Undergraduate Public Finance: Inequality, Poverty, Taxes, and Transfers

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Whereabouts in the Course

Part I – Introduction

Part II – Externalities and Public Goods

Part III – Social Insurance and Redistribution

Part IV – Taxation

Our Roadmap

Part IV – Taxation

- Inequality, Poverty, Taxes, and Transfers (Chapters 17-18)
- Incidence and Efficiency Costs of Taxation (Chapters 19-20)
- Labor Income Taxation (Chapters 20-21)
- Corporate Taxation (not in the textbook)
- Taxes on Capital and Savings (not in the textbook)

Redistribution

Even with no market failures, free market outcomes may generate substantial inequality.

Inequality matters because humans are social beings: people evaluate their economic well-being relative to others, not in absolute terms.

In advanced economies, people pool 30-50% of their income through their government to fund many transfer programs.

Do taxes and transfers affect economic behavior?

$\Rightarrow$ Generates an efficiency and equity trade-off (i.e., size of economic pie vs. distribution of the economic pie)

Income Inequality: Labor vs. Capital Income

Economic production requires labor and capital.

Individuals derive market income (before tax) from **labor** (work) and **capital** (ownership):

$$z = wl + rk,$$

where w is wage, l is labor supply, k is capital, r is rate of return on capital.

(1) Labor income inequality is due to differences in working abilities (*e.g., education, talent, physical ability*), work effort (*e.g., hours of work, effort on the job*), and institutions (*e.g., minimum wage, unions*), social norms (*e.g., gender norms*).

(2) Capital income inequality is due to differences in wealth k (due to past saving behavior and inheritances received) and in rates of return r.

Macro-aggregates: Labor vs. Capital Income

National Income = income received by residents =
GDP - depreciation of capital + net foreign income

Labor income $wl \simeq 75\%$ of national income z (and decreasing)

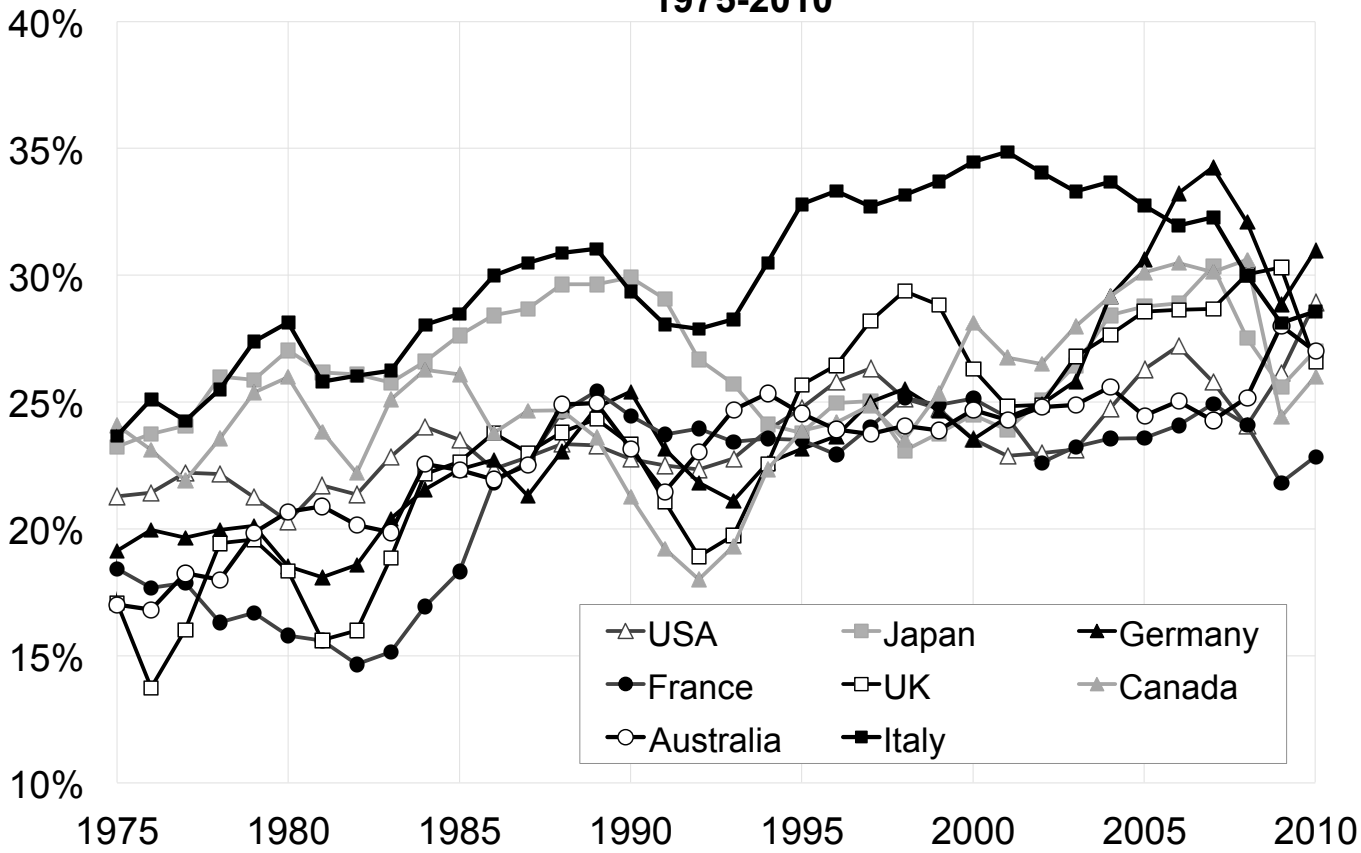
Capital income $rk \simeq 25\%$ of national income z (and increasing)

Private wealth $k \simeq 500\%$ of national income z (and increasing)

Rate of return on wealth $r \simeq 5 - 6\%$

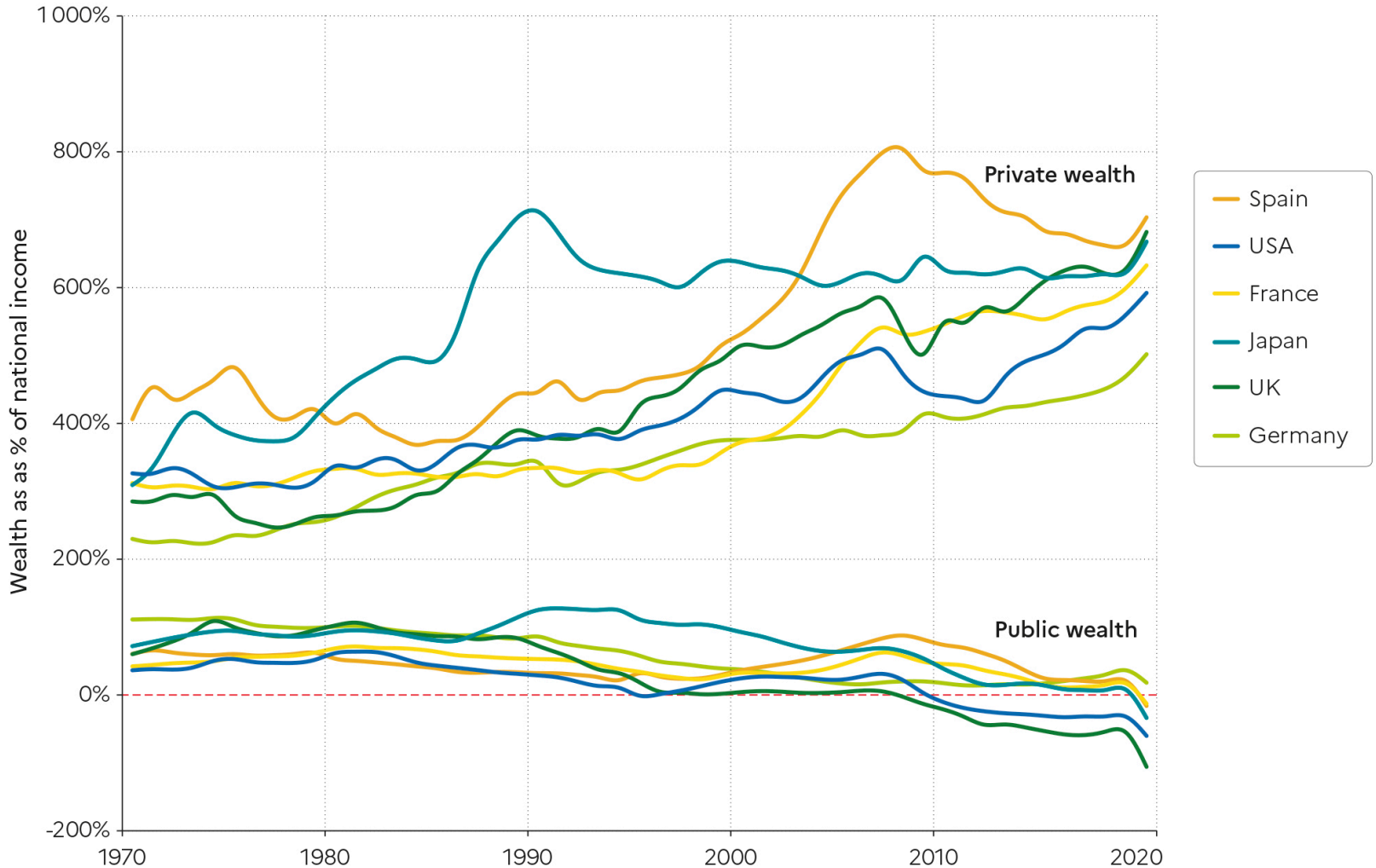
Private wealth has increased while public wealth has declined.

Figure 12: Capital shares in factor-price national income 1975-2010



Source: Piketty and Zucman (2014)[43]

Figure 8 *The rise of private versus the decline of public wealth in rich countries, 1970-2020*



Interpretation: *Public wealth is the sum of all financial and non-financial assets, net of debts, held by governments. Public wealth dropped from 60% of national income in 1970 to -106% in 2020 in the UK.* ***Sources and series:*** *wir2022.wid.world/methodology, Bauluz et al. (2021) and updates.*

Income Inequality: Labor vs. Capital Income

Capital income (or wealth) is more concentrated than Labor Income.

Top 1% wealth holders have almost 40% of total private wealth.

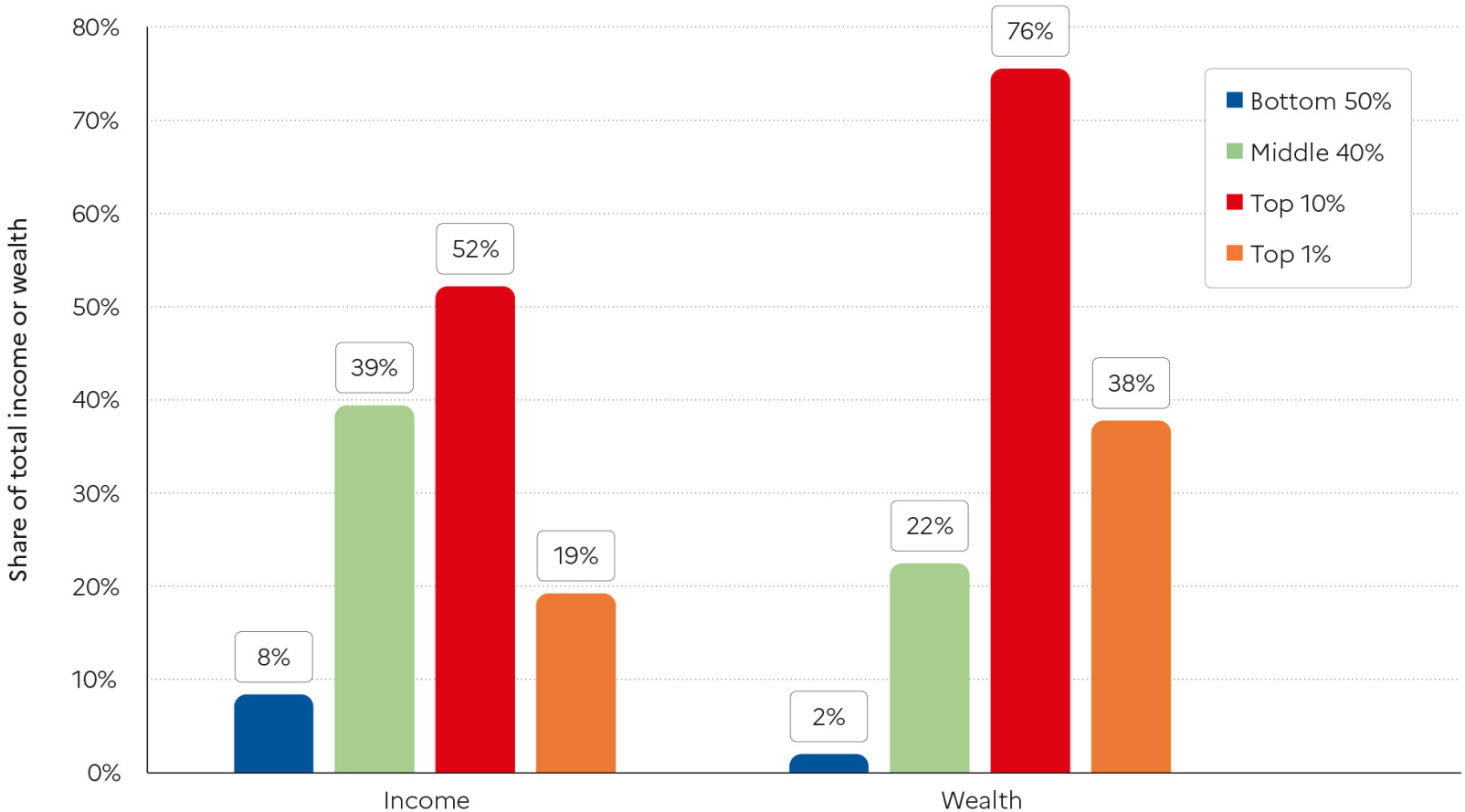
Bottom 50% wealth holders hold practically no wealth (Saez-Zucman 2016).

Top 1% incomes earn about 20% of total national income on a pre-tax basis (Piketty-Saez-Zucman, 2018).

The World Inequality Lab provides standardized statistics for many countries and worldwide

$\Rightarrow$ Income and wealth inequality are pretty similar for the world as a whole.

Figure 1.1 ***Global income and wealth inequality, 2021***



Interpretation: *The global 50% captures 8% of total income measured at Purchasing Power Parity (PPP). The global bottom 50% owns 2% of wealth (at Purchasing Power Parity). The global top 10% owns 76% of total Household wealth and captures 52% of total income in 2021. Note that top wealth holders are not necessarily top income holders. Income is measured after the operation of pension and unemployment systems and before taxes and transfers.* ***Sources and series:*** *wir2022.wid.world/methodology*

Income Inequality Measurement

Most famous inequality index: **Gini coefficient**

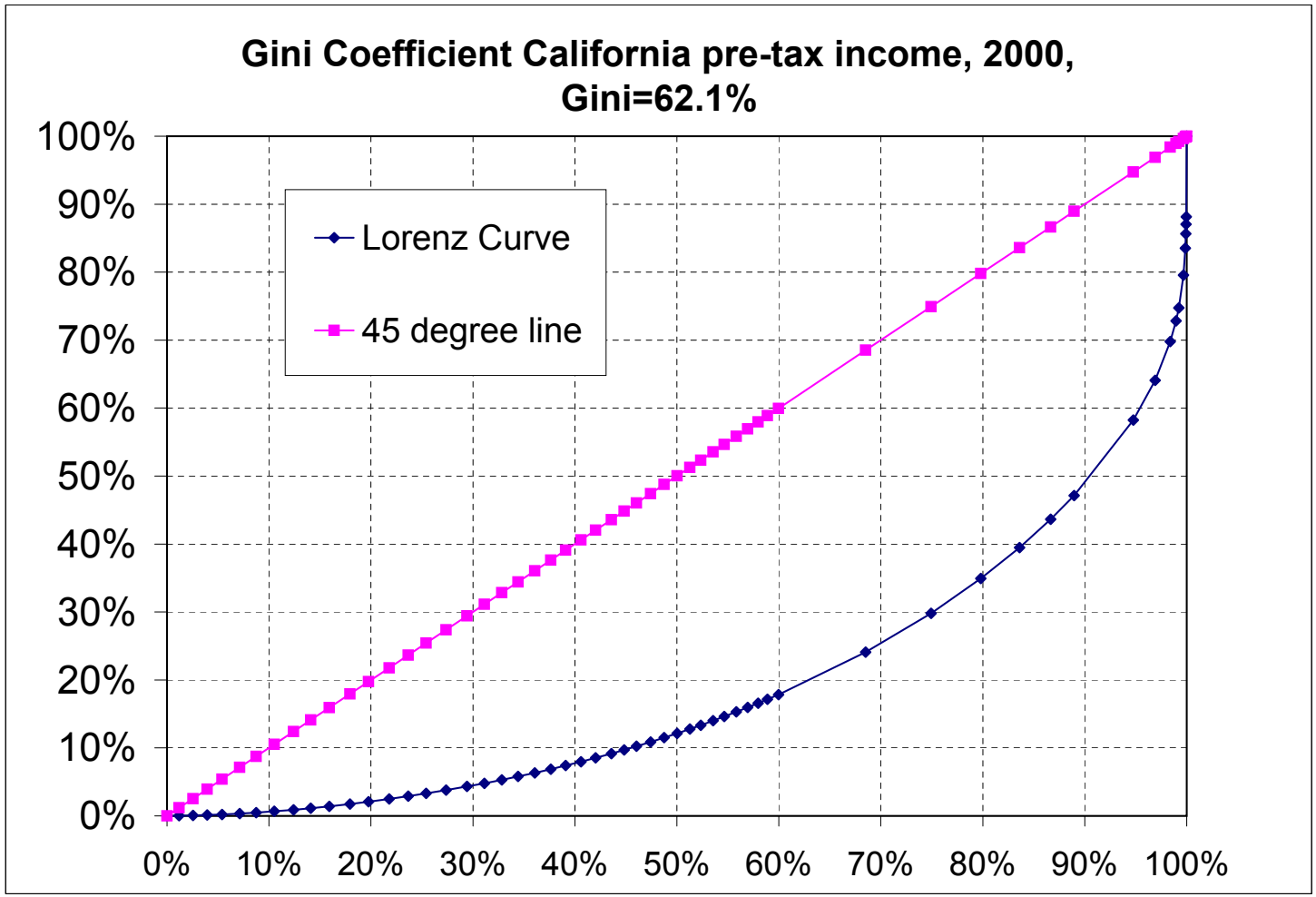
Gini = 2 * area between 45-degree line and Lorenz curve

Lorenz curve $L(p)$ at percentile p is the fraction of total income earned by individuals below percentile p.

$0 \leq L(p) \leq p$

Gini=0 means perfect equality.

Gini=1 means complete inequality (i.e., the top person has all the income).



Source: Annual Report 2001 California Franchise Tax Board

Key Empirical Facts on Income Inequality

(1) Labor income inequality has increased since the 1970s.

(2) The gender gap has decreased but remains substantial at the top of the distribution.

