Introduction to Inequality, Poverty, Taxes and Transfers

(loosely follows Gruber Chapters 17-18)

131 Undergraduate Public Economics

Emmanuel Saez
UC Berkeley

Recall: Two General Rules for Government Intervention

1) Market Failures: Government intervention can help if there are market failures

2) Redistribution: Free market generates inequality. Public cares about economic disparity. Govt taxes and spending can reduce inequality

Role 2: Redistribution

Even with no market failures, free market outcome might generate substantial inequality

Inequality matters because humans are social beings: we produce together and then we split the pie

1) At workplaces (pre-tax income from labor and capital)

2) Through government (post-tax income net of taxes and adding government transfers)

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 (size of economic pie vs. distribution of the economic pie)

INCOME AND WEALTH

Two key economic concepts for inequality: **Income** and **Wealth**

Economic production happens with labor (supplied by workers) and capital (supplied by business owners)

Income is a flow = Labor income + Capital income

Capital income is the return on capital or wealth

Private wealth=value of privately owned and marketable assets

Private wealth includes real estate (land+buildings), corporate and business equity, deposits+bonds (loans to others), minus debts (mortgage debt, student debt, consumer credit)

Total wealth reflects both **capital stock accumulated through savings** and **pure price effects**

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

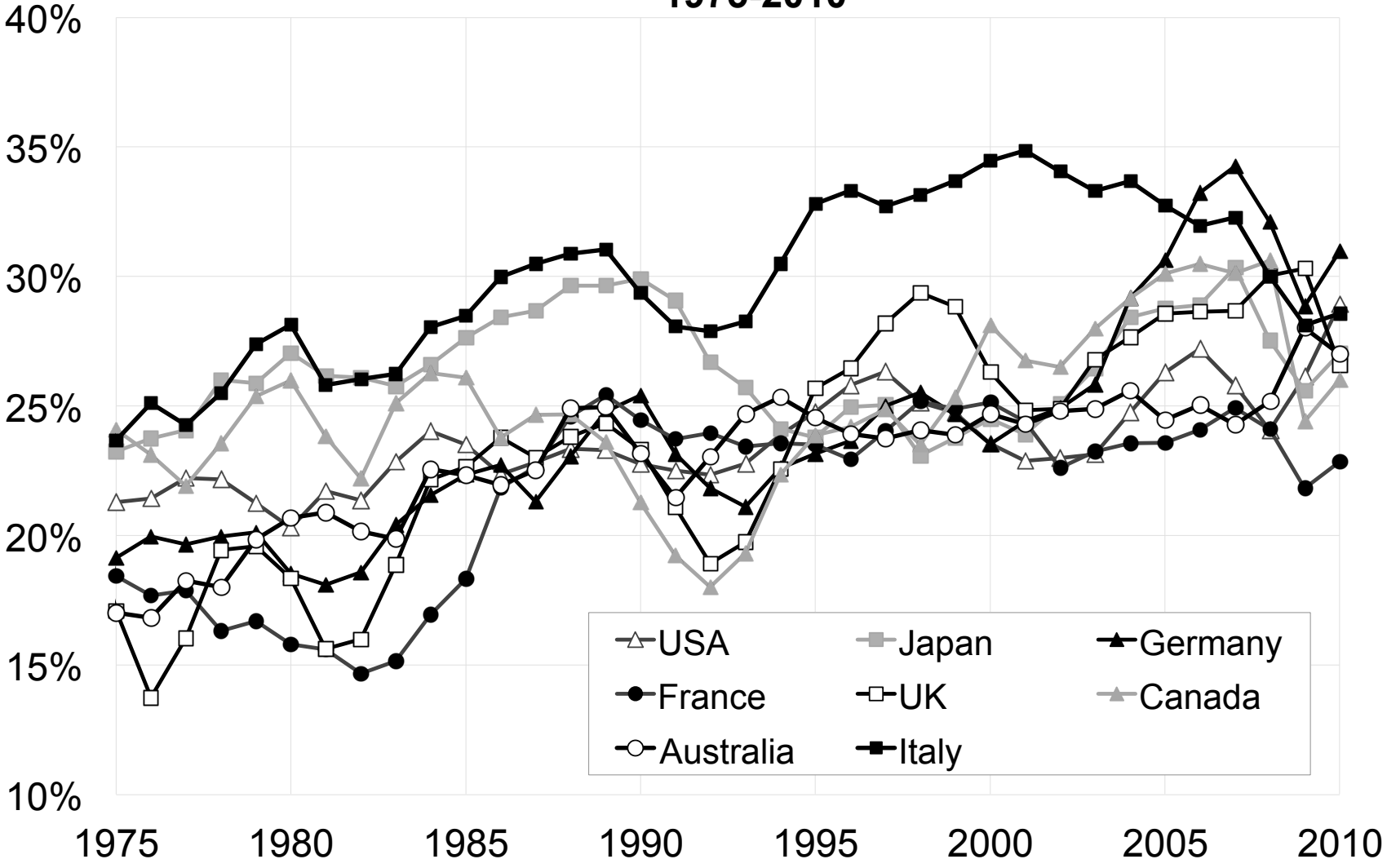
Capital income $rk \simeq 25\%$ of national income z (and increasing)

