Income Top 50%	0	0	0	0	$20	$20	$40

- Tax unit vs individual vs family or household
- This is absolutely important. Not nearly the recognition it should have

$$Total\ Income = \sum_{t=1}^{N} I(t) \cdot w(t) \cdot g_n(t) \cdot g_I(t)$$

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

- **t:** (arbitrary) index for tax returns, 0,1,2,...,N
- $I(t)$: Income of tax return **t**
- $w(t)$: income sharing (assignment) for tax return
- $g_n(t)$: number of measured units or "persons" for tax return t
- $g_I(t)$: weight for tax return t

The idea of these three weightings is to capture the fact that although we count tax *returns*, we usually care about the *people* behind those returns. The weight $g_n(t)$ determines whether we count returns ($g_n(t) = 1$) or persons ($g_n(t) = n$). The idea of weighting by n is that we may not want to give twice the weight to two people filing individual returns versus filing jointly. But once we start counting *people* ($g_n(t) = n$) we must consider how the tax return income is assigned or shared or size-adjusted among those people. There are three cases we might consider:

- Perfect Economies of Scale Extreme: each person is assigned the tax return income, $w(t) = 1$. This is perfect sharing or perfect economies of scale within the tax return

- No Economies of Scale Extreme: equal sharing and each person is assigned $1/n$ of the total income, $w(t) = 1/n$. No economies of scale within the tax return

- Square-Root: each person is assigned $1/\sqrt{n}$ of the total income, $w(t) = 1/\sqrt{n}$. This is a commonly-used weighting, and assumes some but not perfect economies of scale within the household.

We also require that the income sum to the correct total, and this is insured by setting $g_I(t) = 1/w(t)\cdot g_n(t)$ or $w(t) \cdot g_n(t) \cdot g_I(t) = 1$

$$Measured\ Unit\ Income\ for\ Return\ t = I(t) \cdot w(t)$$

$$r(t) = Rank\ Order\ for\ I(t) \cdot w(t)$$

$$Tax\ Returns\ in\ Rank\ Order = t(r)\ \ r = 0, 1, 2, ..., N$$

$$Number\ of\ Measured\ Units\ or\ "persons"\ in\ K\text{-}Lowest\text{-}Income\ Returns = \sum_{r=1}^{K} g_n\left(t(r)\right)$$

$$Fraction\ of\ Measured\ Units\ or\ "persons"\ in\ K\text{-}Lowest\text{-}Income\ Returns = \frac{\sum_{r=1}^{K} g_n\left(t(r)\right)}{\sum_{r=1}^{N} g_n\left(t(r)\right)}$$

$$Fraction\ of\ Income\ in\ K\text{-}Lowest\text{-}Income\ Returns = \frac{\sum_{r=1}^{K} I\left(t(r)\right) \cdot w\left(t(r)\right) \cdot g_n\left(t(r)\right) \cdot g_I\left(t(r)\right)}{\sum_{r=1}^{N} I\left(t(r)\right) \cdot w\left(t(r)\right) \cdot g_n\left(t(r)\right) \cdot g_I\left(t(r)\right)}$$

Examples will make things more clear. Let's work with

Adjusting for Economies of Scale (Square-Root)

Number of household members	Household income	Household income per person	Equivalence scale	Number of household members	Household income	Household income per person	Equivalence scale
[a]	[b]	[b]/[a]	[b]/sqrt([a])	[a]	[b]	[b]/[a]	[b]/sqrt([a])
1	100,000	$ 100,000	$ 100,000	1	57,735	$ 57,735	$ 57,735
2	100,000	$ 50,000	$ 70,711	2	81,650	$ 40,825	$ 57,735
3	100,000	$ 33,333	$ 57,735	3	100,000	$ 33,333	$ 57,735
4	100,000	$ 25,000	$ 50,000	4	115,470	$ 28,868	$ 57,735
5	100,000	$ 20,000	$ 44,721	5	129,099	$ 25,820	$ 57,735
6	100,000	$ 16,667	$ 40,825	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

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

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

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

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

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

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

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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?

PSZ EqSplit: fiscal (tax) income grouping by individuals / equal split income

- 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 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

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%
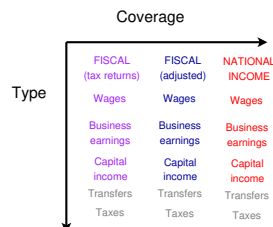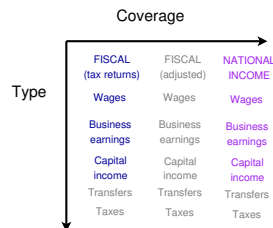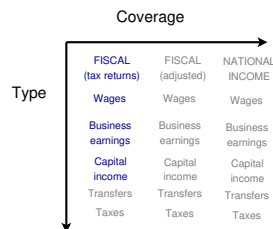
Avg Real Grth, 1979-2014	Overall	Bottom 50%	Top 1%	*Top Share*
PS FiscalPS Fiscal	30.9%	-37.8%	187.4%	*22.6%*
PS EqSplitPS Eq-Split	44.6%	-26.3%	220.5%	*20.6%*
PSZ Pre-TaxPSZ	57.2%	0.9%	175.6%	*18.9%*

3.5 Consensus: Top 1% Share Has Increased, Less Than Piketty, Saez, Zucman

Outline
Contents

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	
	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%

	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%

	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
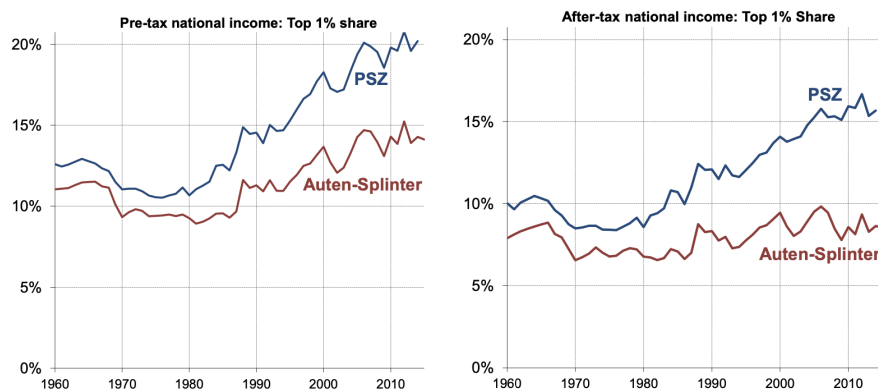
Figure 1: Top 1% shares of national income

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).

4 Narrative 2: Taxes Are Progressive

Outline

Contents

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

5 Conclusion

Outline

Contents

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

    I. Top 1% does *not* take everything – top grows, but so does bottom

    II. Taxes are *not* regressive – tax policy has mitigated rising income inequality

    III. 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