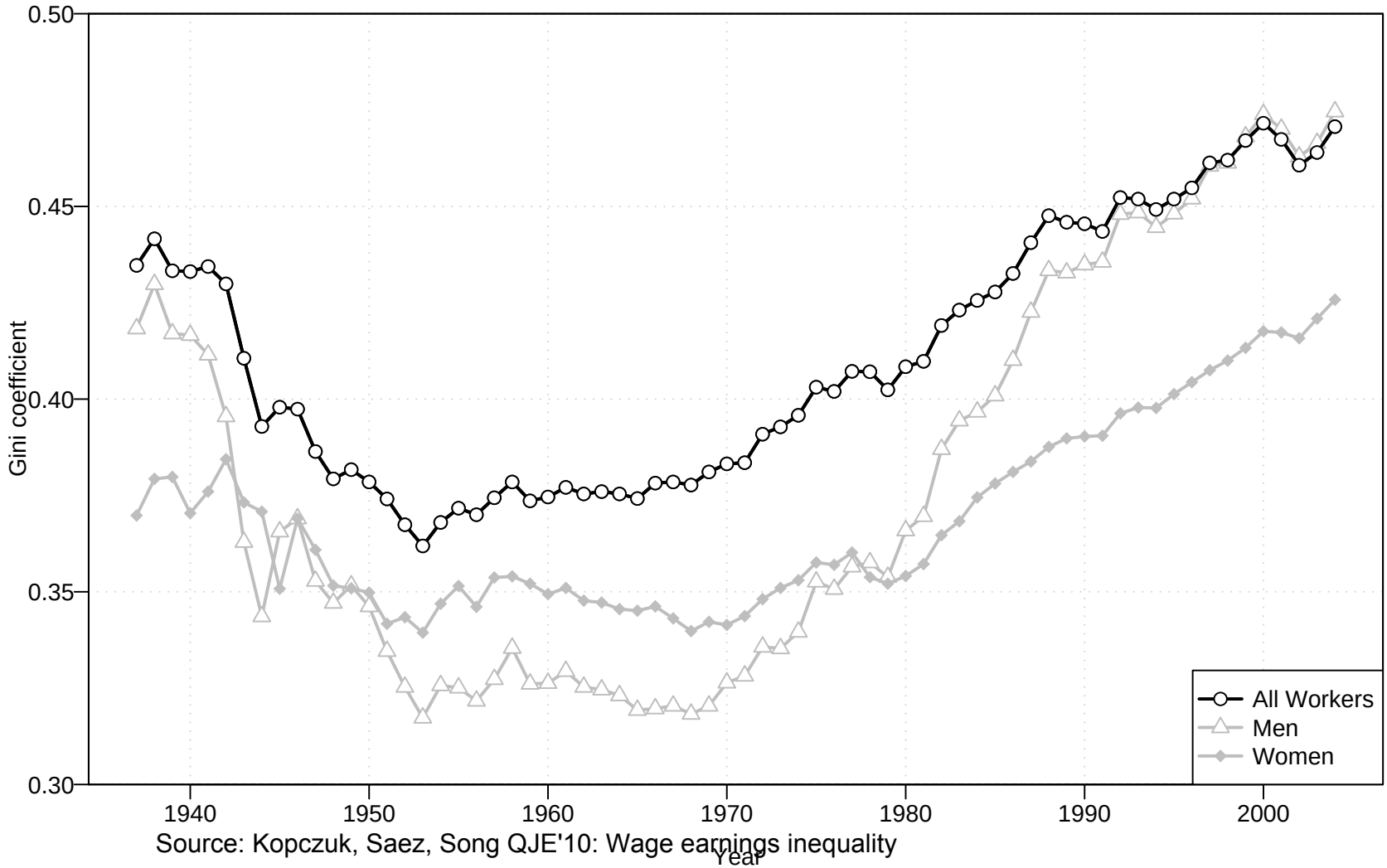
(3) Bottom 50% pre-tax income per adult have stagnated since 1980 in spite of a 60% increase in average national income.

(4) Top income shares dropped from 1929 to 1950 and increased since 1980.

Most OECD countries saw a fall in top income shares from 1900-1950.

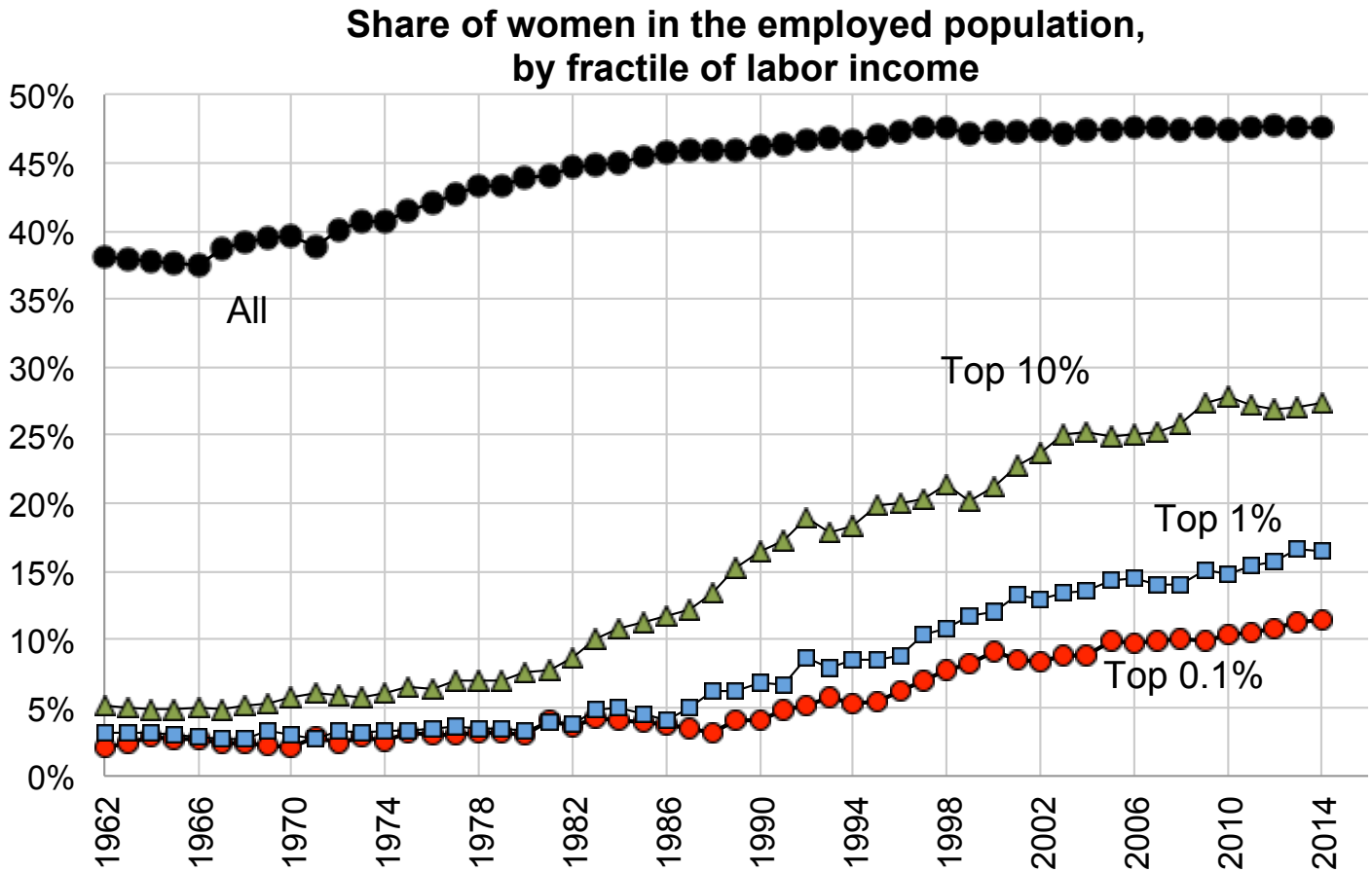
However, the surge in top income shares has happened primarily in English-speaking countries, not as much in Continental Europe and Japan (Atkinson, Piketty, Saez JEL'11).

Figure 1: Gini coefficient



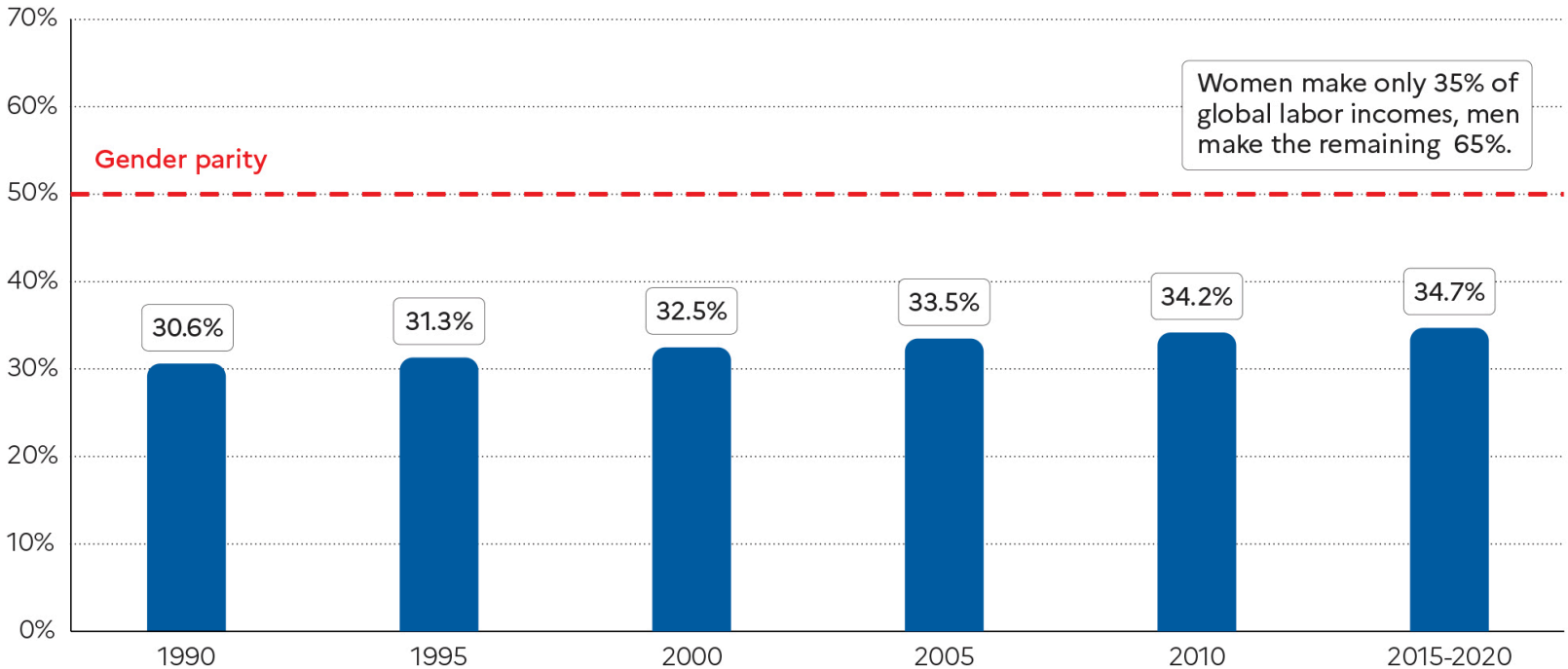
Source: Kopczuk, Saez, Song QJE'10: Wage earnings inequality

Men still make 85% of the top 1% of the labor income distribution



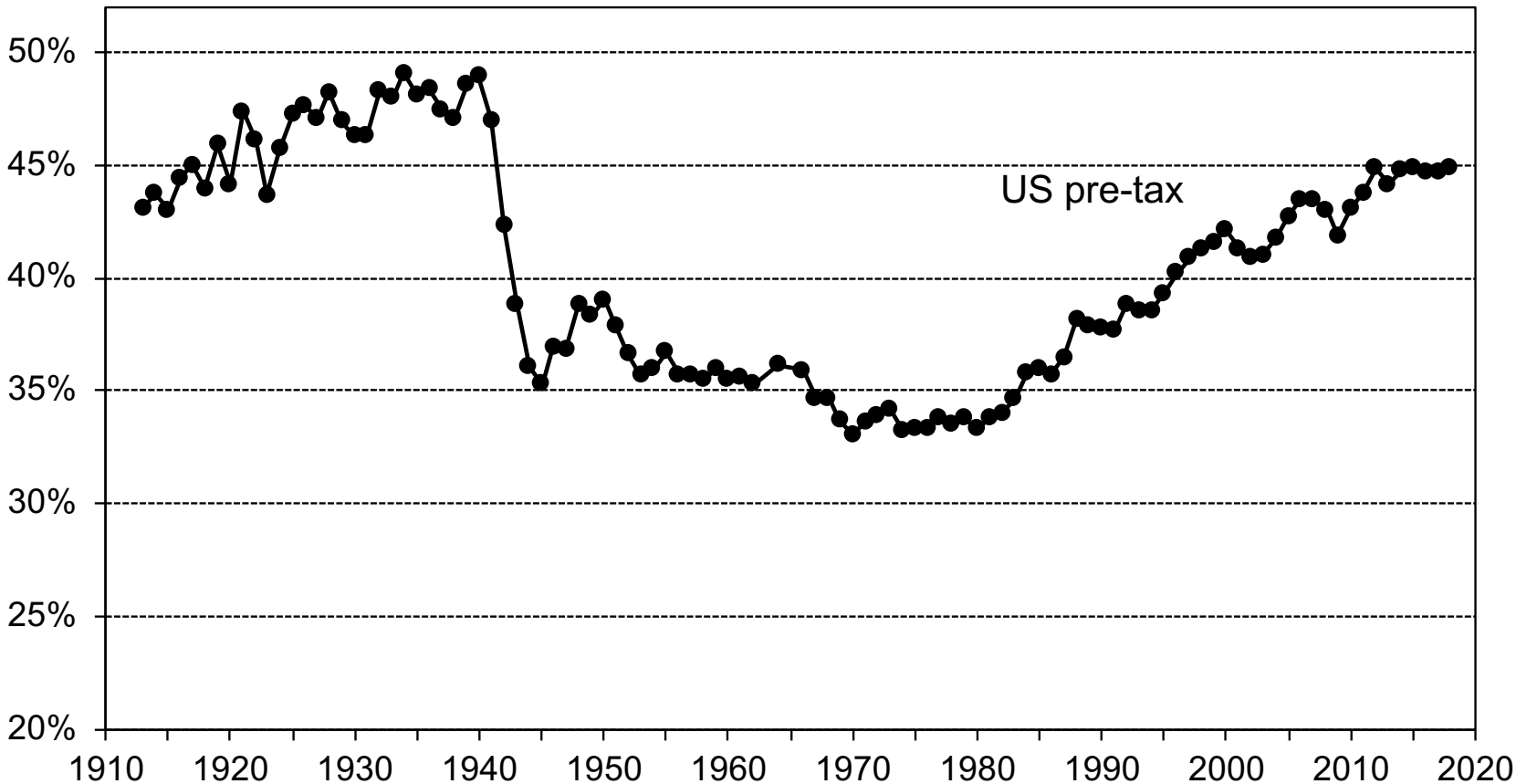
Source: Appendix Table II-F1.

Figure 12 *Female share in global labor incomes, 1990-2020*

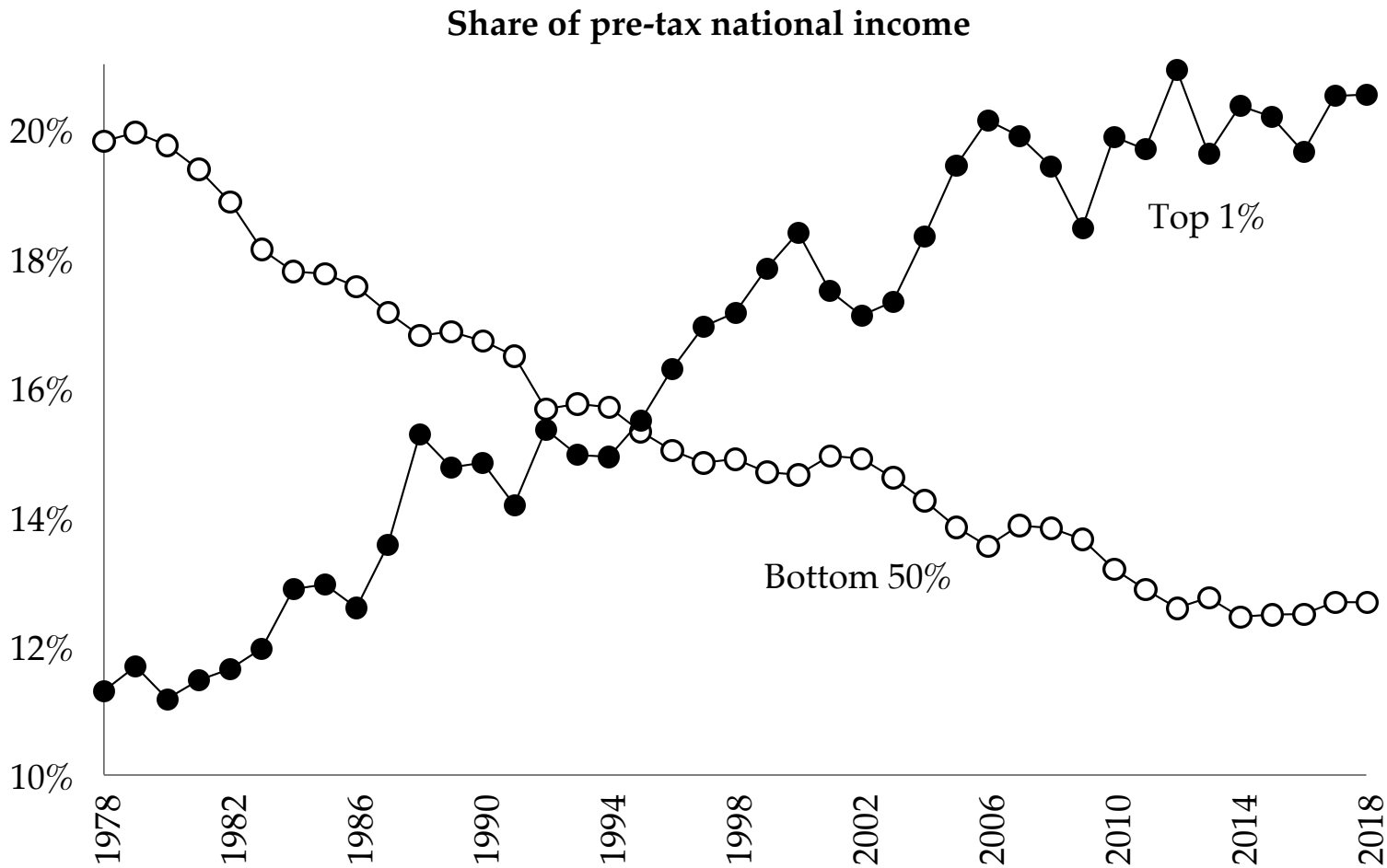


Interpretation: *The share of female incomes in global labour incomes was 31% in 1990 and nears 35% in 2015-2020. Today, males make up 65% of total labor incomes.* ***Sources and series:*** *wir2022.wid.world/methodology and Neef and Robilliard (2021).*