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

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

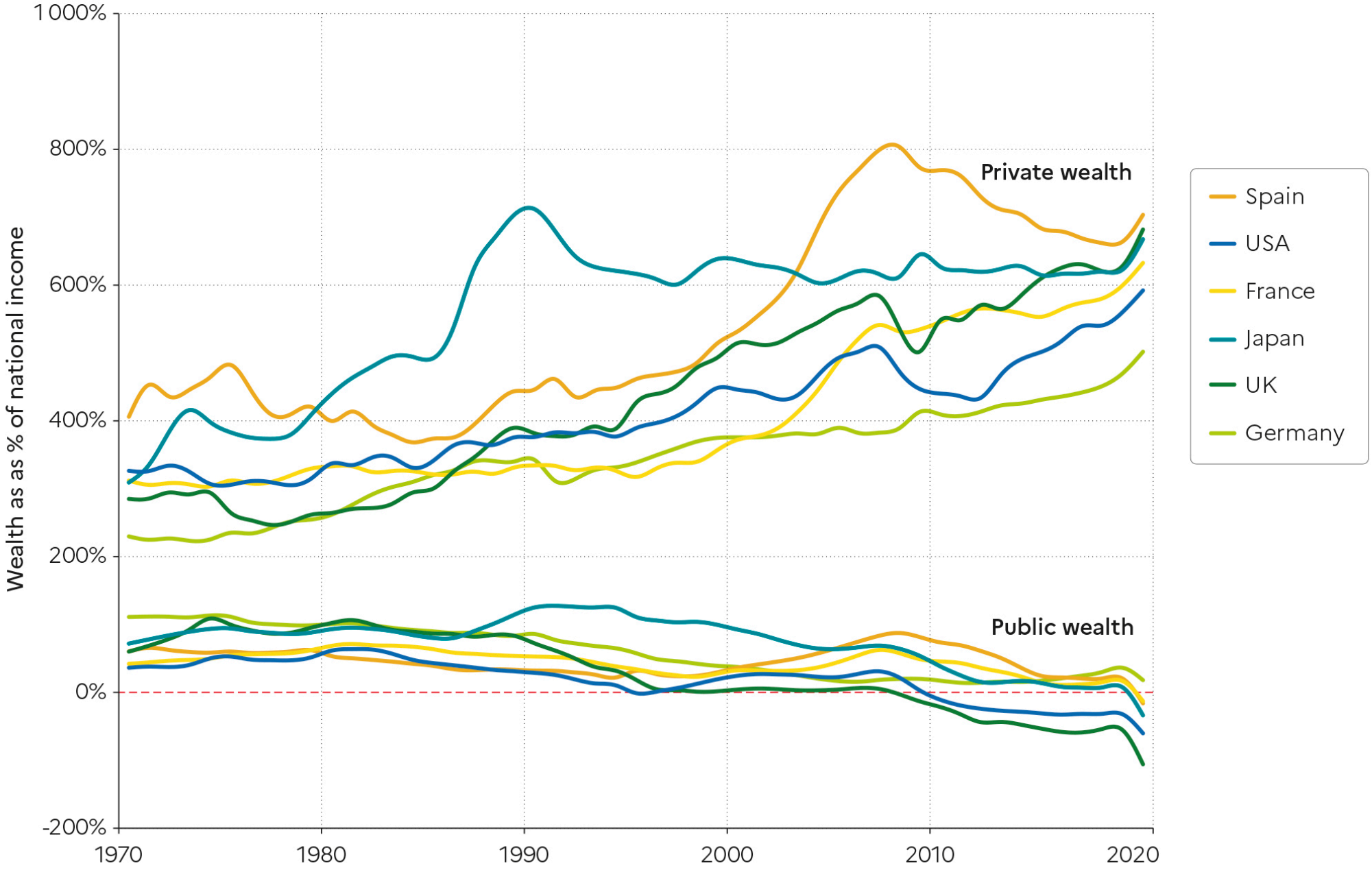
Private wealth has increased while public wealth has declined

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



Source: Piketty and Zucman (2014)

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

Individuals derive pre-tax income from **labor** (work) and **capital** (ownership): $z = wl + rk$ where w is wage, l is labor supply, k is capital=wealth, r is rate of return on capital

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

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

Capital Income (or wealth) is much more concentrated than Labor Income

Income Inequality: Labor vs. Capital Income

Capital Income (or wealth) is always more concentrated than Labor Income. In the United States:

Top 1% wealth holders have almost 40% of total private wealth (Saez-Zucman 2016). Bottom 50% wealth holders hold almost no wealth.

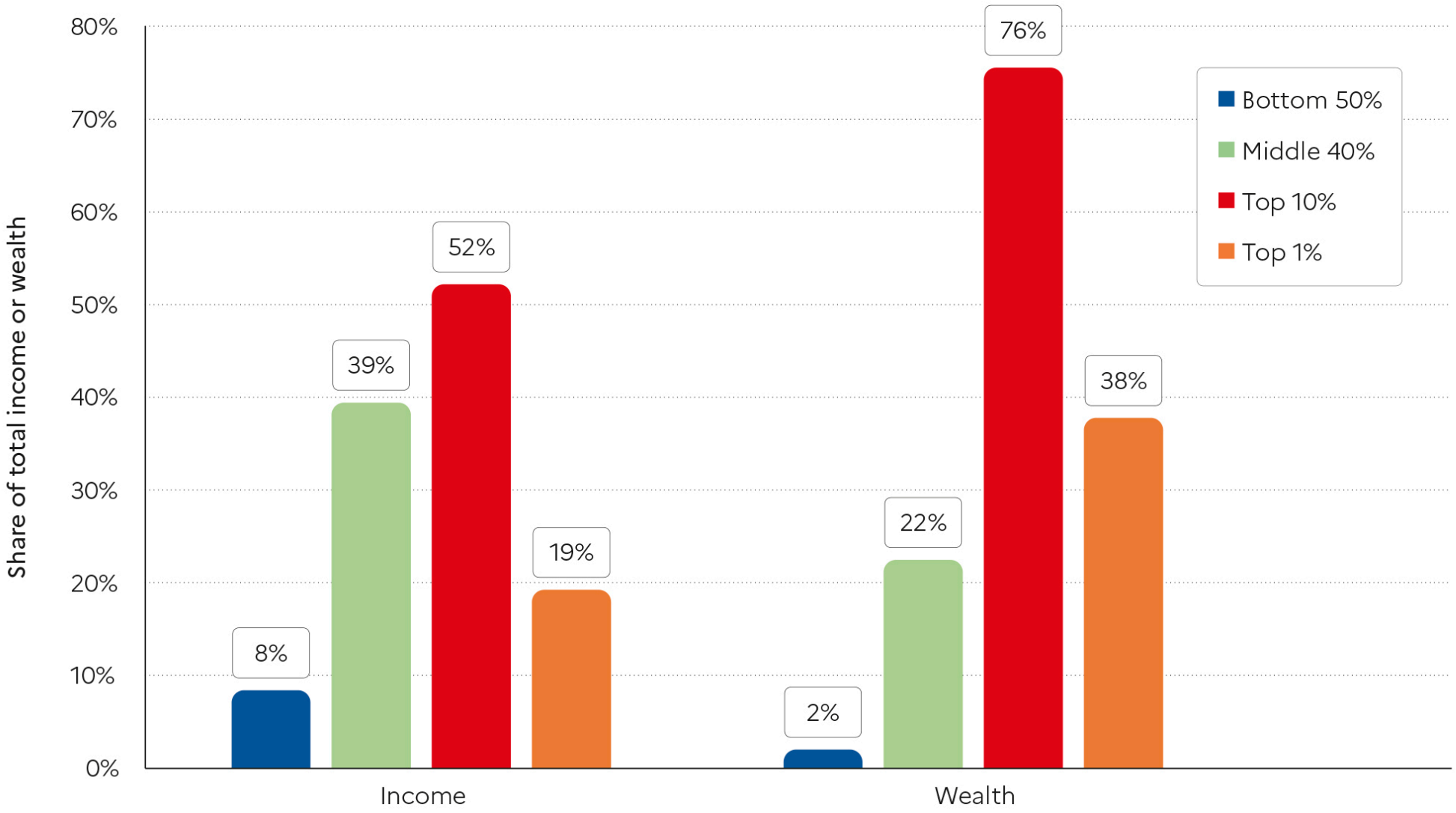
Top 1% incomes earn about 20% of total national income on a pre-tax basis (Piketty-Saez-Zucman, 2018)

Top 1% labor income earners have about 15% of total labor income

World Inequality Lab wid.world provides standardized statistics for many countries and worldwide