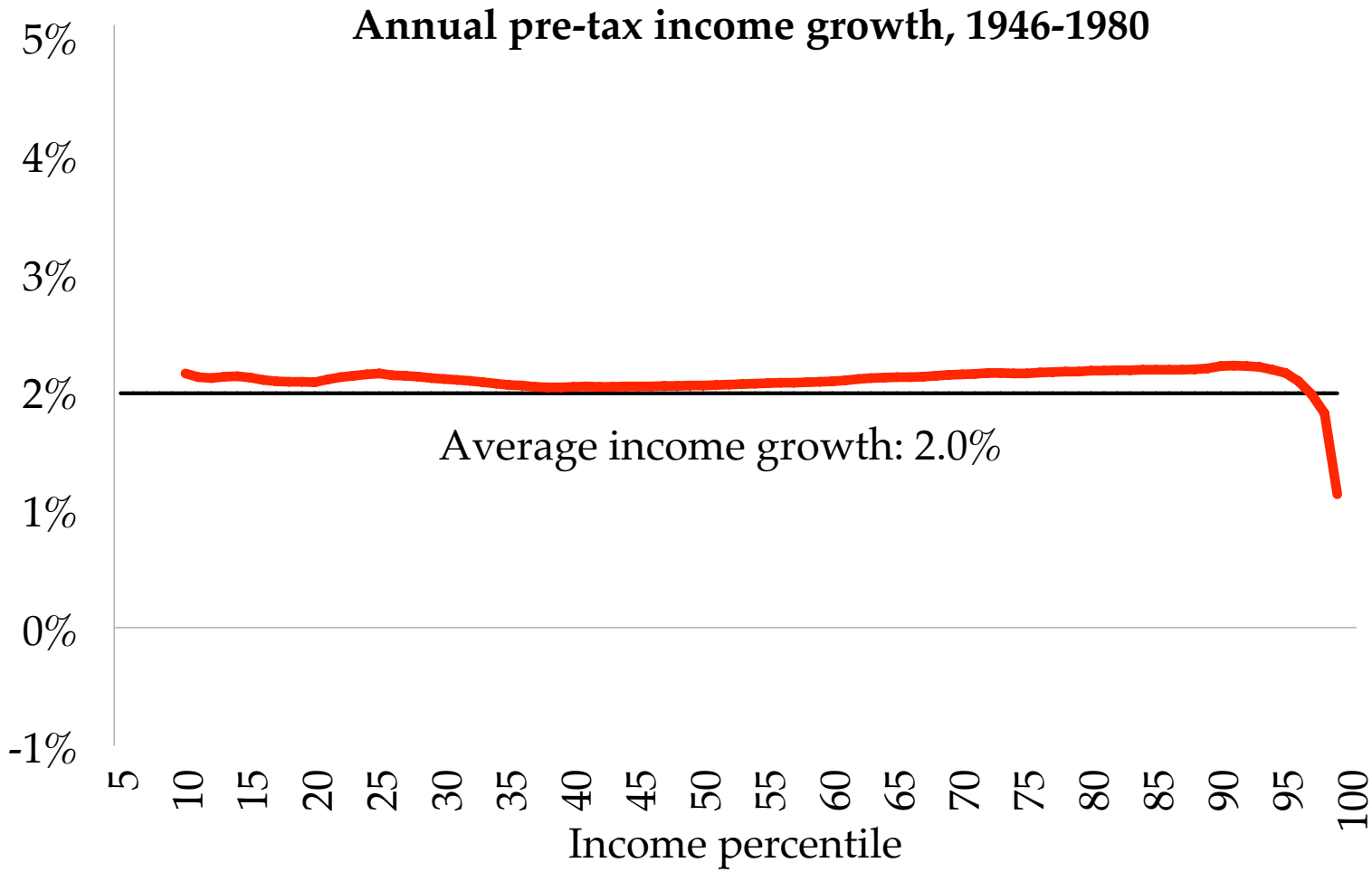
Top 10% Pre-tax Income Share in the US, 1913-2018

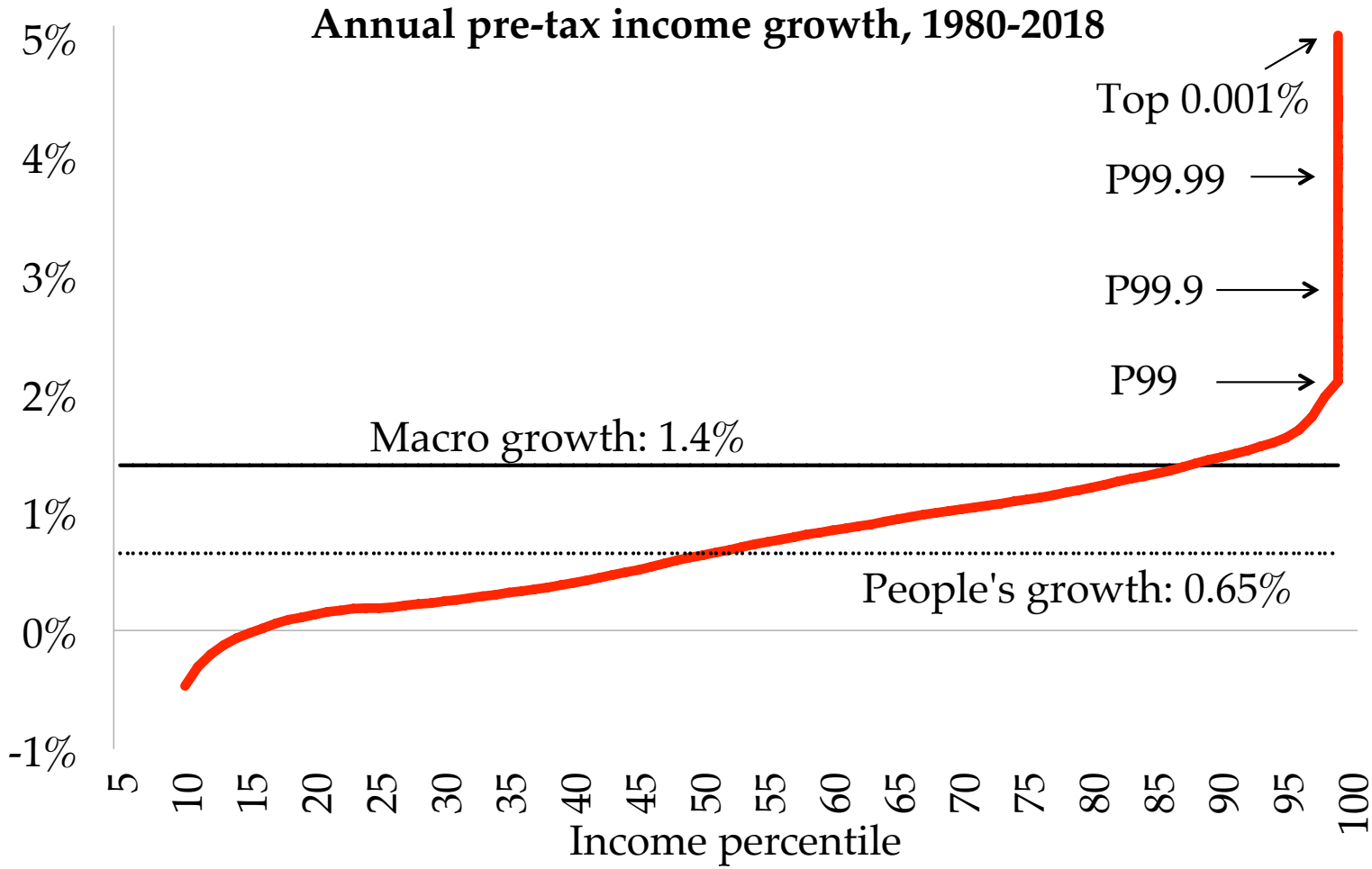


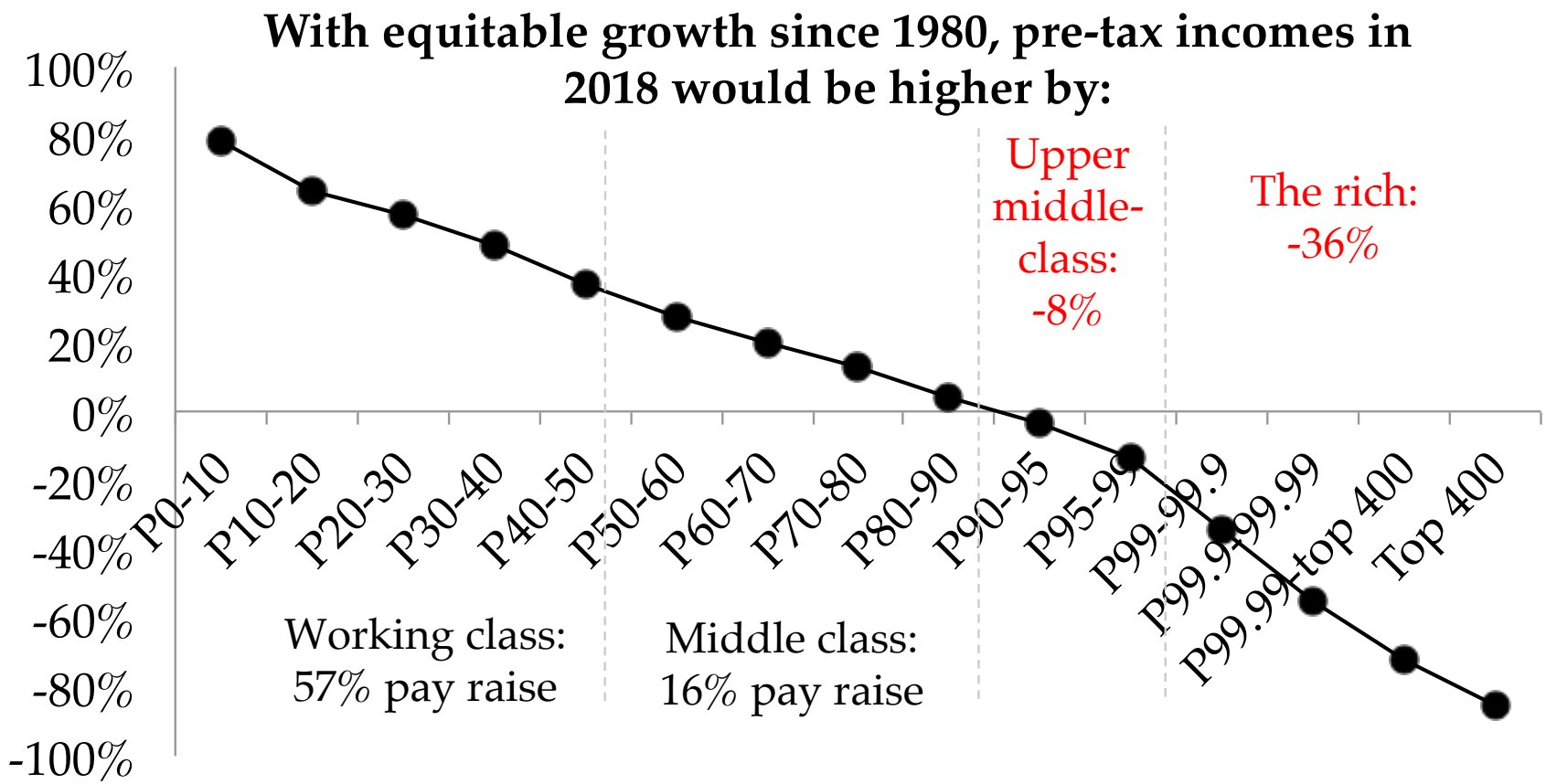
Top income shares of pretax national income among adults aged 20+ (income within couples equally split).
Source is World Inequality Database wid.world (from Piketty, Saez, Zucman 2018).

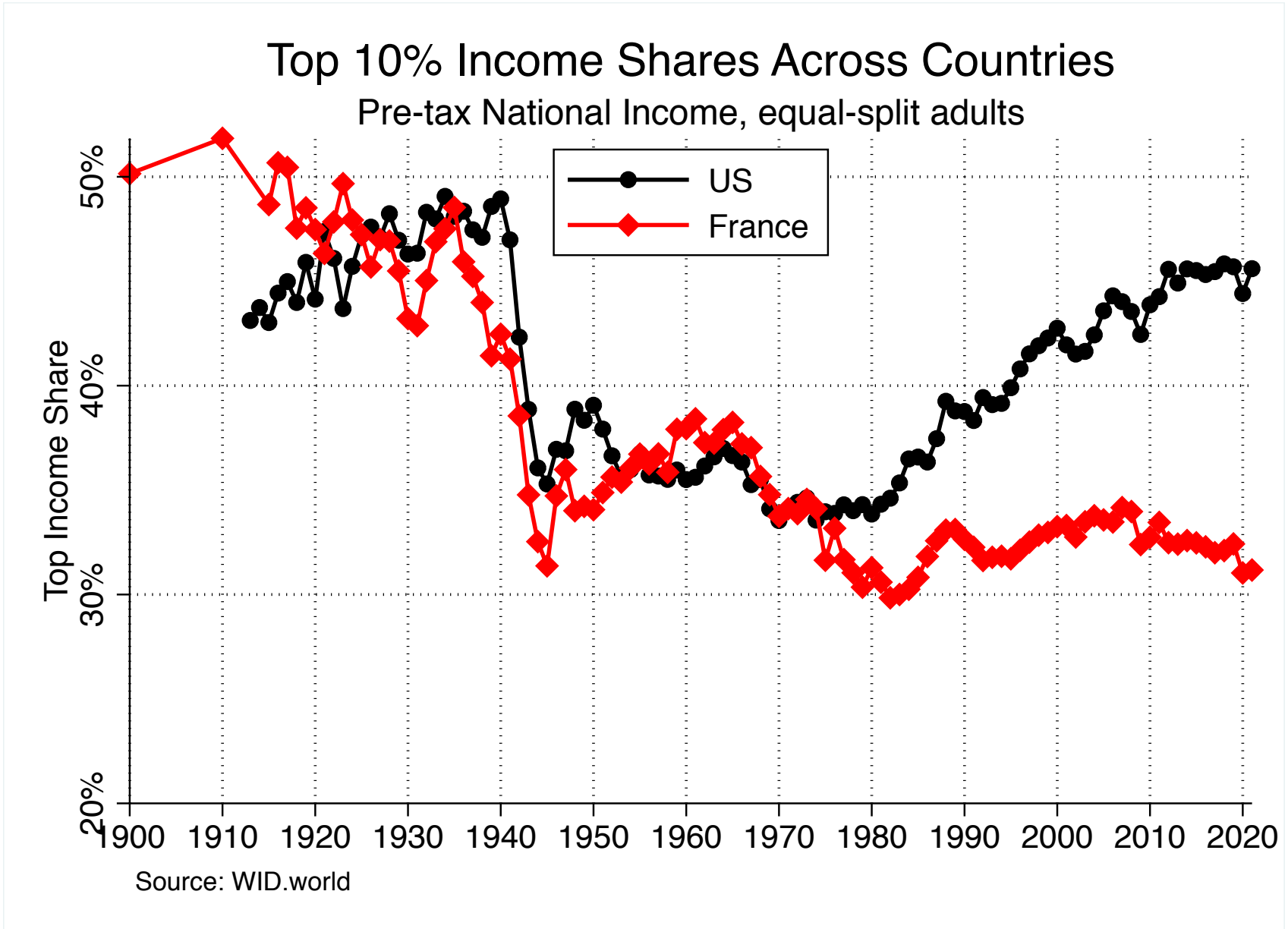


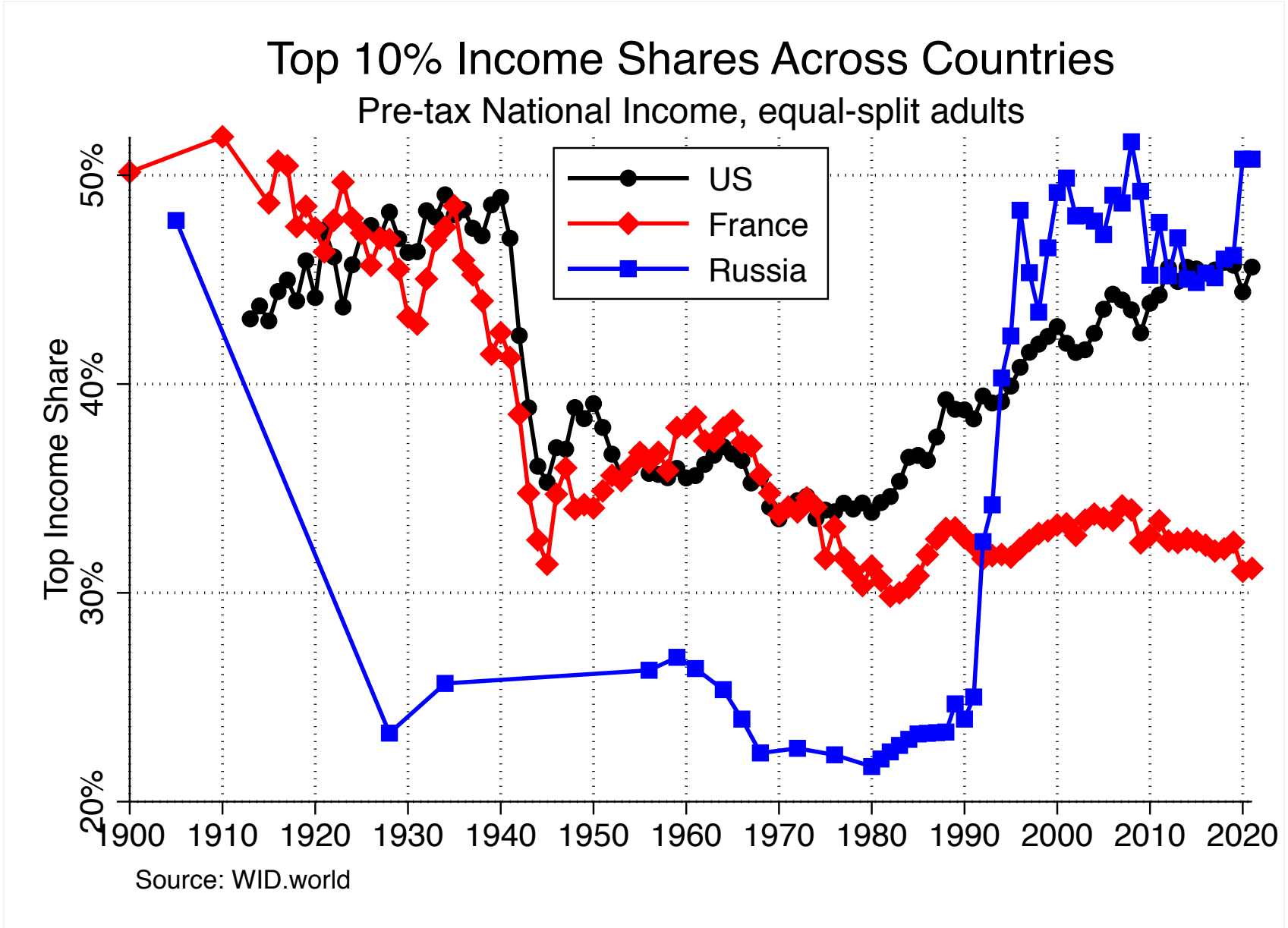
Source: Saez and Zucman (2019), Figure 1.1


Annual pre-tax income growth, 1946-1980
5%
4%
3%
2%
1%
0%
-1%
Average income growth: 2.0%
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
Income percentile


Annual pre-tax income growth, 1980-2018
5%
4%
3%
2%
1%
0%
-1%
Top 0.001%
P99.99
P99.9
P99
Macro growth: 1.4%
People's growth: 0.65%
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
Income percentile


With equitable growth since 1980, pre-tax incomes in 2018 would be higher by:
100%
80%
60%
40%
20%
0%
-20%
-40%
-60%
-80%
-100%
P0-10
P10-20
P20-30
P30-40
P40-50
P50-60
P60-70
P70-80
P80-90
P90-95
P95-99
P99-99.9
P99.9-99.99
P99.99-top 400
Top 400
Upper middle-class: -8%
The rich: -36%
Working class: 57% pay raise
Middle class: 16% pay raise