Income and wealth inequality are pretty similar for the World as a whole and within the US

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

Inequality can be measured by indexes such as Gini coefficient, quantile income shares which are functions of the income distribution $F(z)$

Most famous inequality index: **Gini coefficient**

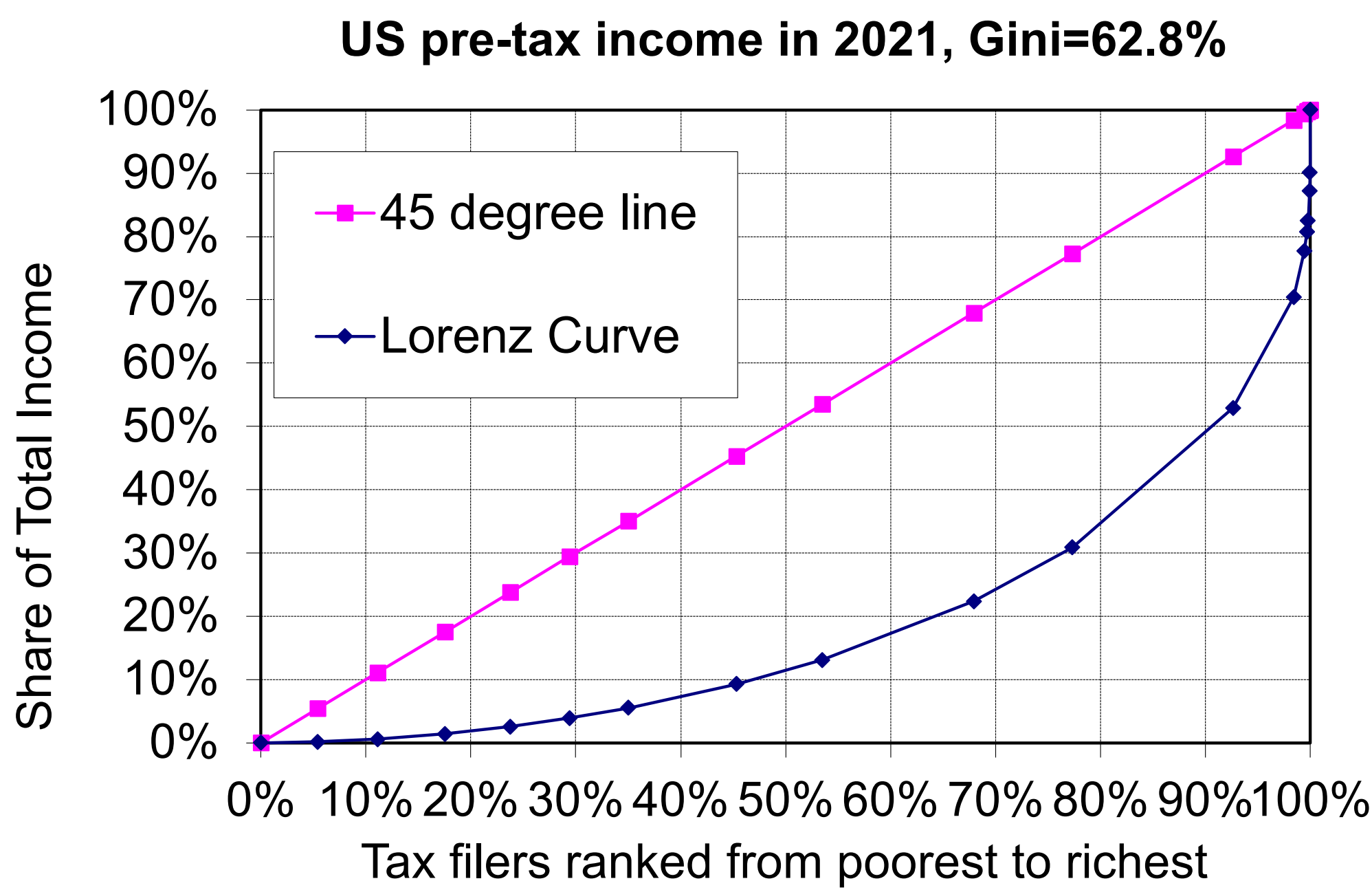
Gini = 2 $\times$ area between 45 degree line and Lorenz curve

Lorenz curve $L(p)$ at percentile p is 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 (top person has all the income)



Source: IRS Individual income tax statistics for 2021

Quiz

Why does the slope of the Lorenz curve increase?

A. Because there is inequality

B. Because people are ranked from poorest to richest on the x-axis.

C. Because each percentile earns a larger share of income than the preceding percentile

D. All of A., B., C.

E. None of A, B, C, D

Key Empirical Facts on Income Inequality

1) In the US, labor income inequality has increased substantially since 1970: debate between skilled biased technological progress view vs. institution view (min wage and Unions) [Autor-Katz'99]

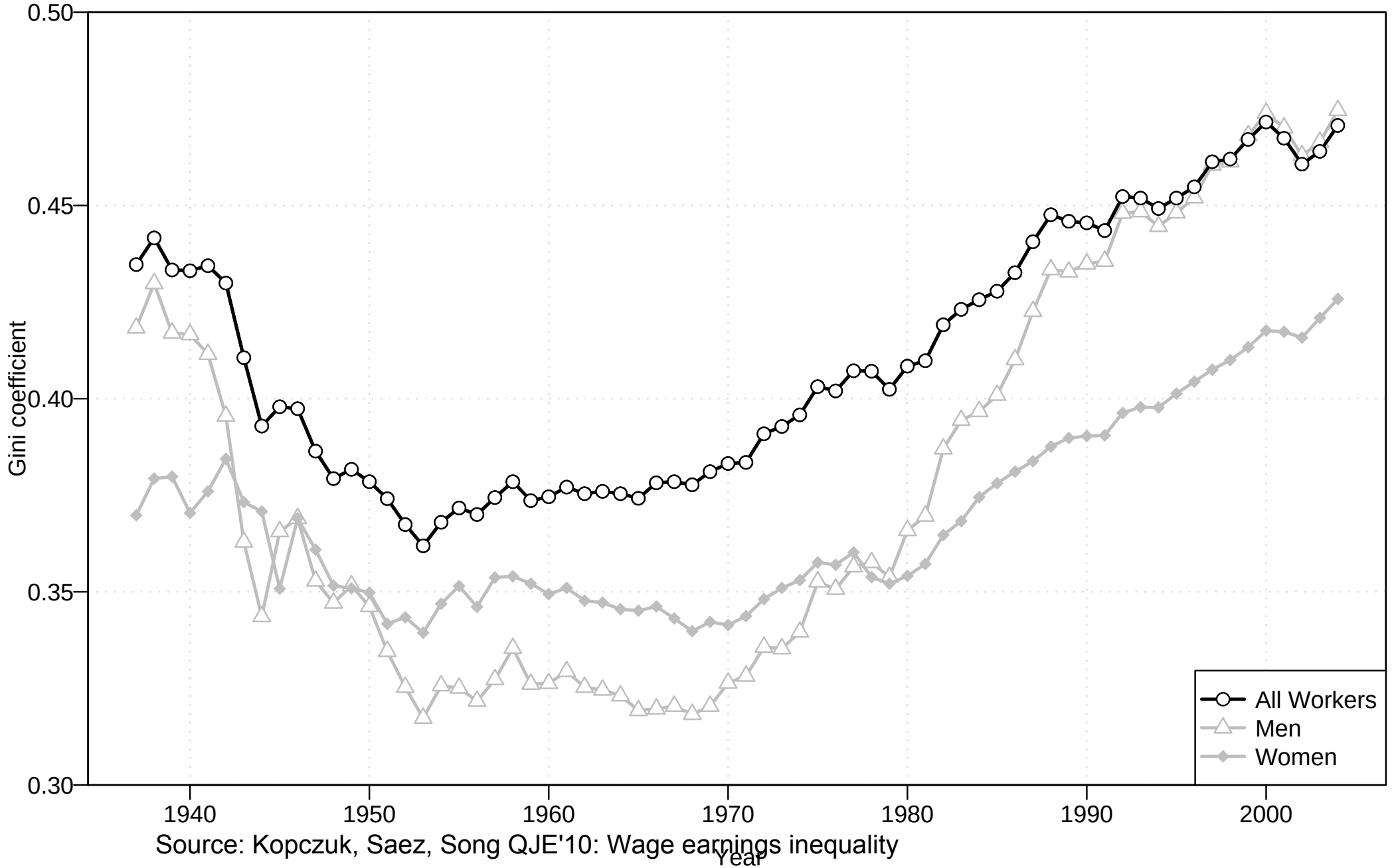
2) Gender gap has decreased but remains substantial especially at the very top