Top 10% Income Shares Across Countries
Pre-tax National Income, equal-split adults
US
France
Top Income Share
50%
40%
30%
20%
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2020
Source: WID.world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France
Russia
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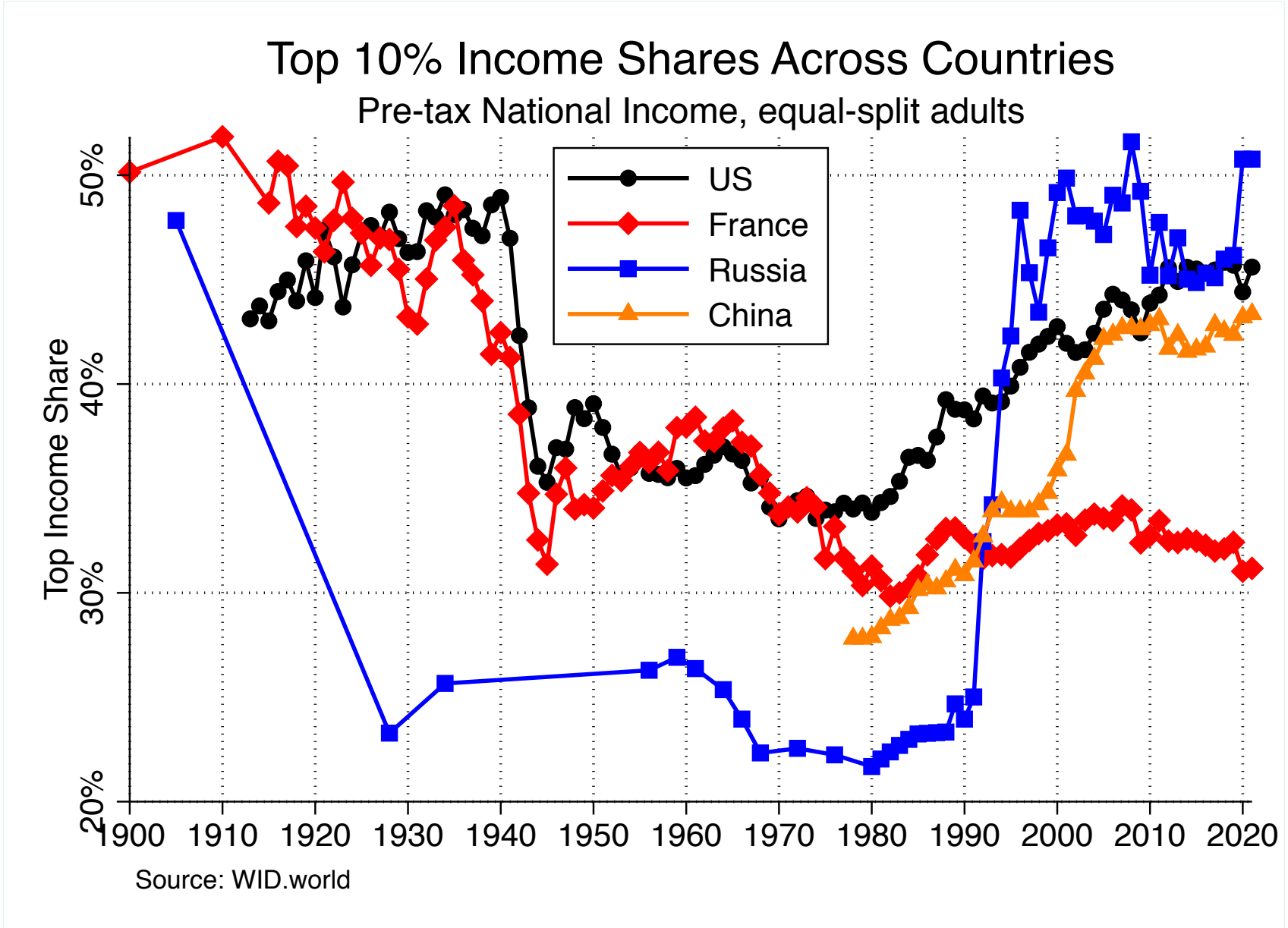
1940
1950
1960
1970
1980
1990
2000
2010
2020
Source: WID.world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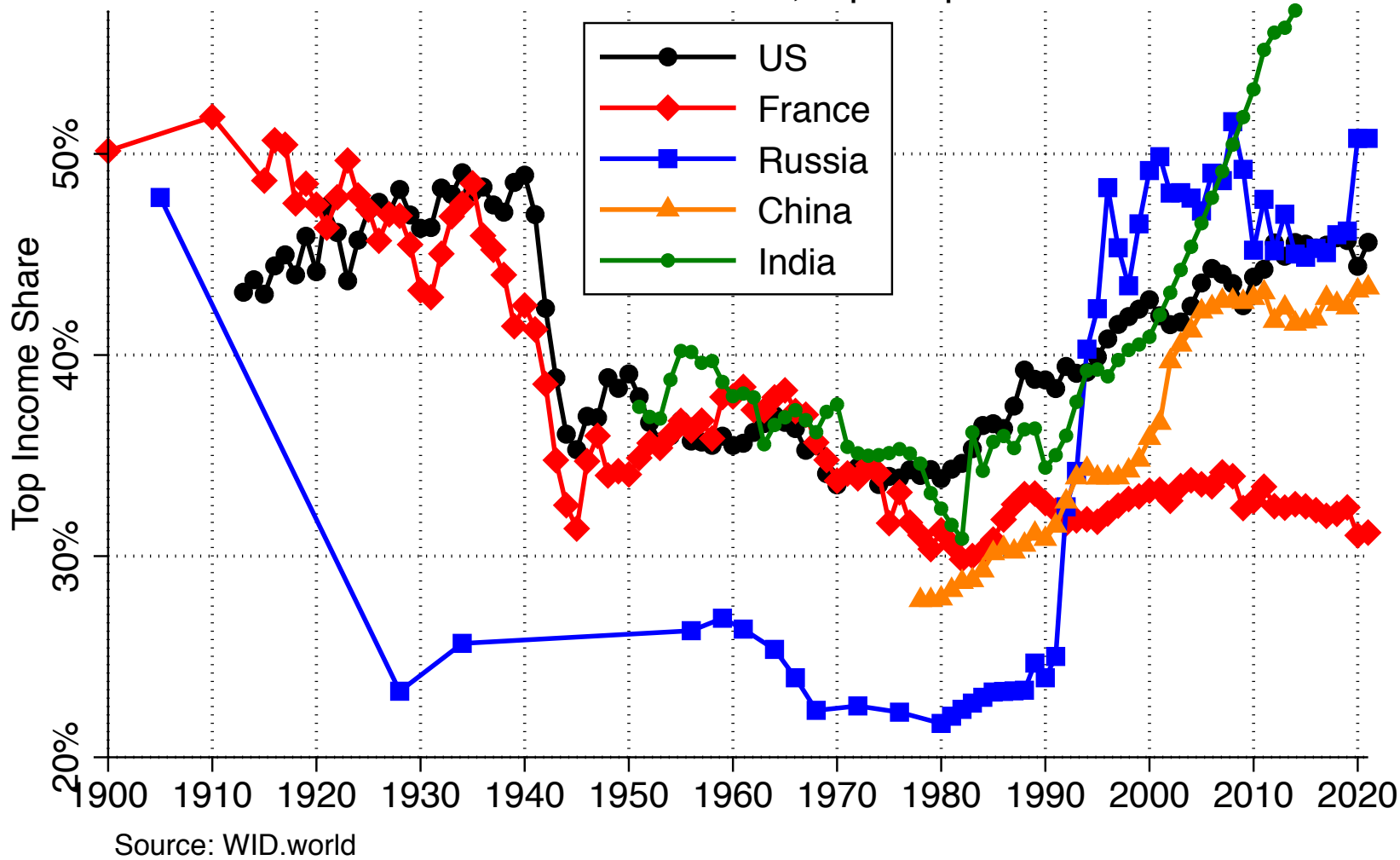
2010
2020
Source: WID.world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1920
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1940
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1980
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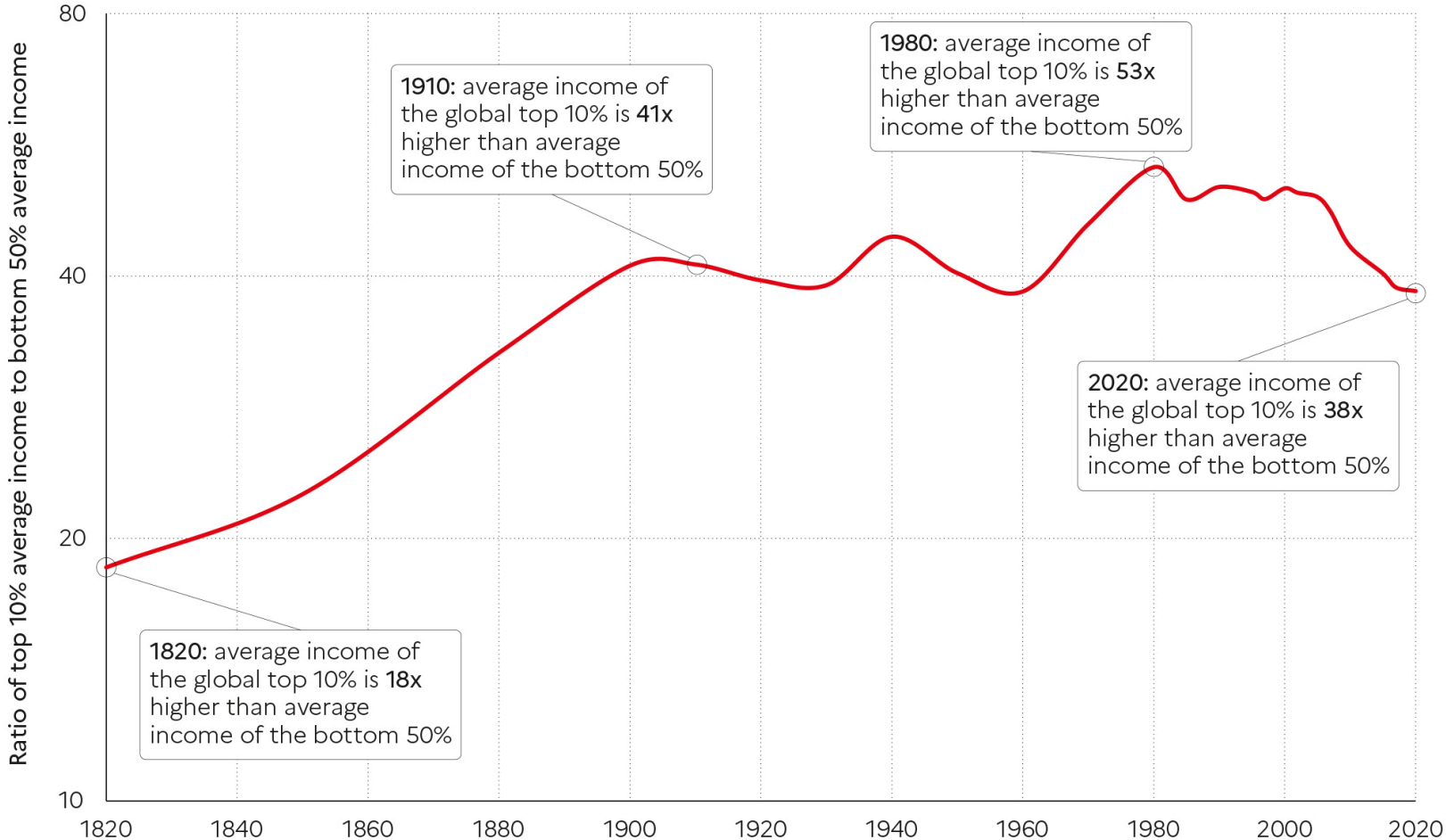
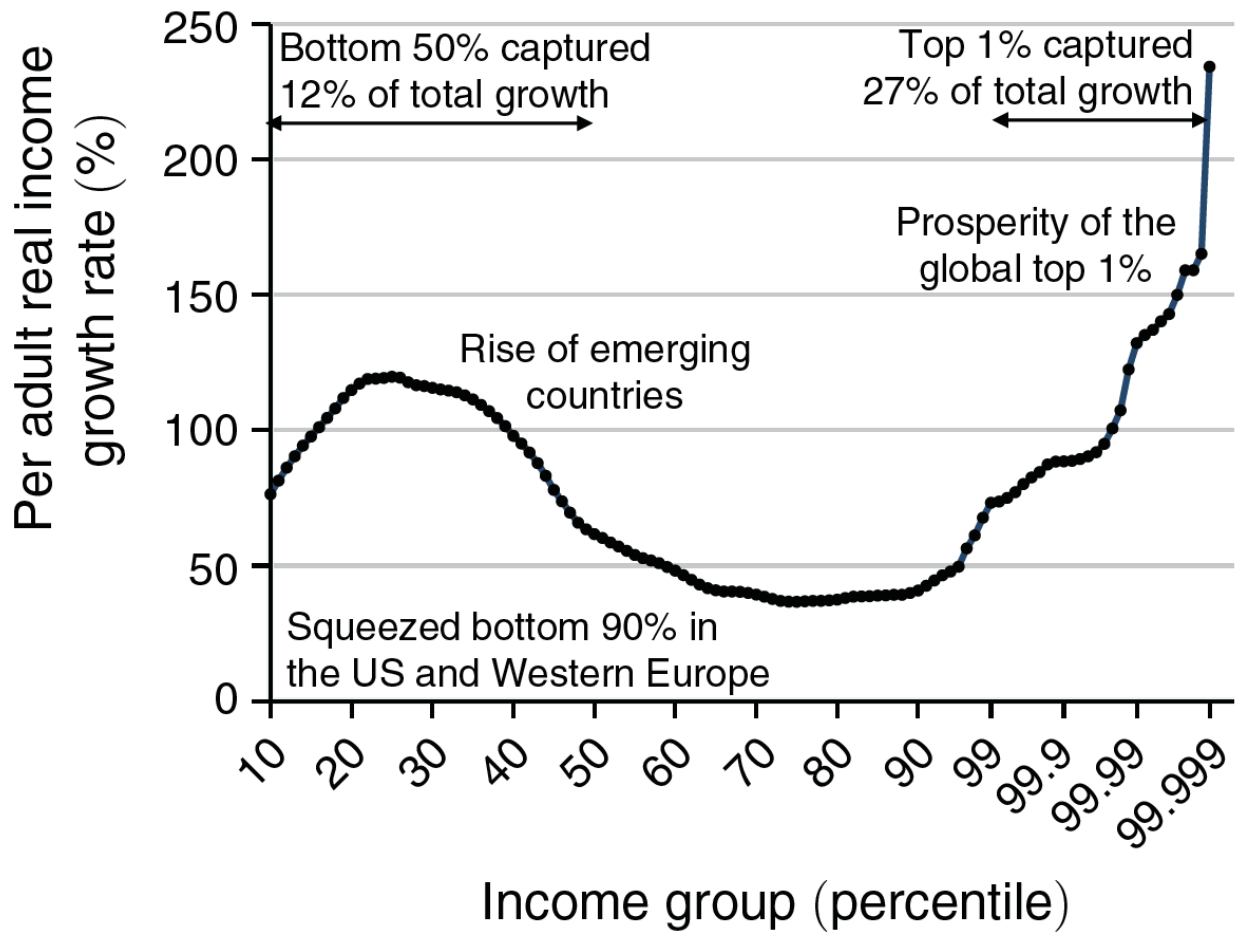
2000
2010
2020
Source: WID.world

Figure 5 ***Global income inequality: T10/B50 ratio, 1820-2020***



Interpretation: *Global inequality, as measured by the ratio T10/B50 between the average income of the top 10% and the average income of the bottom 50%, more than doubled between 1820 and 1910, from less than 20 to about 40, and stabilized around 40 between 1910 and 2020. It is too early to say whether the decline in global inequality observed since 2008 will continue. Income is measured per capita after pension and unemployement insurance transfers and before income and wealth taxes.* ***Sources and series:*** *wir2022.wid.world/lmethodology and Chancel and Piketty (2021).*

The "Elephant Curve"



Source: Alvaredo et al. (2018)

Poverty Rate Definitions

(1) Absolute: Fraction of population with disposable income (normalized by family size) below **poverty threshold** z^* fixed in real terms (*e.g., World Bank uses $ 1.90/day in 2011 dollars*).

(2) Relative: Fraction of population with disposable income (normalized by family size) below **poverty threshold** z^* fixed relative to median (European Union uses 60% of median).

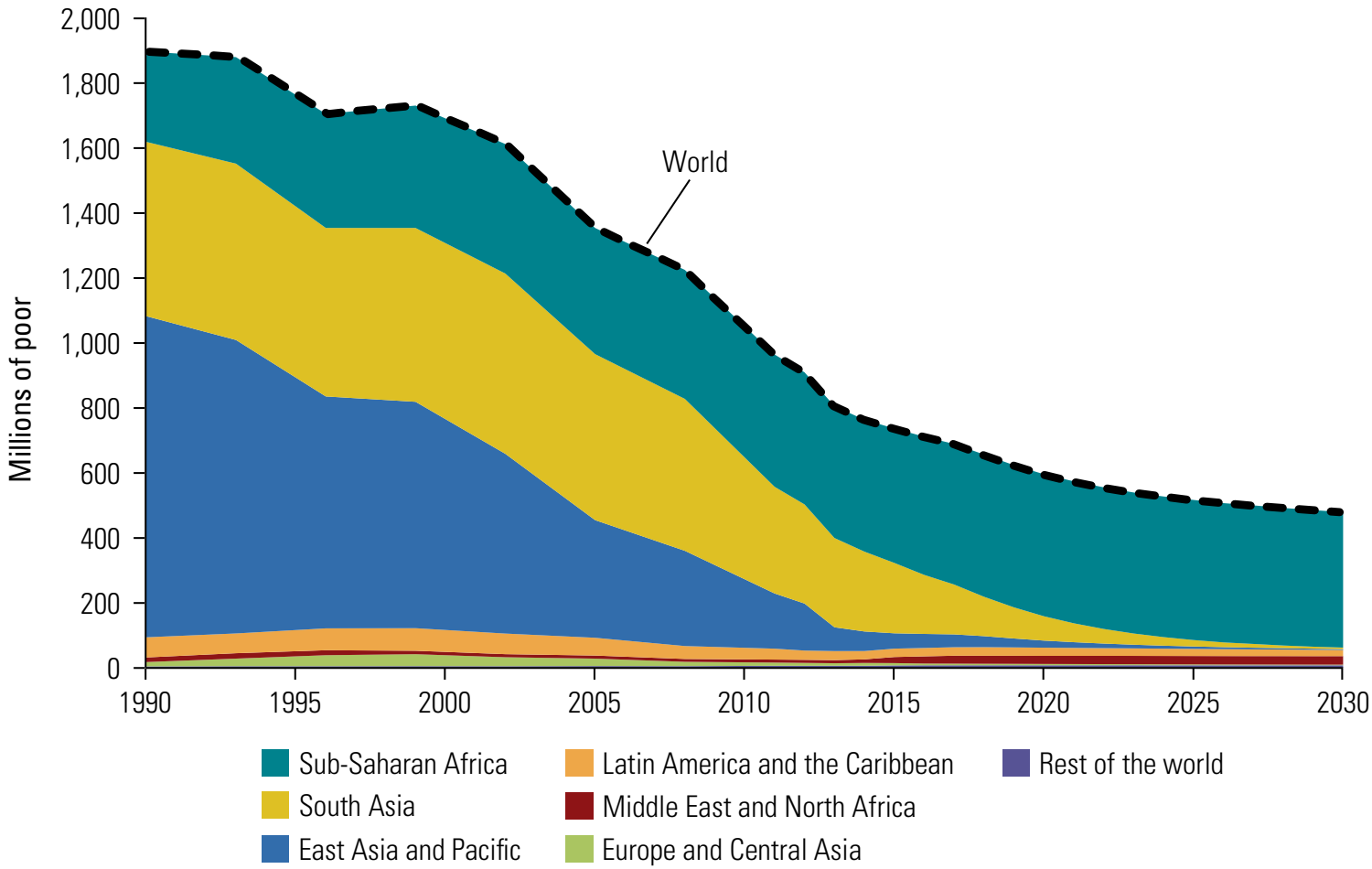
Absolute poverty falls in the long run with economic growth (*e.g., nobody in the US is World Bank poor*), but relative poverty does not.

Absolute poverty captures both growth and inequality effects, while relative poverty captures only inequality effects.

The fact that inequality has stayed in the debate despite huge growth since 1800 shows that relative income is a relevant concept.

Health measures (mortality, stunting) are the most relevant absolute measures of deprivation in the long-run.

FIGURE 1.3 Number of Extreme Poor by Region, 1990–2030



Source: PovcalNet (online analysis tool), http://iresearch.worldbank.org/PovcalNet/. World Bank, Washington, DC, World Development Indicators; World Economic Outlook; Global Economic Prospects; Economist Intelligence Unit.

Poverty Rate Disposable Income Definition

Most intuitive notion of poverty is based on disposable income c (not pre-tax income z)

$$c = z - T(z) + B(z) + E$$

where $T(z)$ is tax, $B(z)$ govt transfers, E net private transfers (*e.g., charity, family, friends*).

Disposable Income is measured in the Current Population Survey (CPS).

Family Scale

Ideally, poverty should be defined at the individual level based on individual consumption (*e.g., kids better off when mother or grandmother controls income instead of father, Duflo '03*).

However, many consumption goods are shared within the family (*e.g., housing, joint meals*), and it is challenging to measure consumption at the individual level.

Measured poverty is based on consumption or disposable income at the family level, and everybody within the family has the same poverty status.

The US Poverty Rate Definition

Based on **money income** = market income before taxes + government transfers + private transfers.

Poverty thresholds are adjusted annually using the official CPI (Consumer Price Index).

In 2022: $14K for a single adult, $18K for a family of 2, $23K for a family of 3, $28K for a family of 4.

The US (absolute!) poverty rate has hardly fallen since 1970 in spite of substantial economic growth in 50+ years.

Conceptual weaknesses:

(1) Income and employee payroll taxes are NOT deducted.

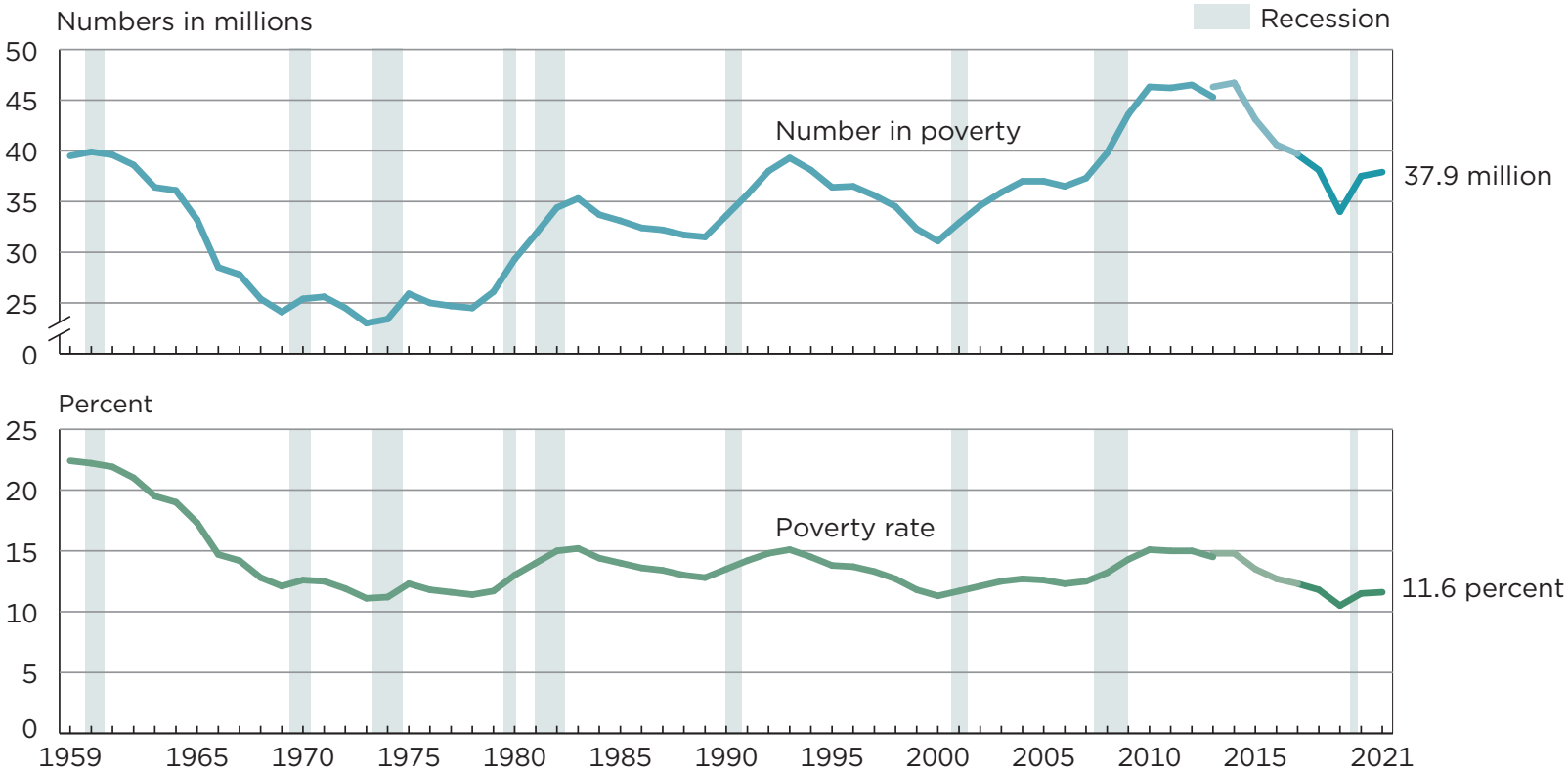
(2) Income tax credits (EITC, Child Tax Credit) are NOT added.

(3) In-kind transfers (Medicaid, food stamps, public housing) do NOT count.

The definition is changing: see here.

Figure 1.

Number in Poverty and Poverty Rate Using the Official Poverty Measure: 1959 to 2021



Note: Population as of March of the following year. The data for 2017 and beyond reflect the implementation of an updated processing system. The data for 2013 and beyond reflect the implementation of the redesigned income questions. Refer to Table A-4 for historical footnotes. The data points are placed at the midpoints of the respective years. Information on recessions is available in Appendix D. Information on confidentiality protection, sampling error, nonsampling error, and definitions is available at <https://www2.census.gov/programs-surveys/cps/techdocs/cpsmar22.pdf>.
Source: U.S. Census Bureau, Current Population Survey, 1960 to 2022 Annual Social and Economic Supplements (CPS ASEC).

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Source: U.S. Census Bureau, Current Population Survey, 1960 to 2021 Annual Social and Economic Supplements.

Measuring Intergenerational Income Mobility

There is a strong consensus that children's success should not depend too much on parental income (it is external circumstance rather than the outcome of a personal decision).

Studies linking adult children to their parents can measure the link between children and parents' income.

Simple measure: average income rank of children by income rank of parents (Chetty et al. '14).

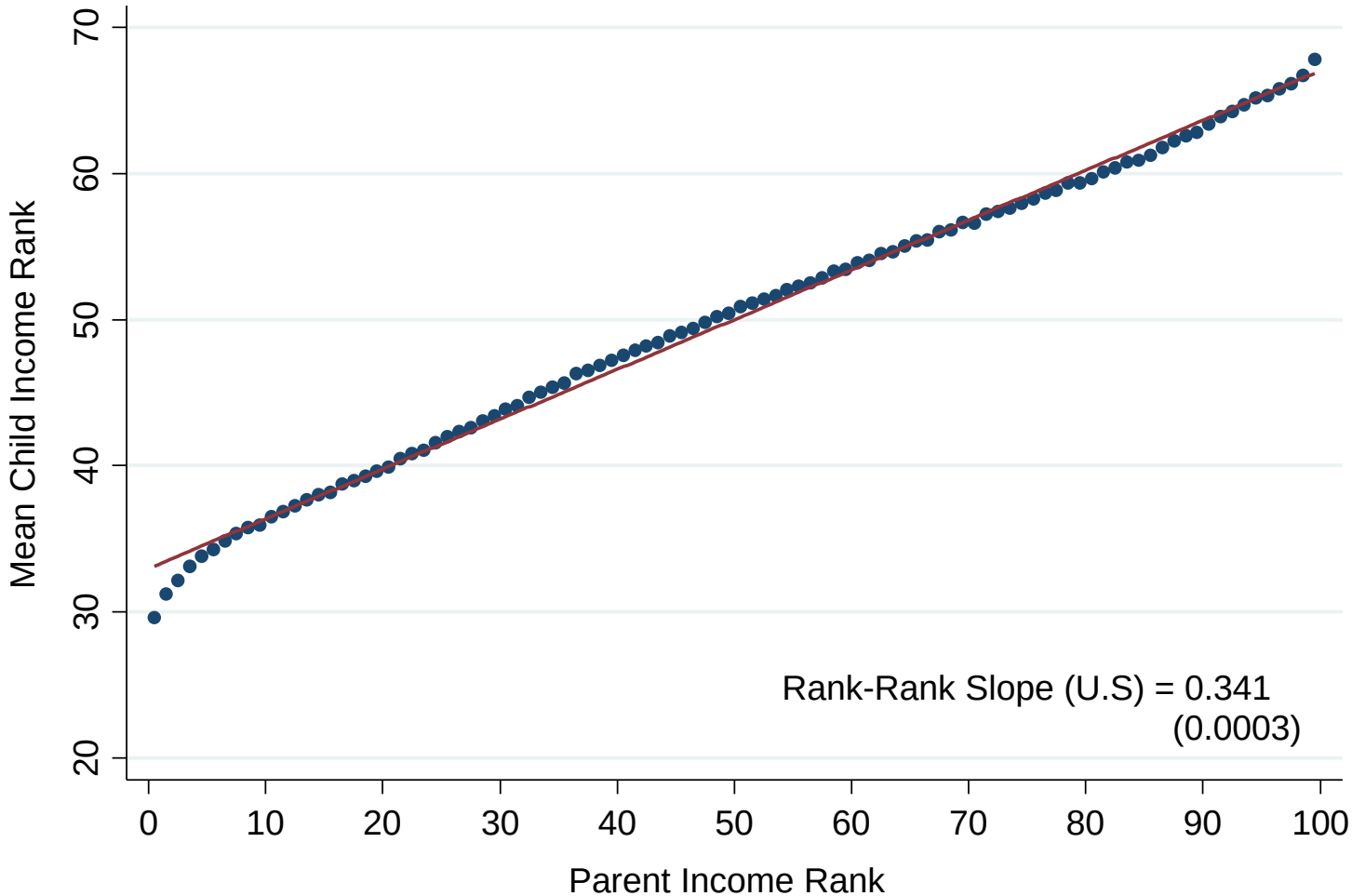
(1) The US has less mobility than European countries (especially Scandinavian countries such as Denmark).

(2) Substantial heterogeneity in mobility across cities in the US.

(3) Characteristics of places with high mobility: low segregation, low-income inequality, good K-12 schools, high social capital, and high family stability.

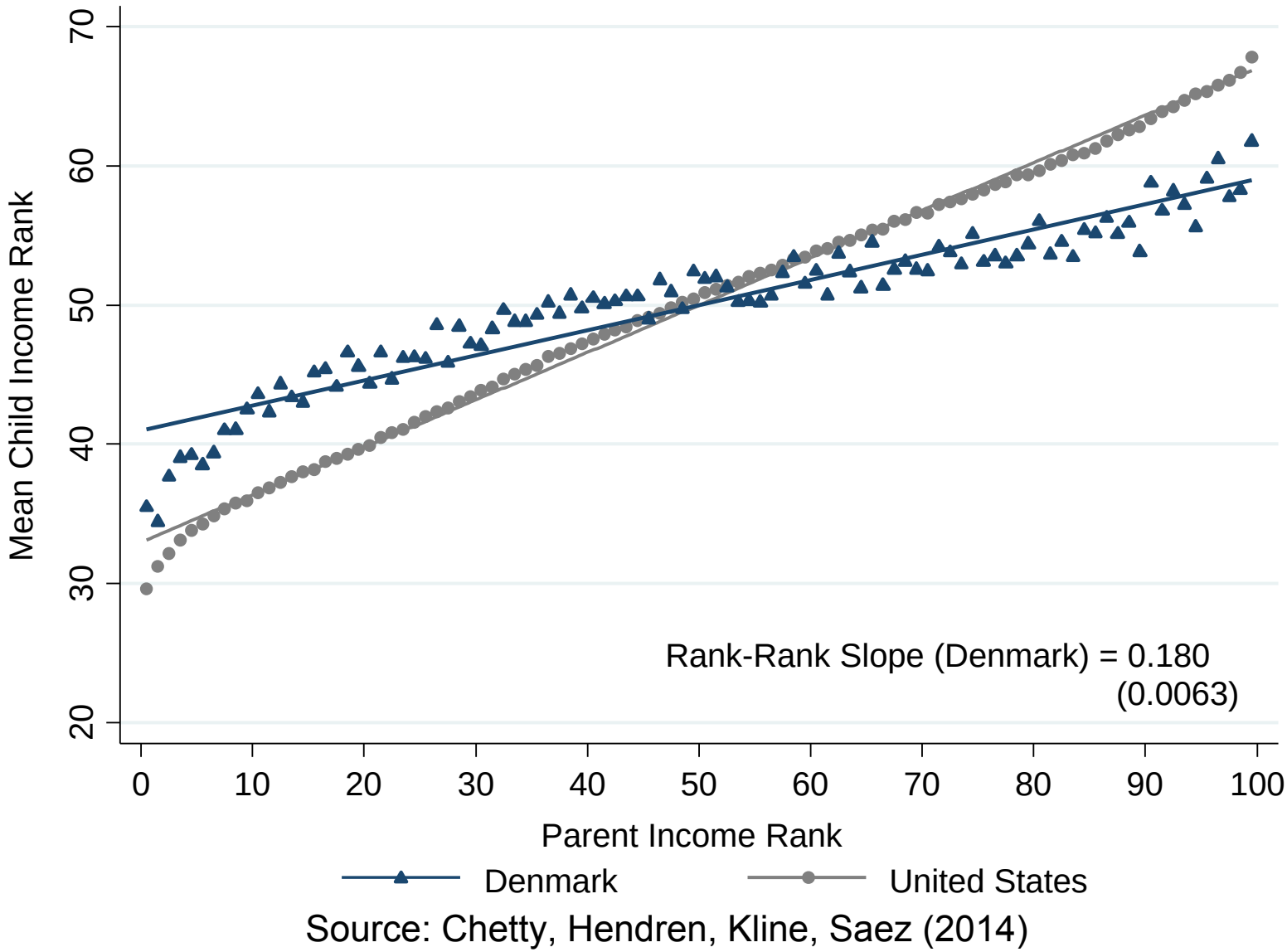
(4) Substantial racial disparity in mobility (Chetty et al. 2020).

A. Mean Child Income Rank vs. Parent Income Rank in the U.S.



Source: Chetty, Hendren, Kline, Saez (2014)

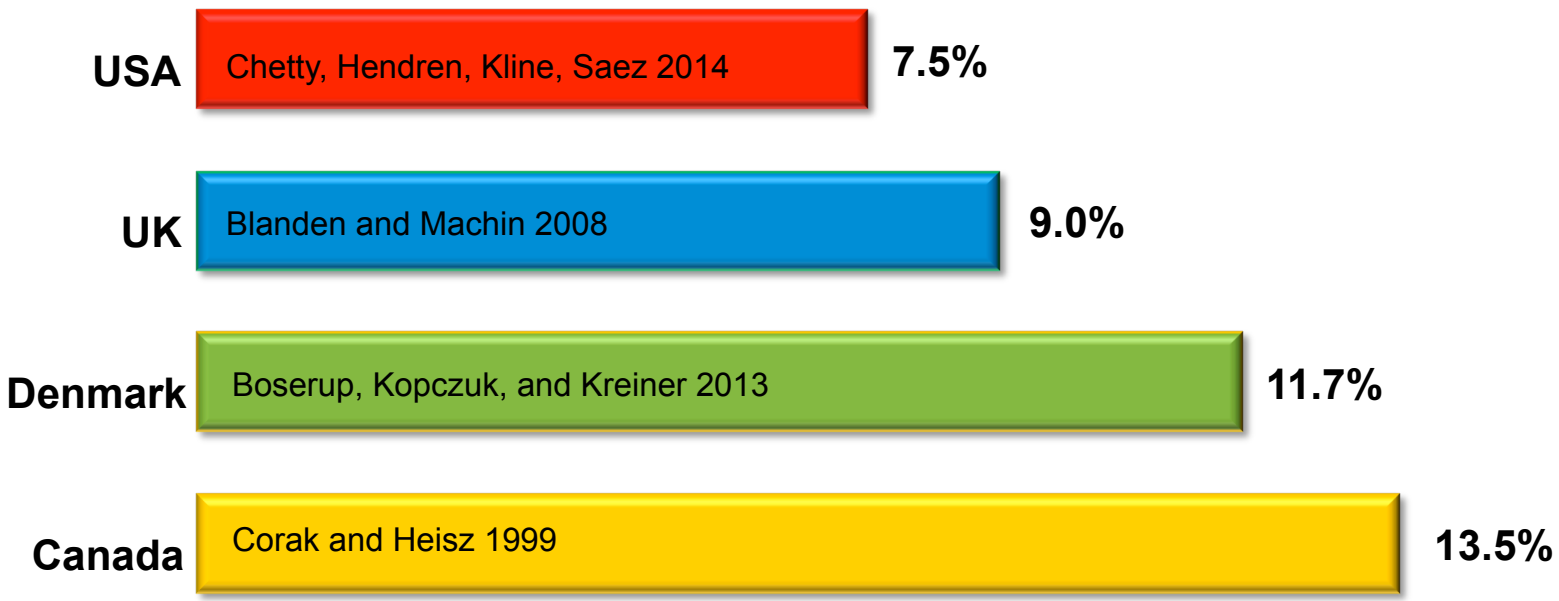
B. United States vs. Denmark



Source: Chetty, Hendren, Kline, Saez (2014)

The American Dream?

- Probability that a child born to parents in the bottom fifth of the income distribution reaches the top fifth:

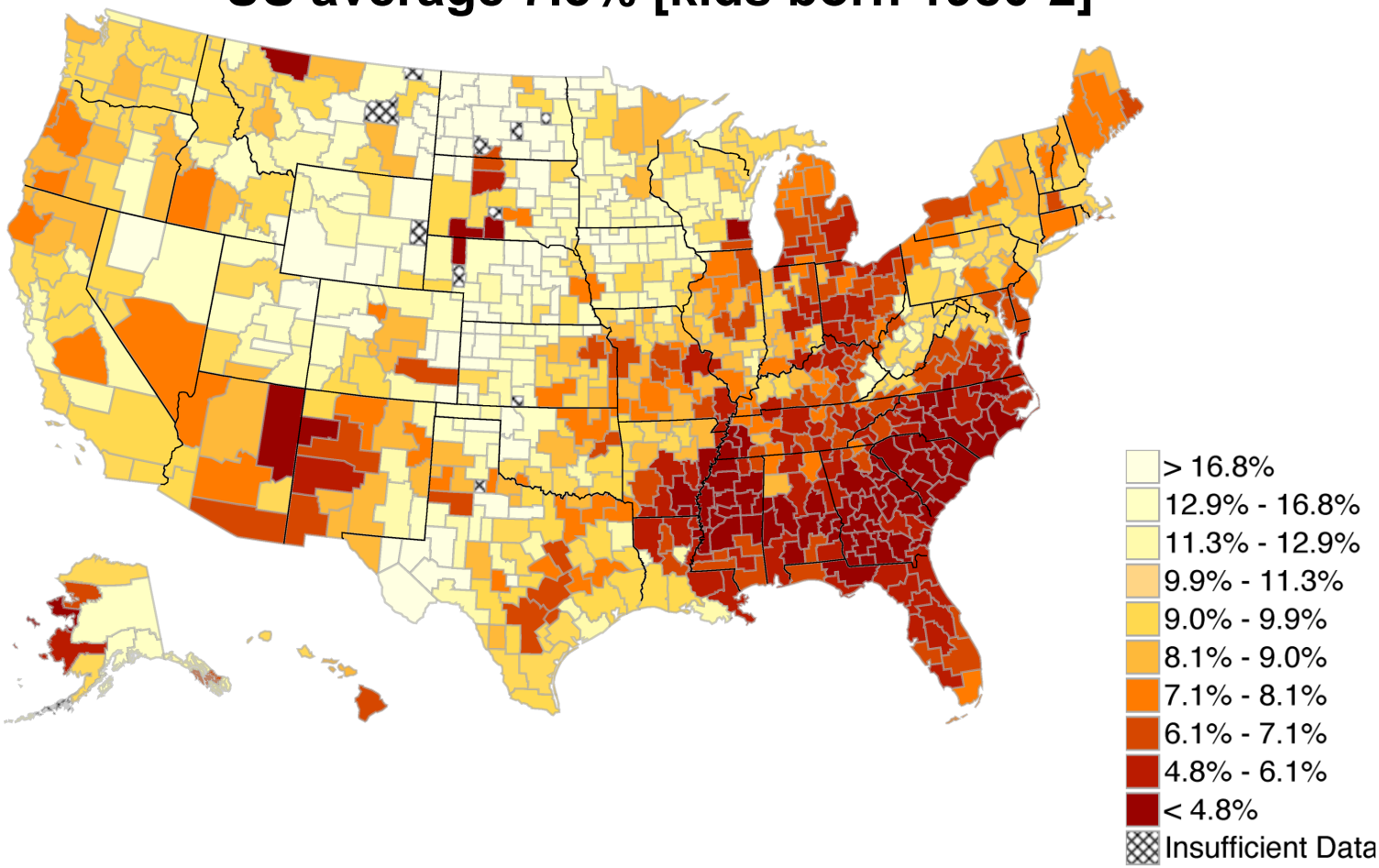


→ Chances of achieving the "American Dream" are almost two times higher in Canada than in the U.S.