3) In the US, top income shares dropped dramatically from 1929 to 1950 and increased dramatically since 1980

4) Bottom 50% pre-tax income per adult has stagnated since 1980 in spite of macro-economic growth

5) Fall in top income shares from 1900-1950 happened in most OECD countries. Surge in top income shares has happened primarily in English speaking countries, not as much in Continental Europe and Japan [World Inequality Database]

Figure 1: Gini coefficient



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

Quiz

Why is the Gini coefficient for all workers higher than the Gini for men and the Gini for women in the 1950s-60s?

A. Because men have more inequality in earnings than women

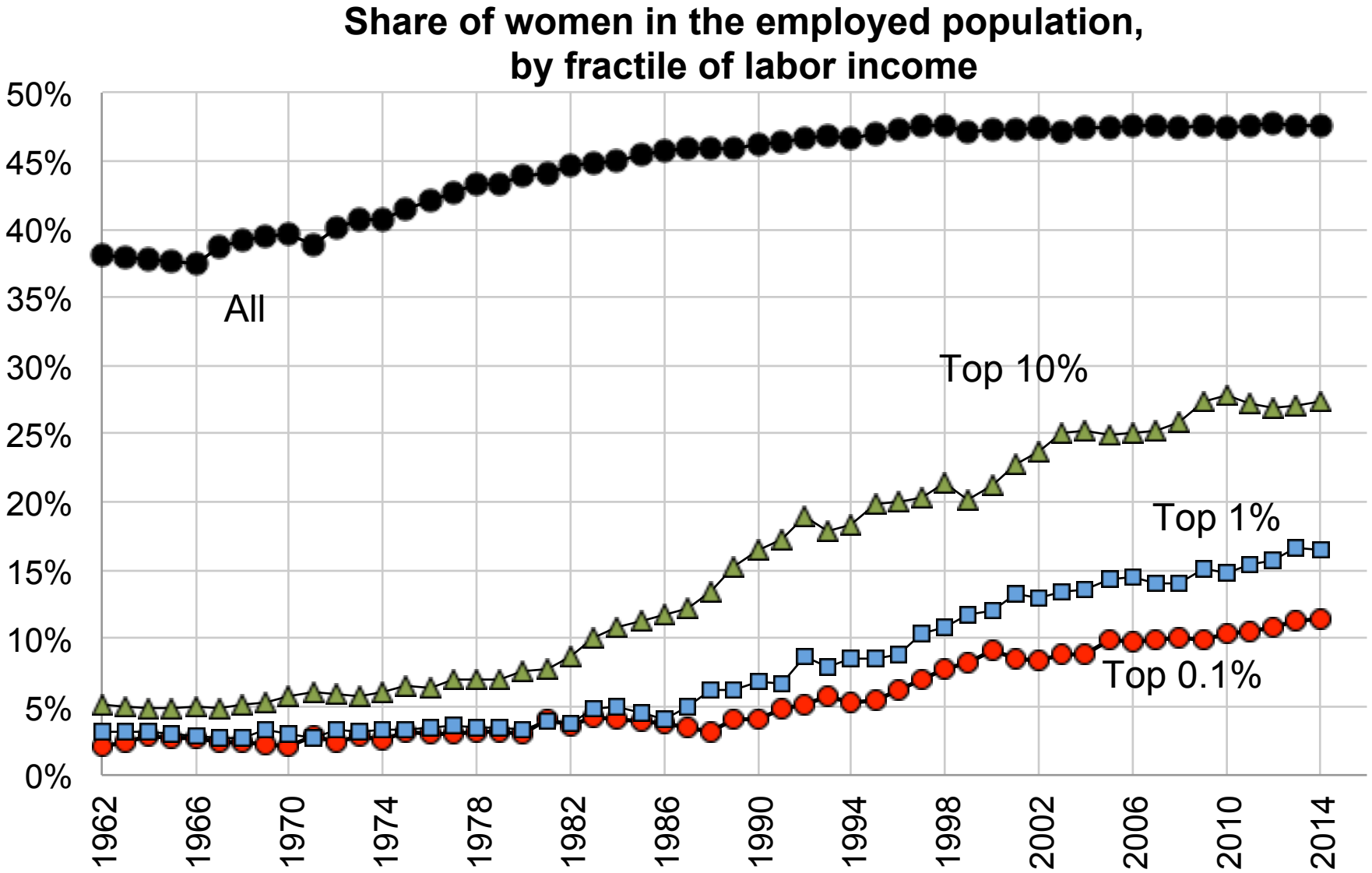
B. Because women have more inequality in earnings than men

C. Because fewer women worked

D. Because women workers earned a lot less than men

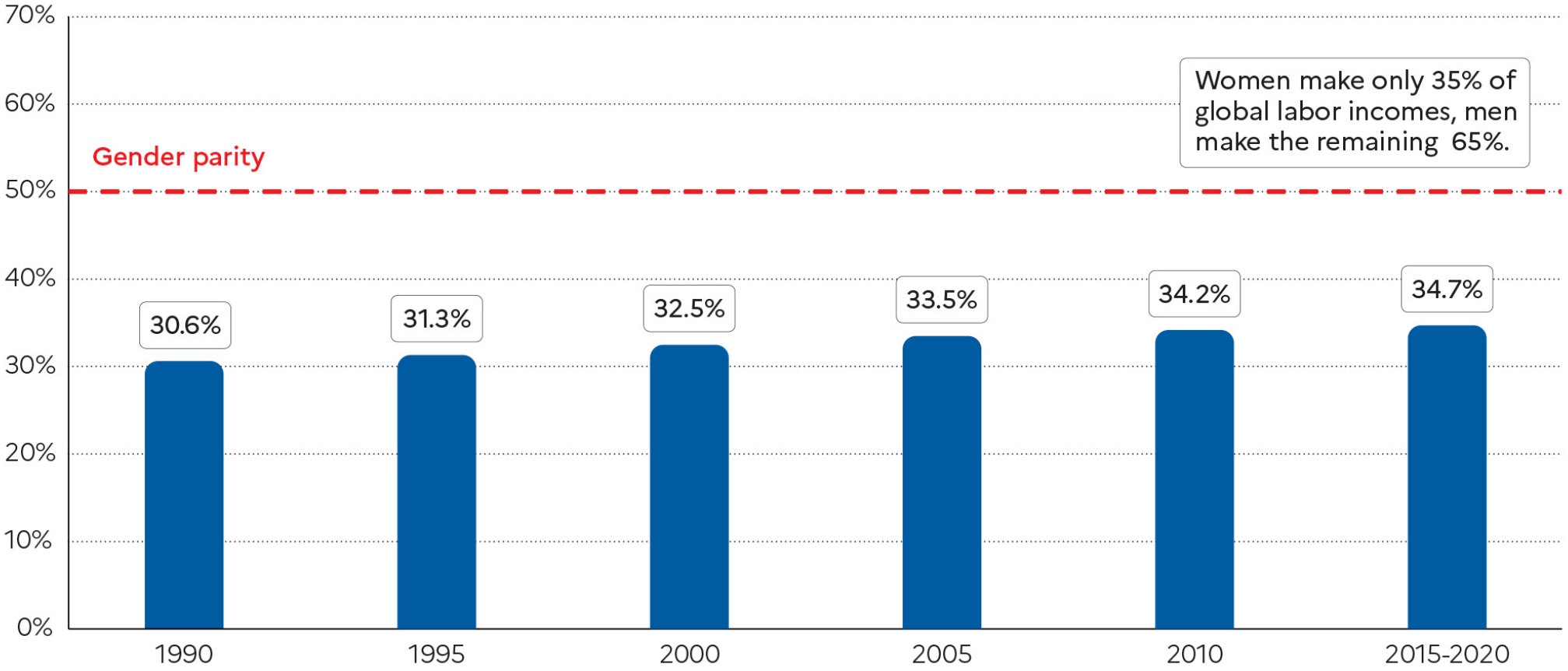
E. None of A, B, C, D