The Geography of Upward Mobility in the United States

Probability of Reaching the Top Fifth Starting from the Bottom Fifth

US average 7.5% [kids born 1980-2]



Note: Lighter Color = More Upward Mobility
Download Statistics for Your Area at www.equality-of-opportunity.org

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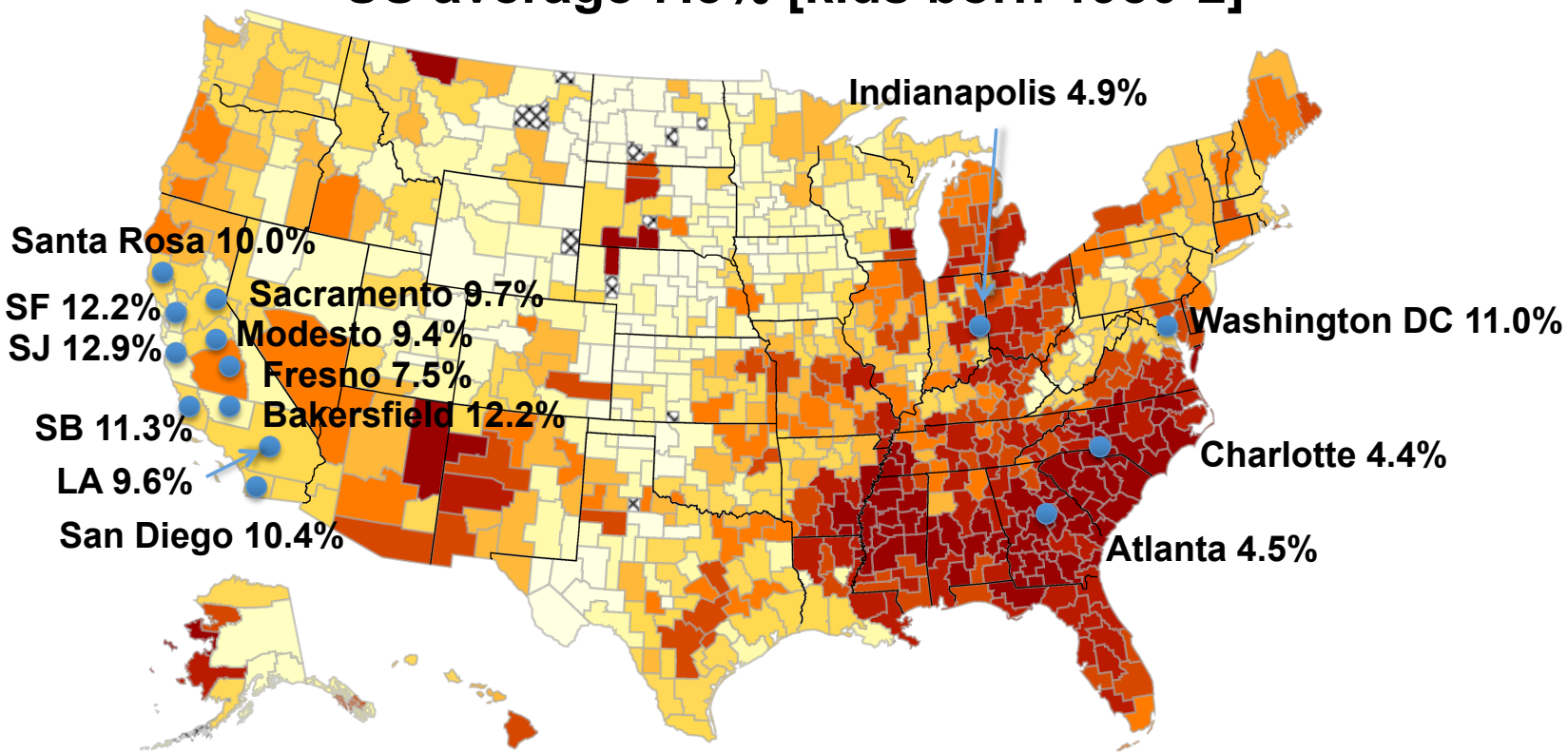

Note: Lighter Color = More Upward Mobility
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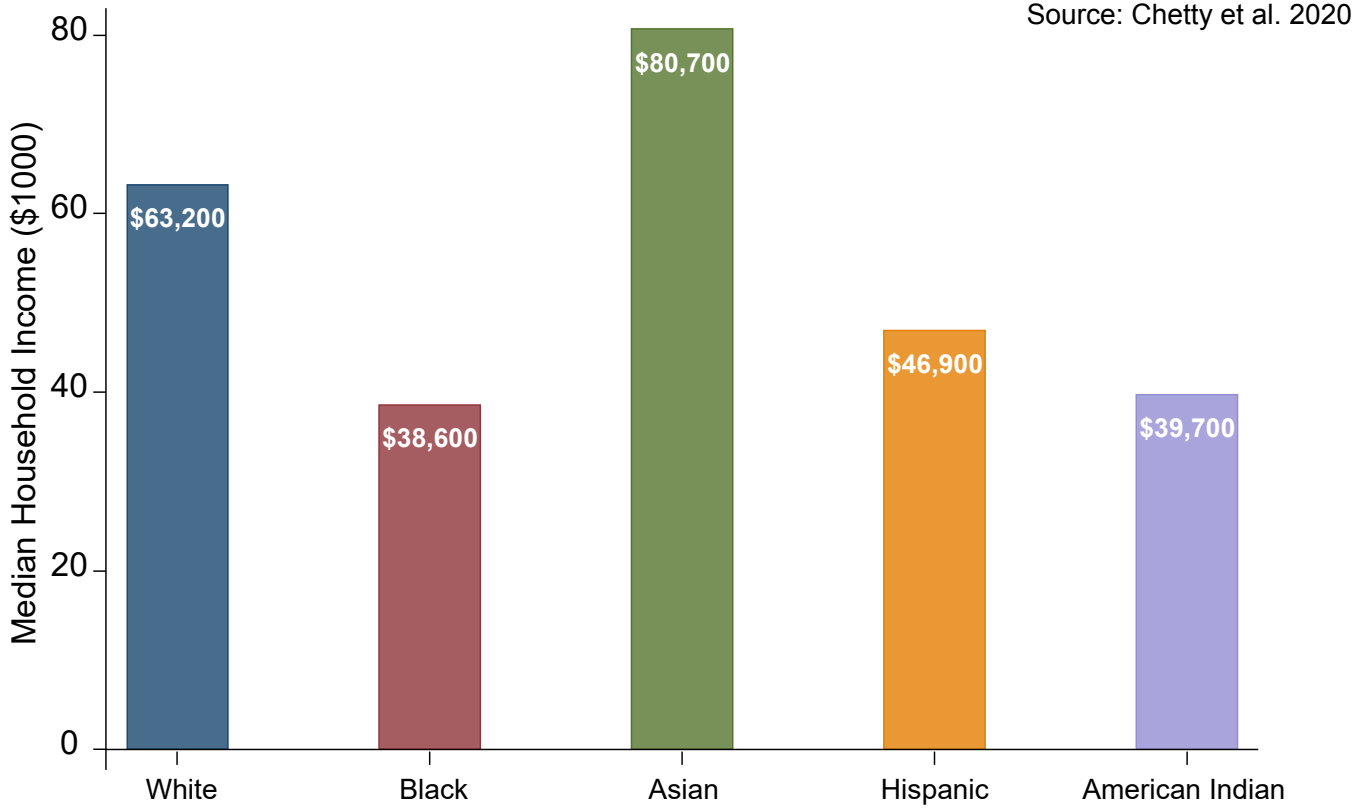
TABLE 1. Upward Mobility in the 50 Largest Metro Areas: The Top 10 and Bottom 10

Rank	Commuting Zone	Odds of Reaching Top Fifth from Bottom Fifth	Rank	Commuting Zone	Odds of Reaching Top Fifth from Bottom Fifth
1	San Jose, CA	12.9%	41	Cleveland, OH	5.1%
2	San Francisco, CA	12.2%	42	St. Louis, MO	5.1%
3	Washington, D.C.	11.0%	43	Raleigh, NC	5.0%
4	Seattle, WA	10.9%	44	Jacksonville, FL	4.9%
5	Salt Lake City, UT	10.8%	45	Columbus, OH	4.9%
6	New York, NY	10.5%	46	Indianapolis, IN	4.9%
7	Boston, MA	10.5%	47	Dayton, OH	4.9%
8	San Diego, CA	10.4%	48	Atlanta, GA	4.5%
9	Newark, NJ	10.2%	49	Milwaukee, WI	4.5%
10	Manchester, NH	10.0%	50	Charlotte, NC	4.4%

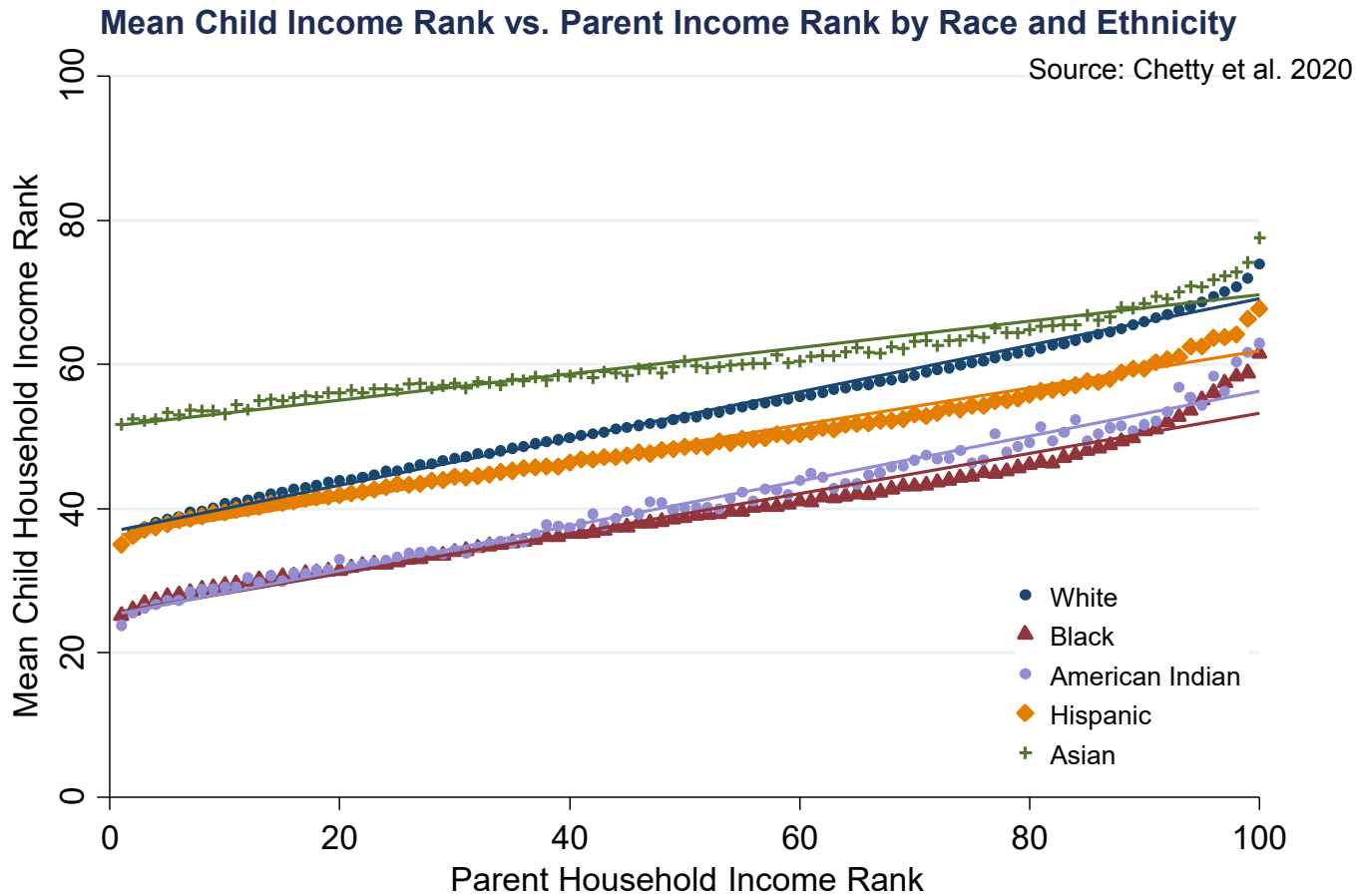
Note: This table reports selected statistics from a sample of the 50 largest commuting zones (CZs) according to their populations in the 2000 Census. The columns report the percentage of children whose family income is in the top quintile of the national distribution of child family income conditional on having parent family income in the bottom quintile of the parental national income distribution—these probabilities are taken from Online Data Table VI of Chetty et al., 2014a.

Source: Chetty et al., 2014a.

Median Household Income by Race and Ethnicity in 2016



Note: We focus here and in subsequent analyses on four non-Hispanic single-race groups (white, black, Asian, American Indian and Alaska Native) and Hispanics. Source: American Community Survey 2016.


Mean Child Income Rank vs. Parent Income Rank by Race and Ethnicity
Source: Chetty et al. 2020
Mean Child Household Income Rank
0
20
40
60
80
100
Parent Household Income Rank
0
20
40
60
80
100
White
Black
American Indian
Hispanic
Asian

Government Redistribution with Taxes and Transfers

The government taxes individuals based on income and consumption and provides transfers: z is pre-tax income, $y = z - T(z) + B(z)$ is post-tax income.

(1) If inequality in y is less than inequality in $z \Leftrightarrow$ The tax and transfer system is redistributive (or progressive).

(2) If inequality in y is more than inequality in $z \Leftrightarrow$ The tax and transfer system is regressive.

US Distributional National Accounts

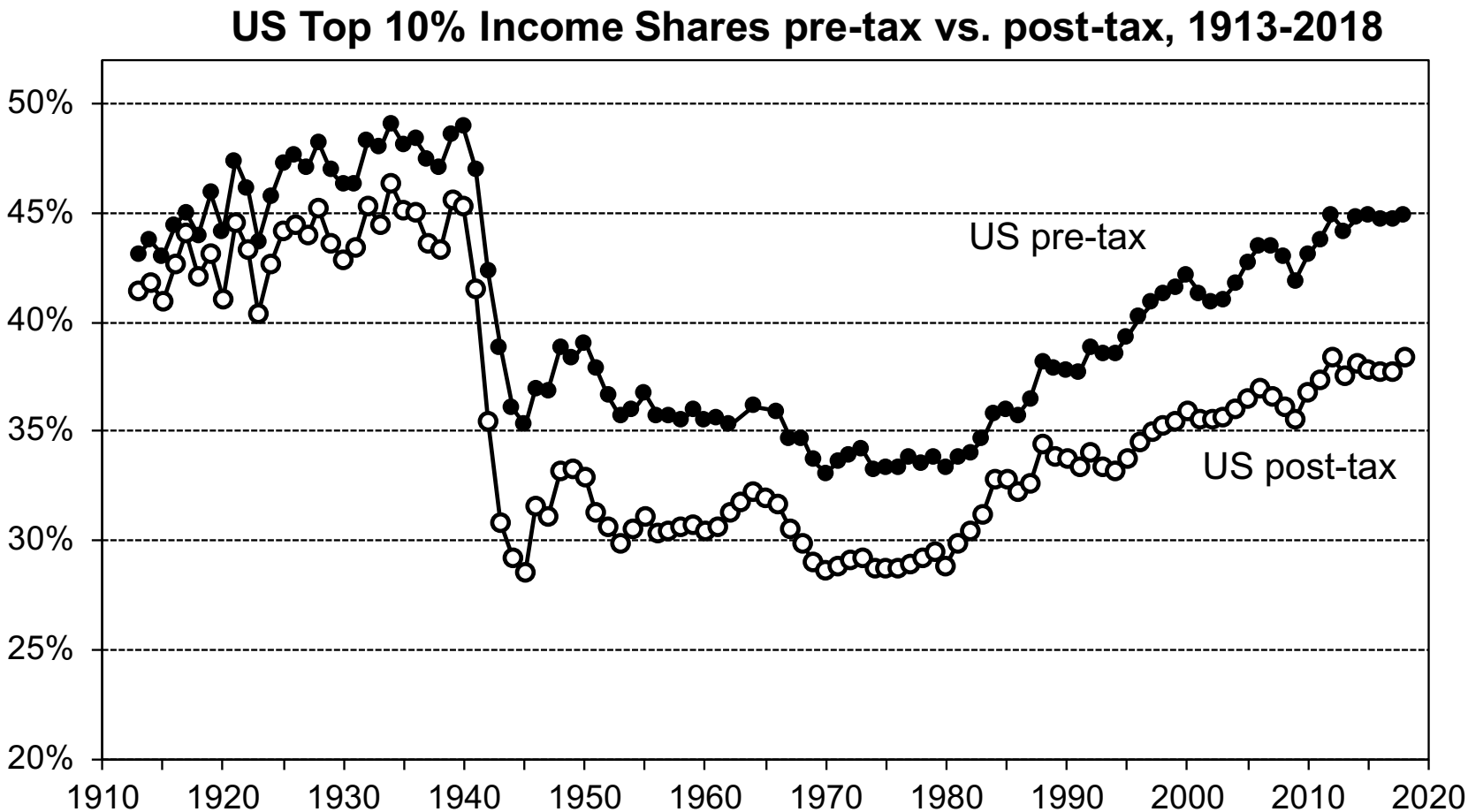
Piketty-Saez-Zucman (2018) distribute both pre-tax and post-tax US **national income** across adult individuals.

National income = GDP - depreciation of capital + net foreign income = broadest measure of income earned by residents.

Pre-tax income is income before taxes and transfers: z.

Post-tax income is income net of all taxes and adding all transfers and public good spending: $y = z - T(z) + G$.