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

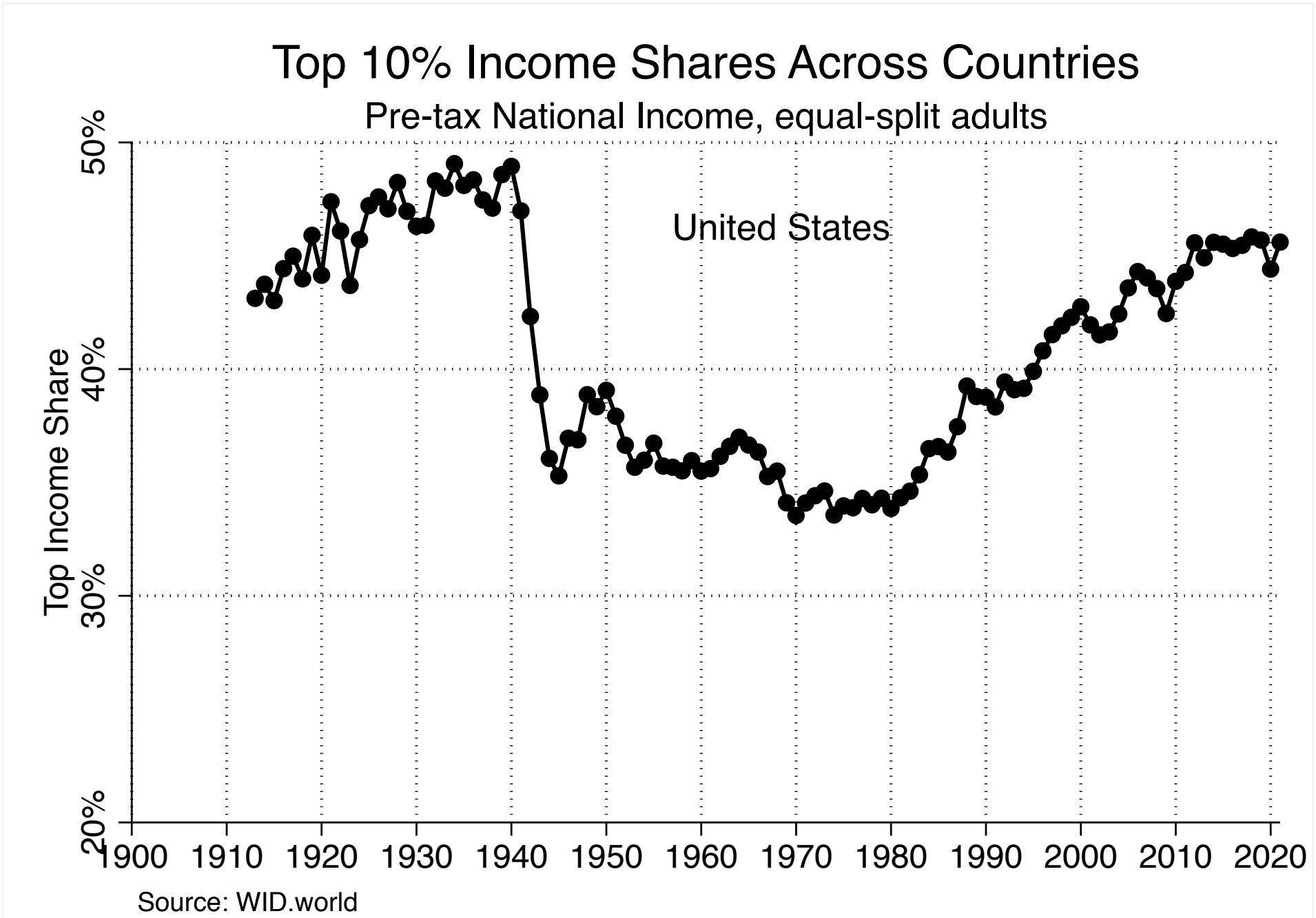


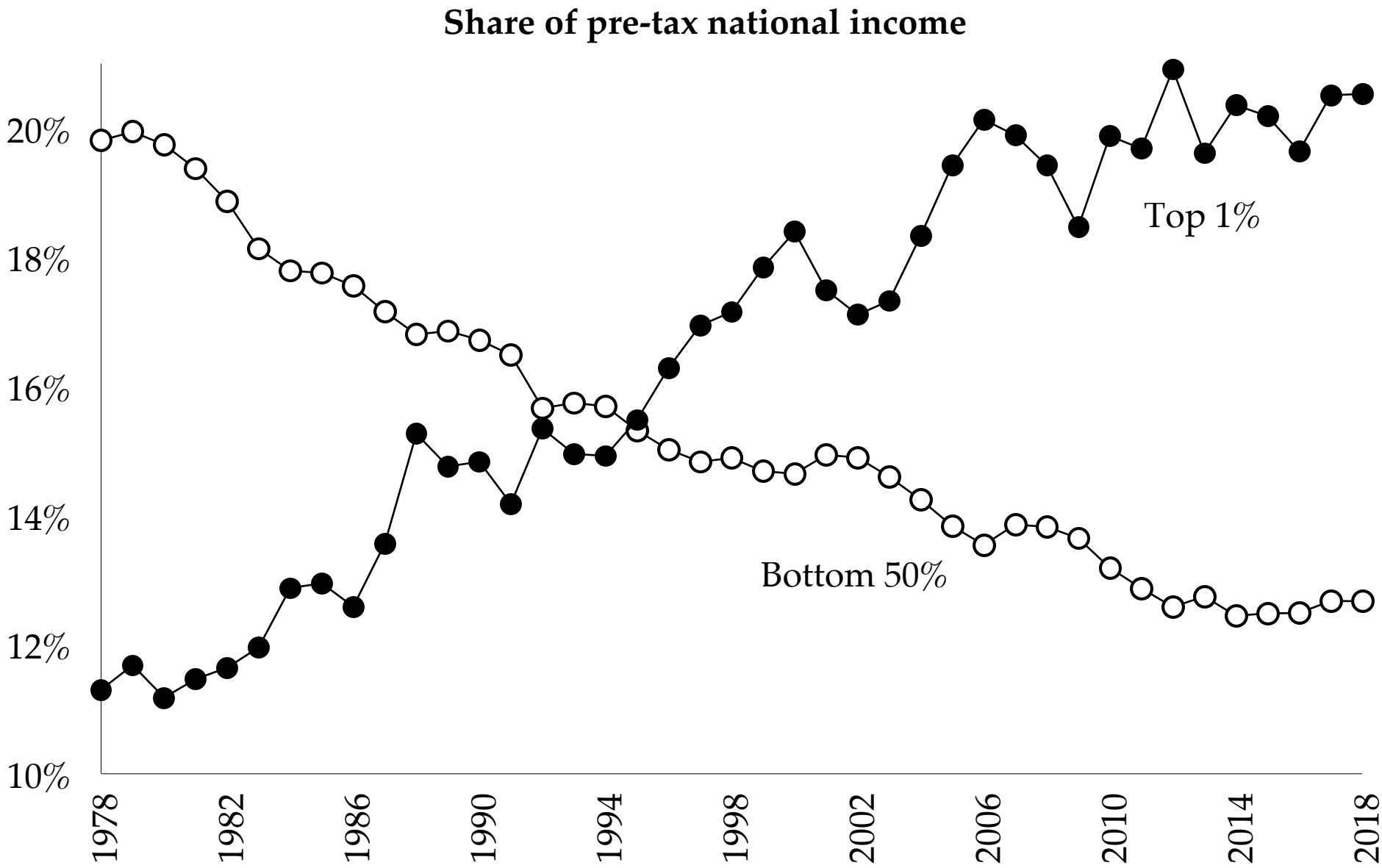
Source: Appendix Table II-F1.