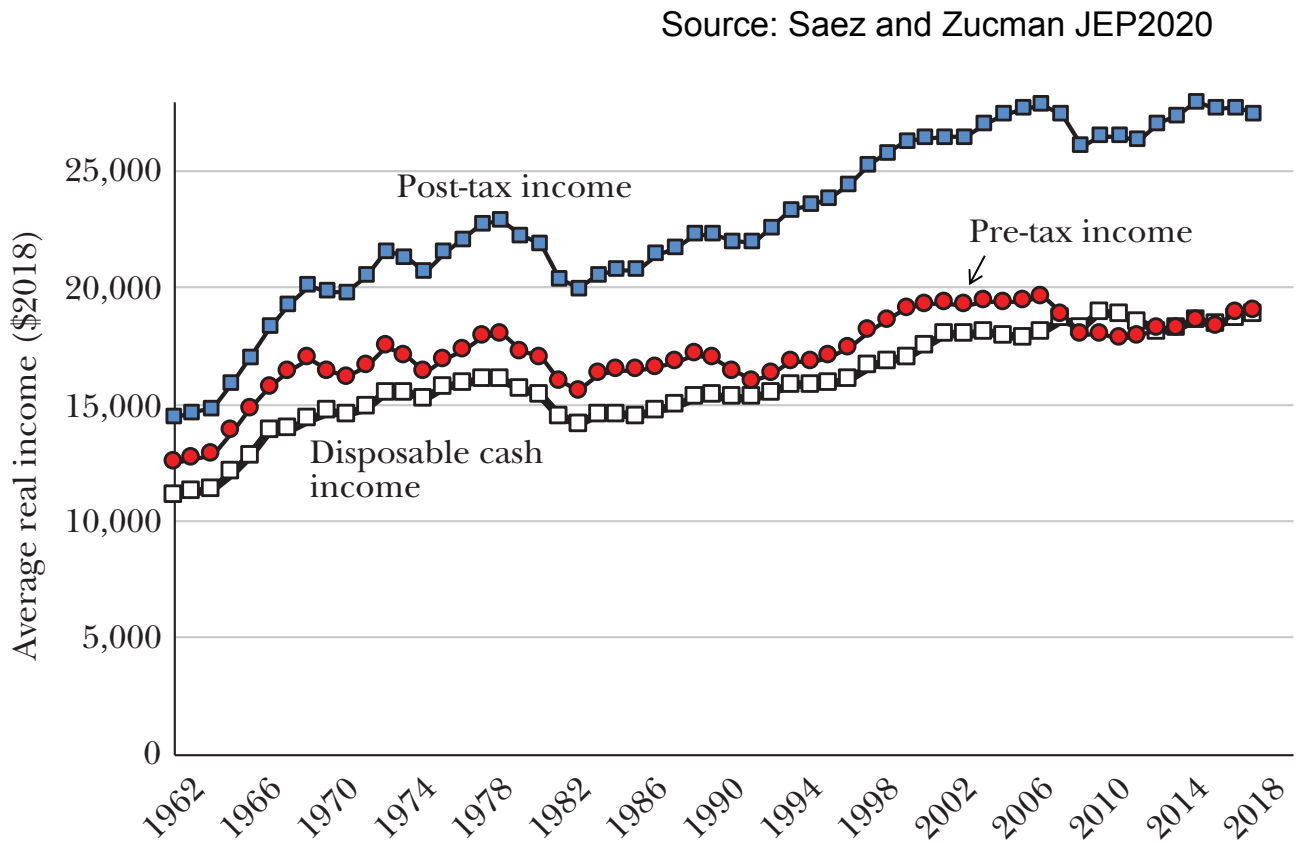
Both concepts add up to national income and provide a comprehensive view of the mechanical impact of government redistribution.



Top income shares of pretax and posttax national income among adults (income within married couples equally split). Source is Piketty, Saez, Zucman (2018) for US and Piketty et al. (2020) for France.

Figure 6

The Evolution of Bottom 50 Percent Incomes



Source: Piketty, Saez, and Zucman (2018), updated September 2020.

Note: The figure depicts the evolution of the real incomes per adult (in 2018 dollars) for the bottom half of the income distribution for three income concepts: (1) pre-tax income before deducting taxes or adding government transfers (concept sums up to national income), (2) post-tax income that deducts all taxes and adds all transfers (cash and in-kind) and collective public expenditures minus the government deficit (also sums up to national income), (3) disposable cash income which is pre-tax income minus all taxes plus cash (or quasi-cash) transfers, i.e., (3) does not include in-kind transfers (primarily Medicaid and Medicare) and collective public expenditures that are included in (2).

Inequality During COVID

Blanchet-Saez-Zucman '22 provides US inequality quarterly statistics (see here).

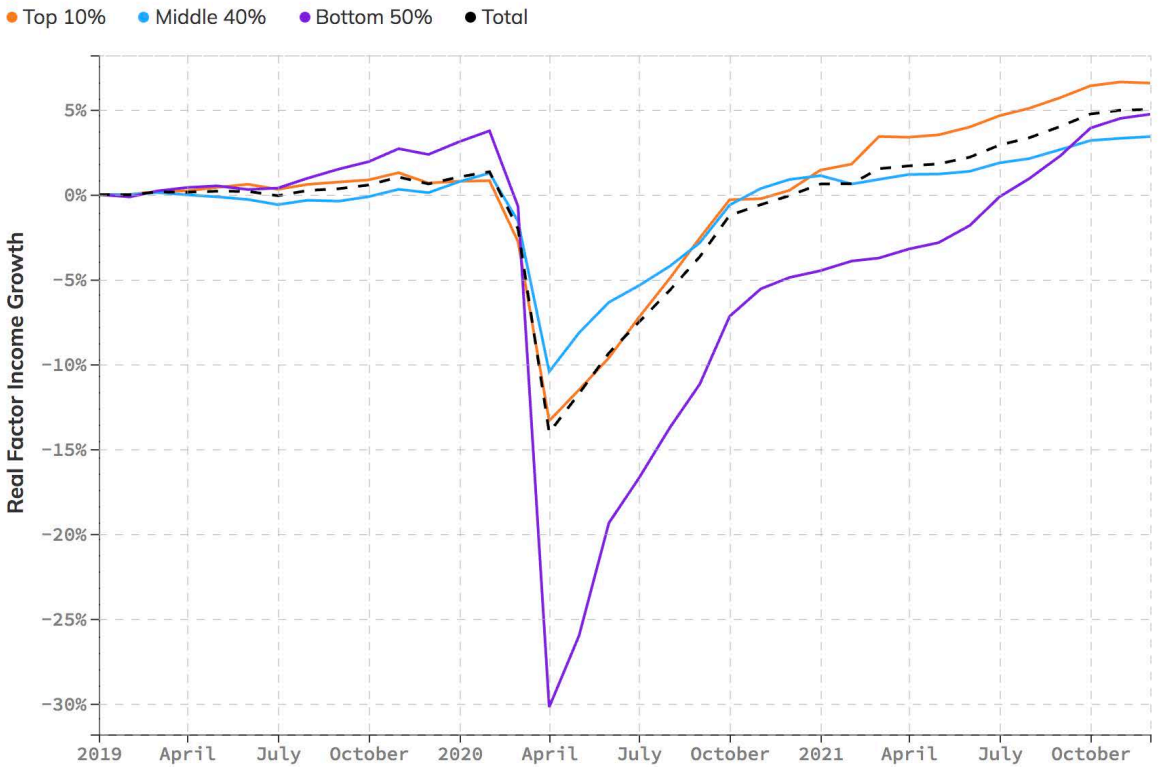
(1) COVID had a large negative impact on **factor income** (labor+capital income), especially among low earners (because of job losses), but all income groups recovered fast (in contrast to the Great Recession of 2008).

(2) **Disposable income** increased a lot during COVID, especially so for bottom 50% due to government transfers.

e.g., direct checks to families, extra unemployment benefits for job losers, paycheck protection program for businesses, expanded child tax credit

Factor Income During the Pandemic

Factor income (defined as labor income from work and capital income from ownership) fell a lot during COVID and the fall was much more dramatic for people in the Bottom 50%. But factor income recovered fast for all groups. All income figures adjust for price inflation.



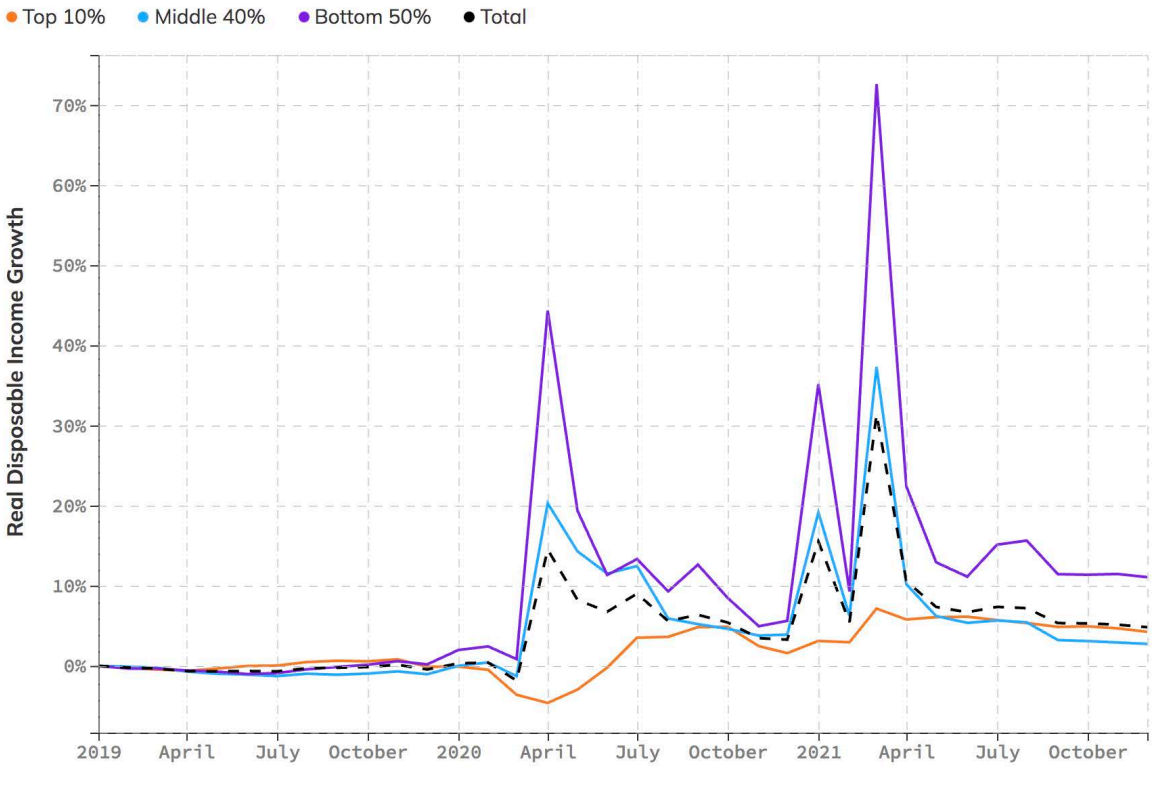
Factor income growth per unit

From 01/2019 to 12/2021

Group	Growth (%)	Gain ($)
☐ Top 0.01%	5.7%	$1.8M
☐ Top 0.1%	6.9%	$470k
☐ Top 1%	8.2%	$120k
☑ Top 10%	**6.6%**	$24k
☑ Middle 40%	**3.4%**	$2.9k
☑ Bottom 50%	**4.7%**	$870
☑ Total	**5%**	$4.0k

Disposable Income During the Pandemic

> Thanks to government transfers to help with covid losses (such as checks to families, extra unemployment benefits, the paycheck protection program, etc.), disposable income (defined as income after taxes and cash transfers) increased a lot, especially so for the Bottom 50%.

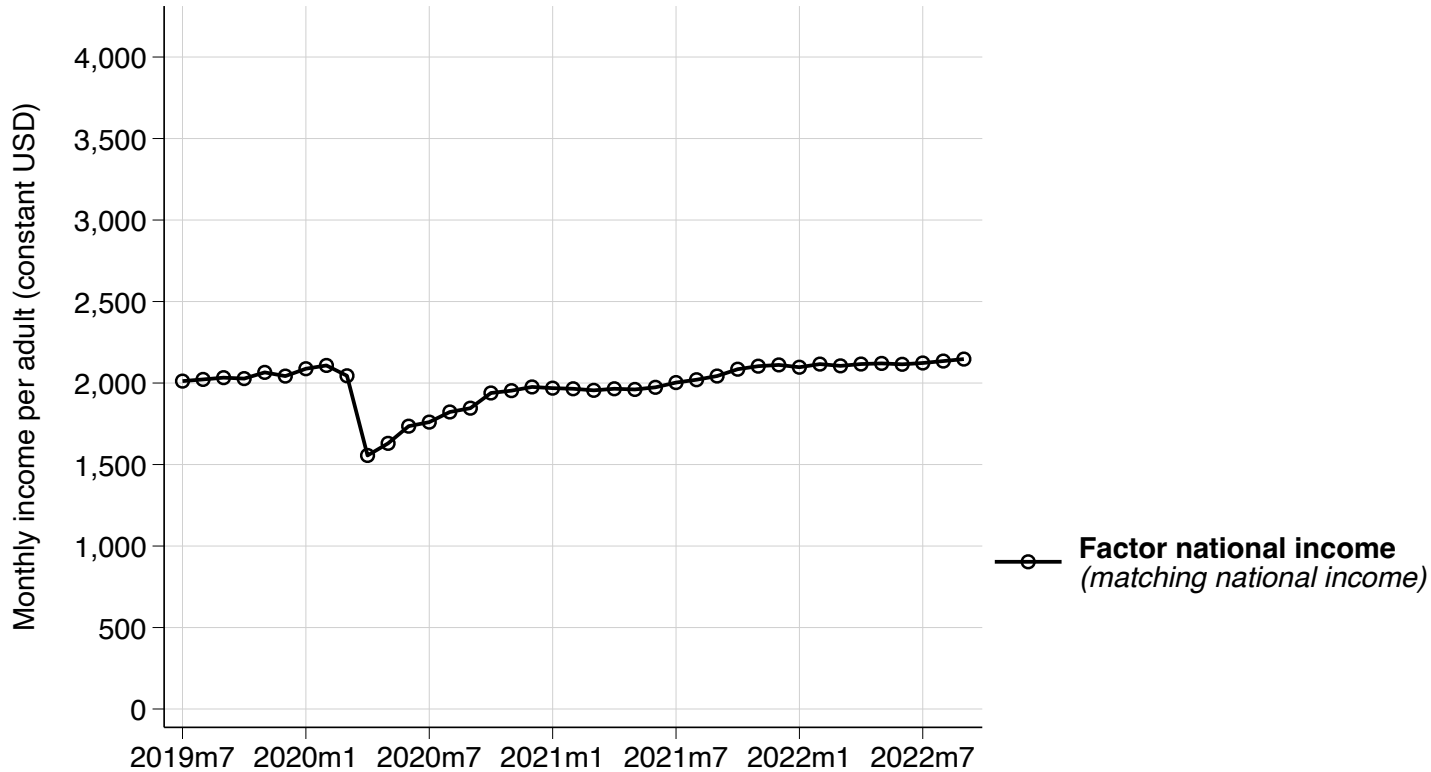


Disposable income growth per unit

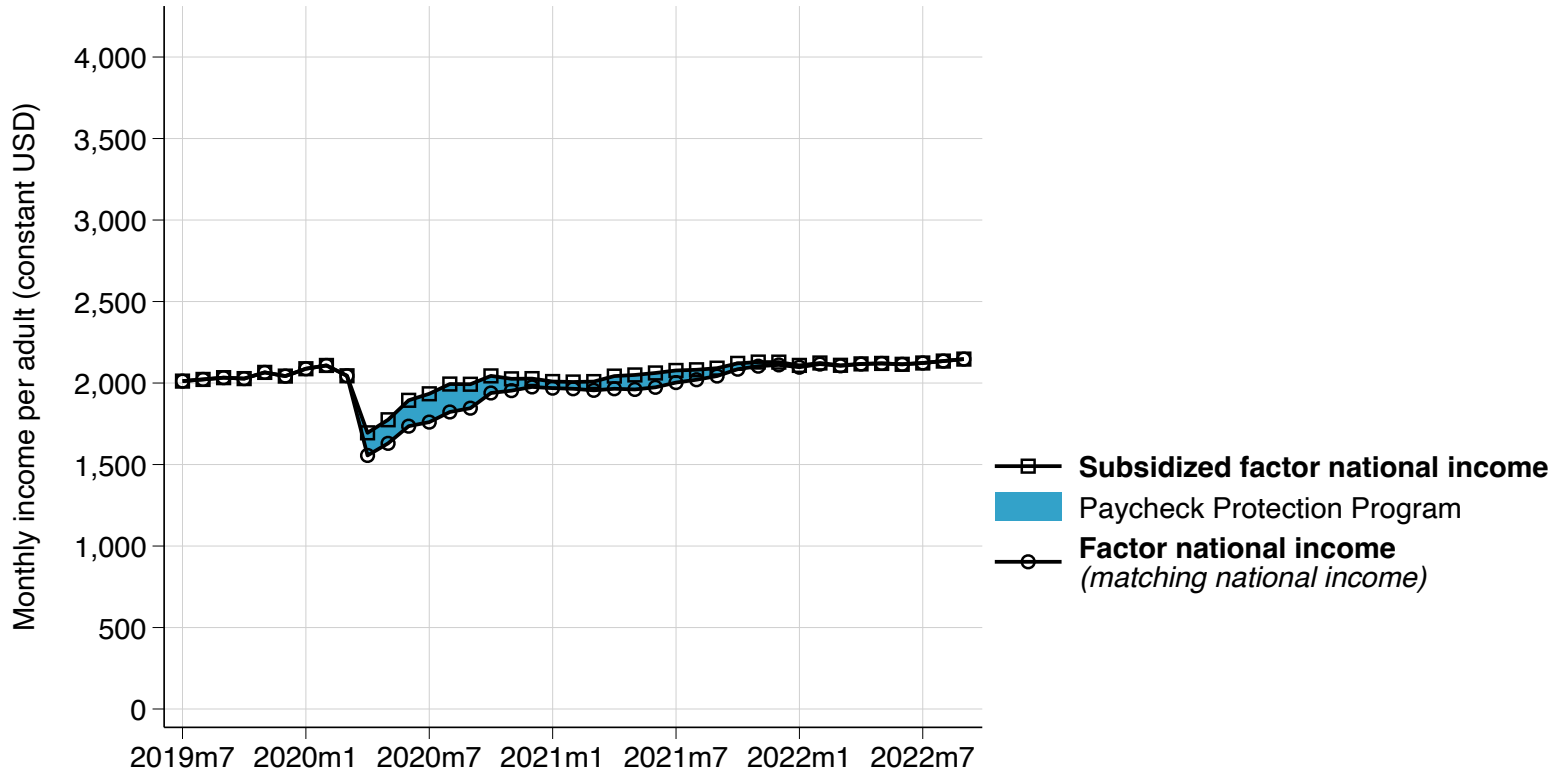
From 01/2019 to 12/2021

Group	Growth (%)	Gain ($)
☐ Top 0.01%	4.6%	$910k
☐ Top 0.1%	5.8%	$260k
☐ Top 1%	6.4%	$67k
☑ Top 10%	**4.2%**	$11k
☑ Middle 40%	**2.7%**	$1.9k
☑ Bottom 50%	**11.1%**	$2.6k
☑ Total	**4.8%**	$3.2k