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

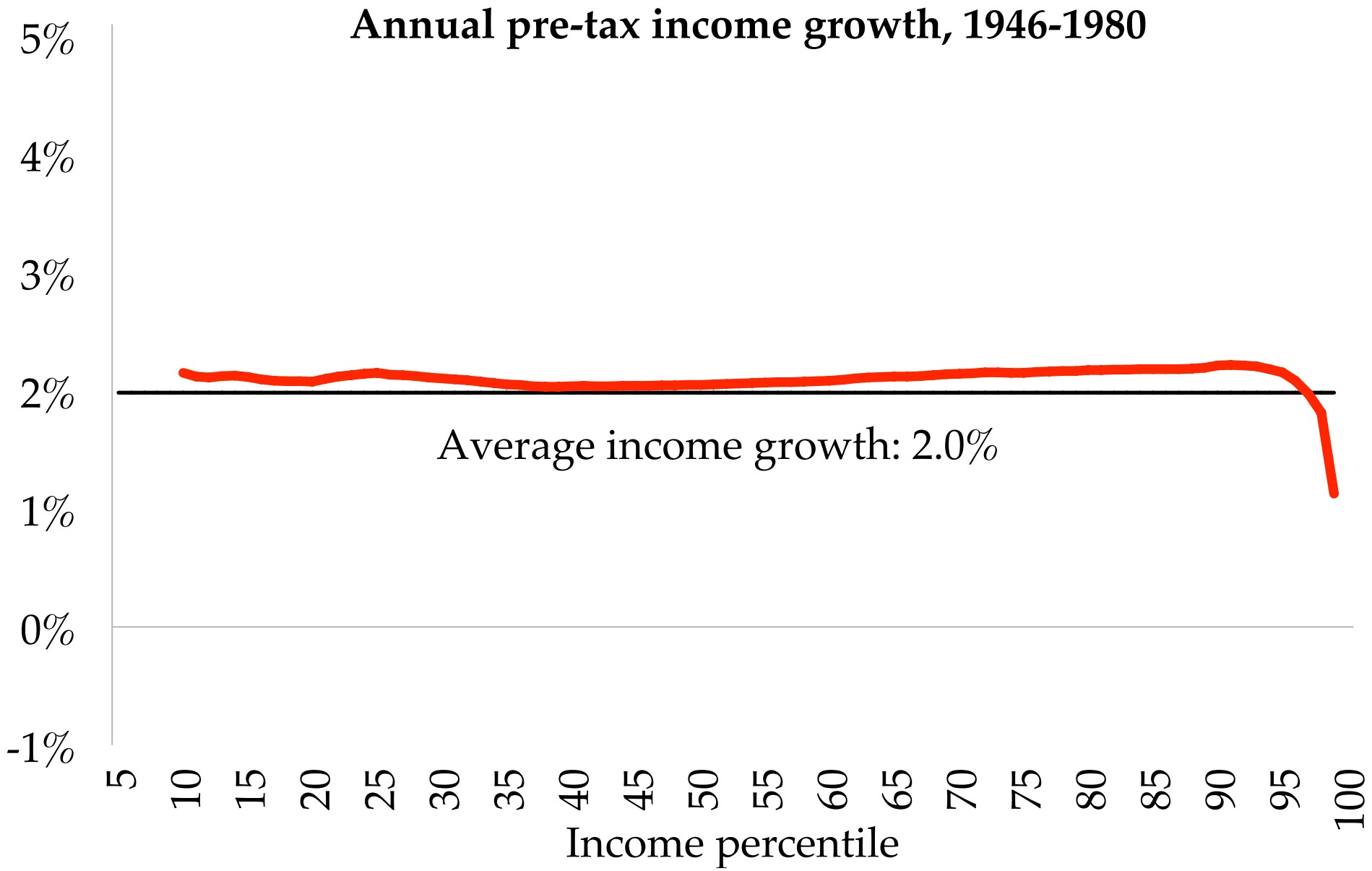


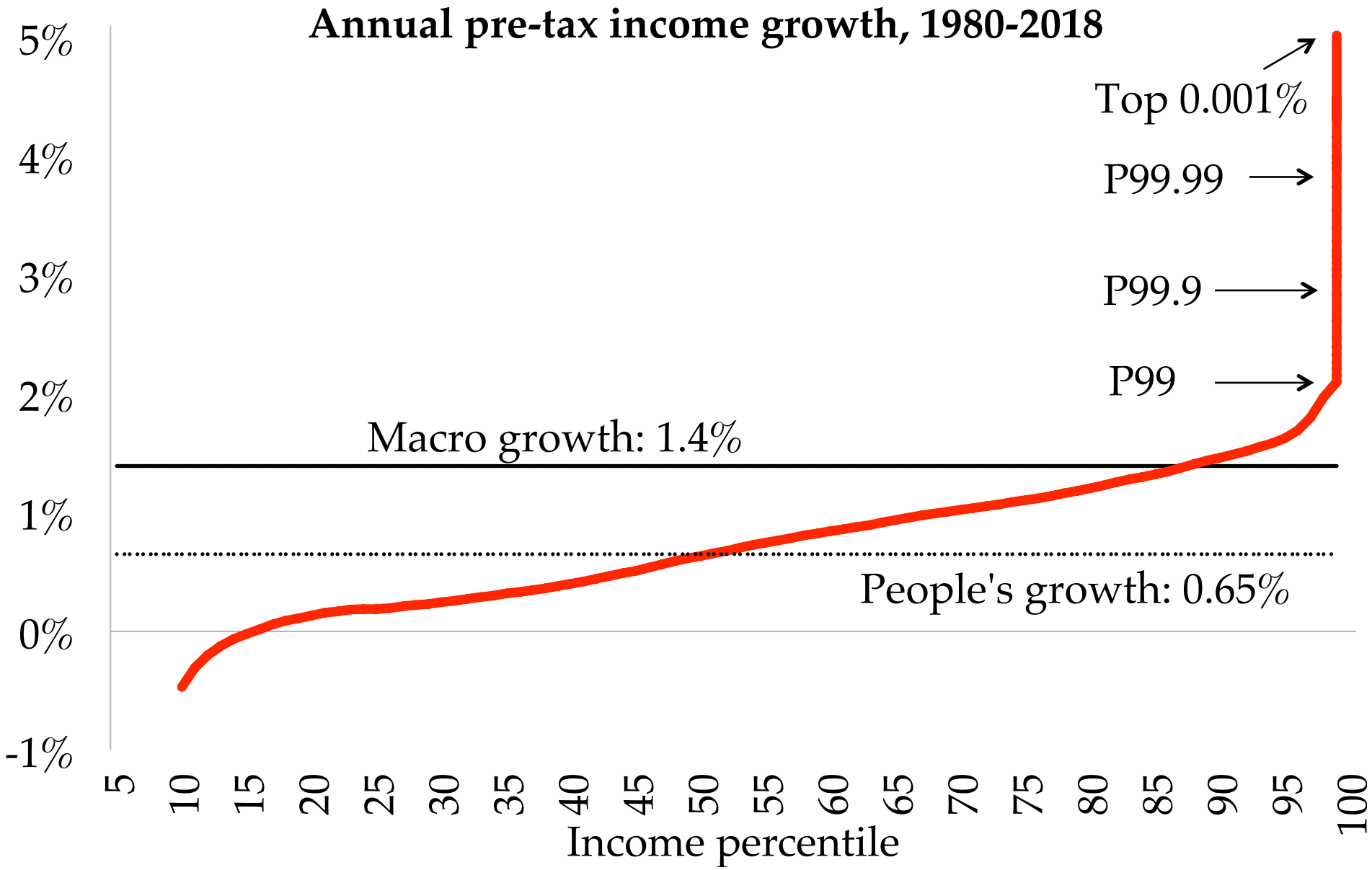
Interpretation: *The share of female incomes in global labour incomes was 31% in 1990 and nears 35% in 2015-2020. Today, males make up 65% of total labor incomes.* ***Sources and series:*** *wir2022.wid.world/methodology and Neef and Robilliard (2021).*


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



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

WORLD | BY COUNTRY | DATA

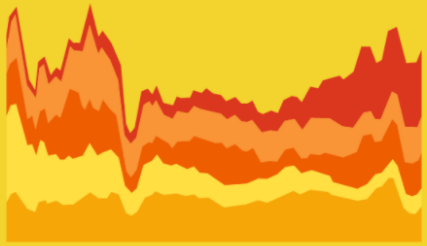
WORLD
WEALTH & INCOME
DATABASE

METHODOLOGY | ABOUT US | NEWS

WORLD VIEW

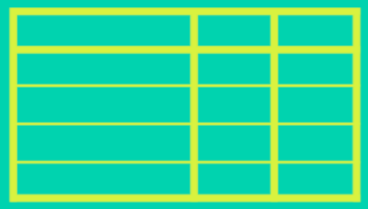
Compare inequality between countries on an interactive world map