Bottom 50% Incomes (aged 20-64): The Role of Government Transfers



Bottom 50% Incomes (aged 20-64): The Role of Government Transfers



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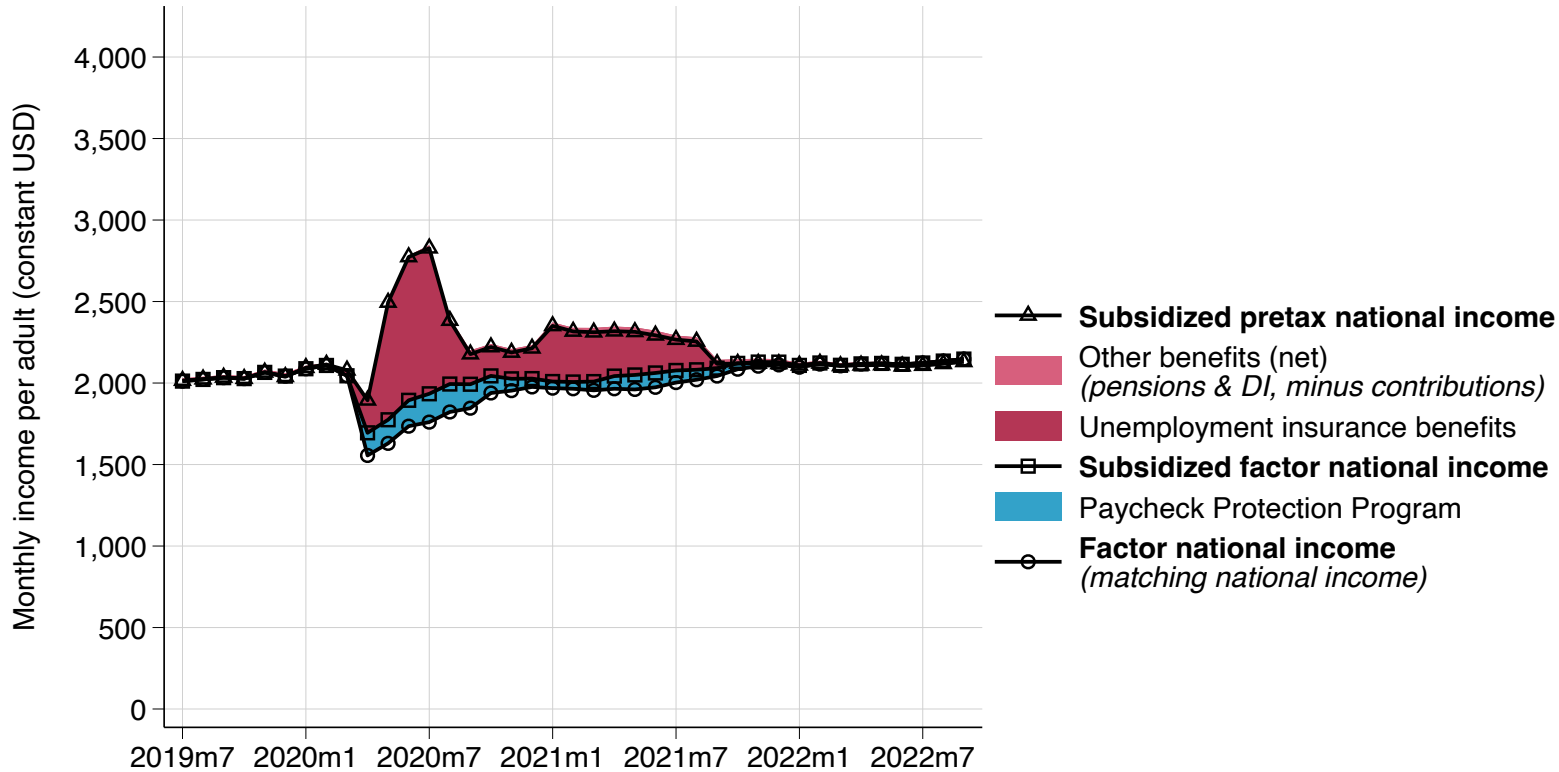
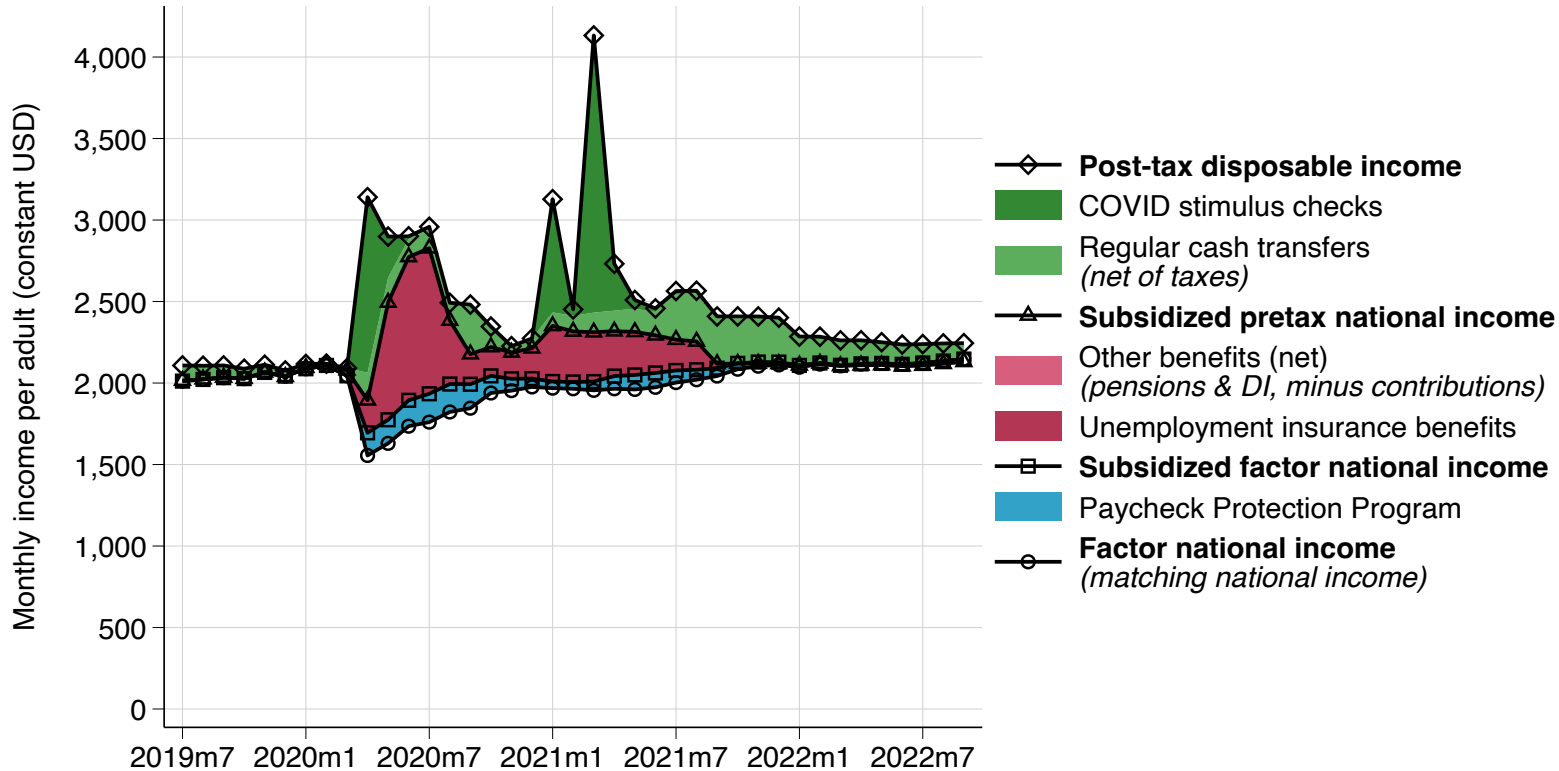


Bottom 50% Incomes (aged 20-64): The Role of Government Transfers



Federal US Tax System (2/3 of total taxes)

(1) Individual income tax (on both labor+capital income) is progressive (40% of fed tax revenue).

(2) Payroll taxes (on labor income) financing social security programs are regressive (40% of revenue).

(3) Corporate income tax (on capital income) is progressive (15% of revenue).

(4) Estate taxes (on capital income) are very progressive (1% of revenue).

(5) Minor excise taxes (on consumption) are very regressive (3% of revenue).

State+Local Tax System (1/3 of total taxes)

Decentralized governments can experiment, be tailored to local views, create tax competition, and make redistribution harder (recall the Tiebout model).

(1) Individual + Corporate income taxes are progressive (1/3 of state+local tax revenue).

(2) Sales taxes + Excise taxes (tax on consumption) are very regressive (1/3 of revenue).

(3) Real estate property taxes (tax on housing wealth) are slightly progressive (1/3 of revenue).

US tax/transfer System: Progressivity and Evolution

(0) The US tax and transfer system is progressive overall.

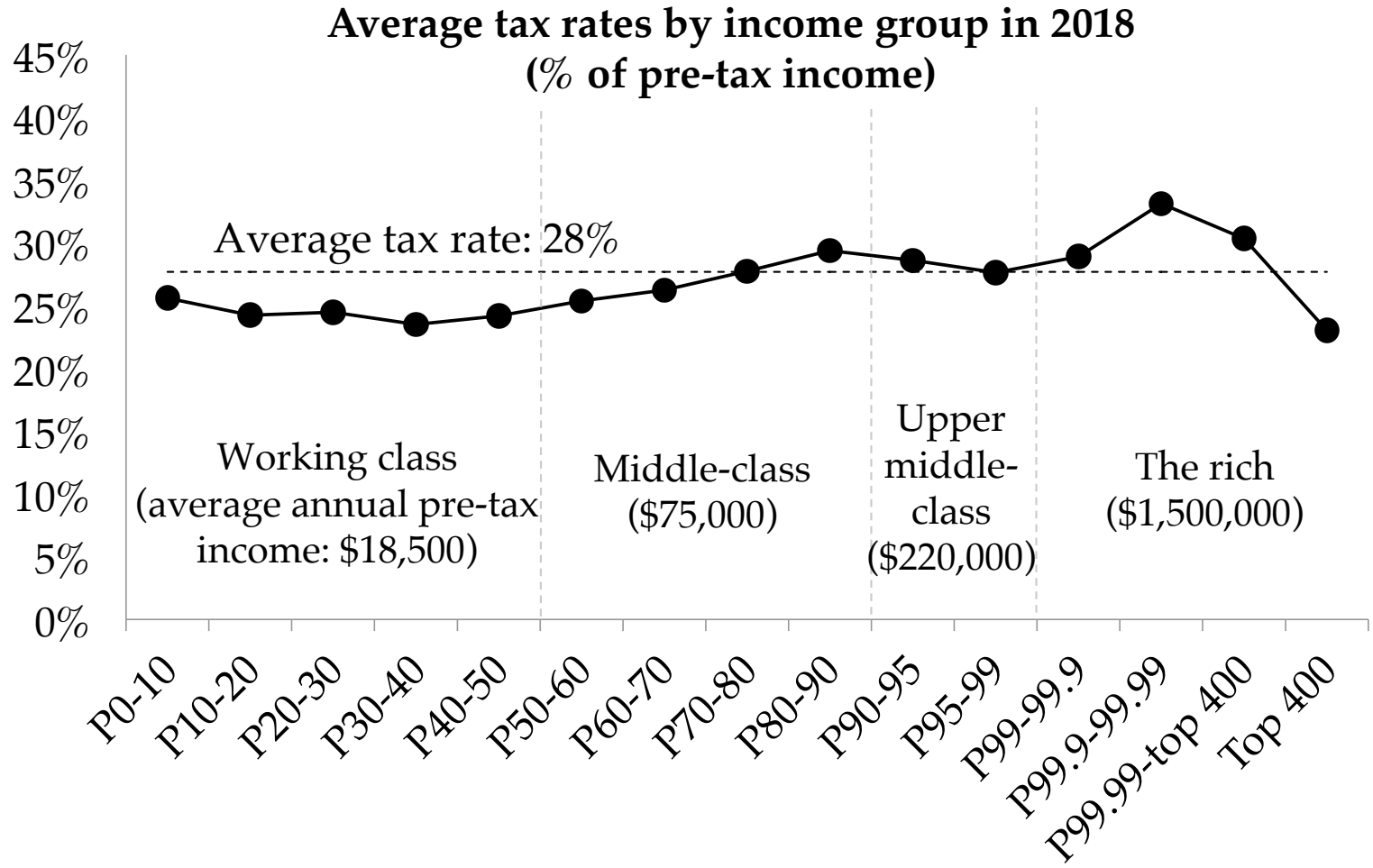
Pre-tax national income is less equally distributed than post-tax/post-transfer national income.

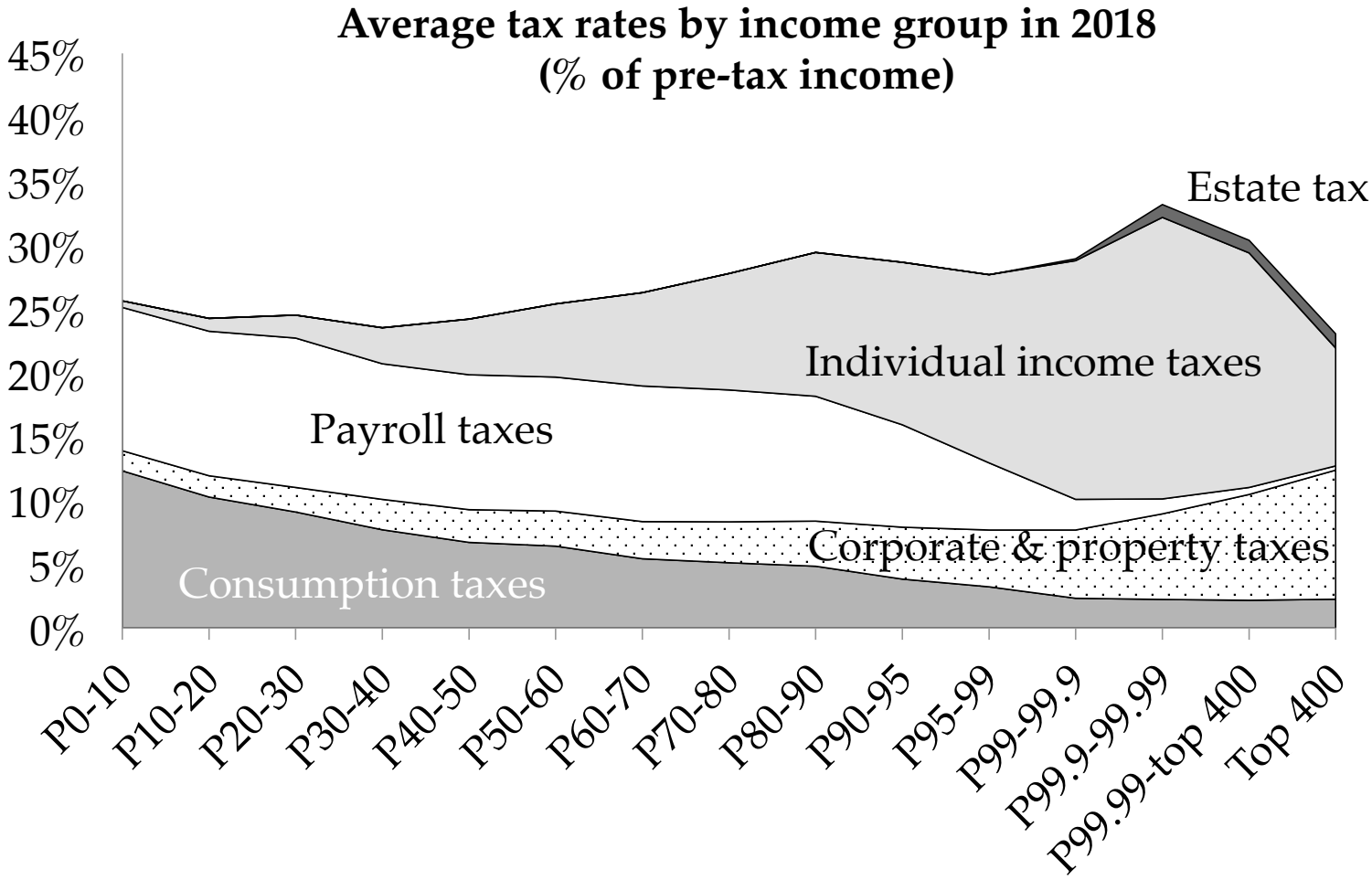
(1) Long Term Changes

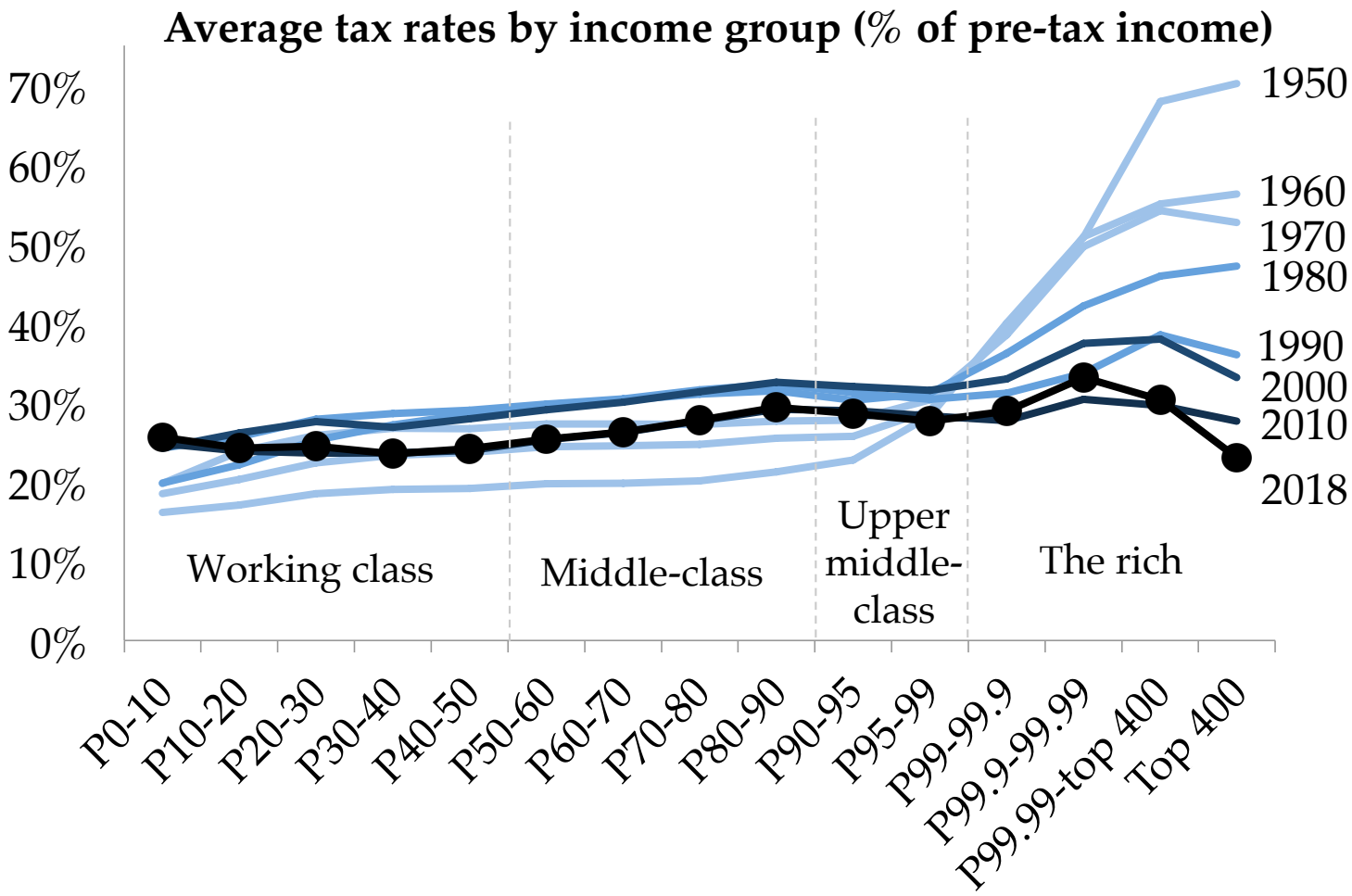
Before 1913, US taxes were primarily tariffs, excises, and real estate property taxes, minimal welfare state (i.e., small government).

(2) Medium Term Changes

The US tax progressivity has declined since 1950 (Saez and Zucman 2019), but government redistribution through transfers has increased (via Medicaid, Social Security retirement, DI, UI various income support programs).


Average tax rates by income group in 2018
(% of pre-tax income)
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
Average tax rate: 28%
Working class
(average annual pre-tax income: $18,500)
Middle-class
($75,000)
Upper middle-class
($220,000)
The rich
($1,500,000)
P0-10
P10-20
P20-30
P30-40
P40-50
P50-60
P60-70
P70-80
P80-90
P90-95
P95-99
P99-99.9
P99.9-99.99
P99.99-top 400
Top 400


Average tax rates by income group in 2018
(% of pre-tax income)
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
Estate tax
Individual income taxes
Payroll taxes
Corporate & property taxes
Consumption taxes
P0-10
P10-20
P20-30
P30-40
P40-50
P50-60
P60-70
P70-80
P80-90
P90-95
P95-99
P99-99.9
P99.9-99.99
P99.99-top 400
Top 400


Average tax rates by income group (% of pre-tax income)
70%
60%
50%
40%
30%
20%
10%
0%
1950
1960
1970
1980
1990
2000
2010
2018
Working class
Middle-class
Upper middle-class
The rich
P0-10
P10-20
P20-30
P30-40
P40-50
P50-60
P60-70
P70-80
P80-90
P90-95
P95-99
P99-99.9
P99.9-99.99
P99.99-top 400
Top 400

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