COUNTRY GRAPHS

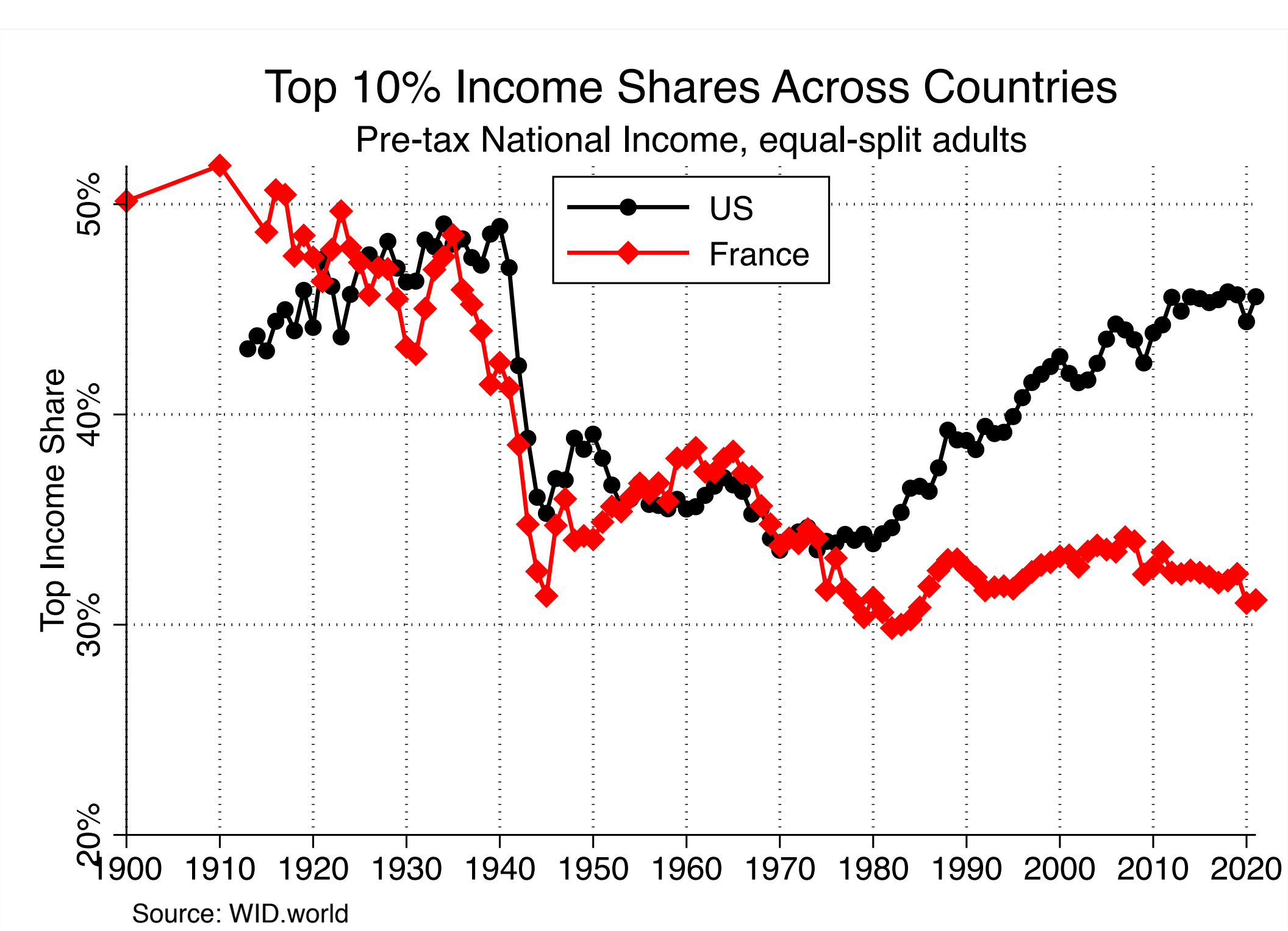


Follow the evolution of inequality within countries with user-friendly graphs

DATA TABLES



Download our open-access datasets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France
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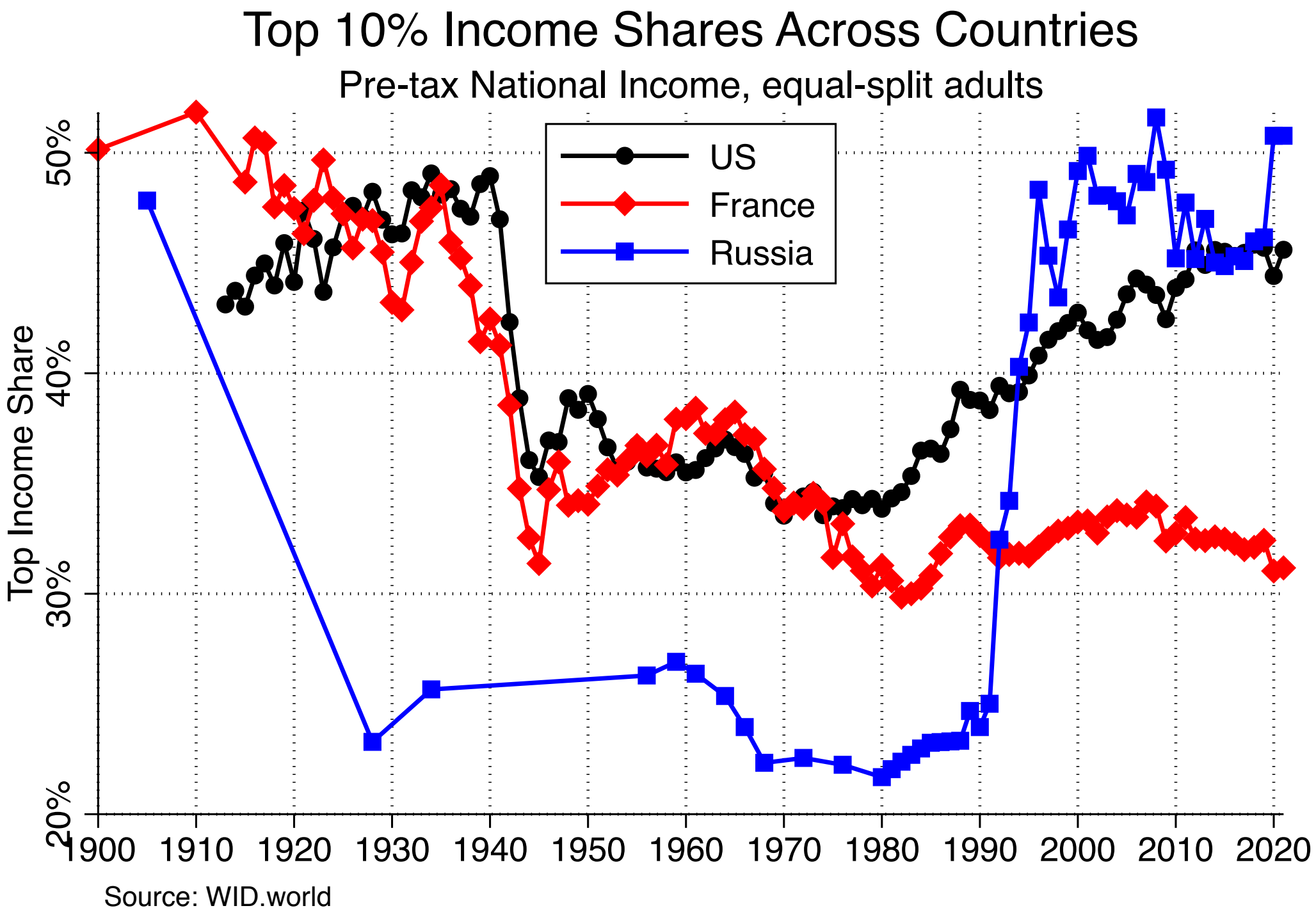
1950
1960
1970
1980
1990
2000
2010
2020
Source: WID.world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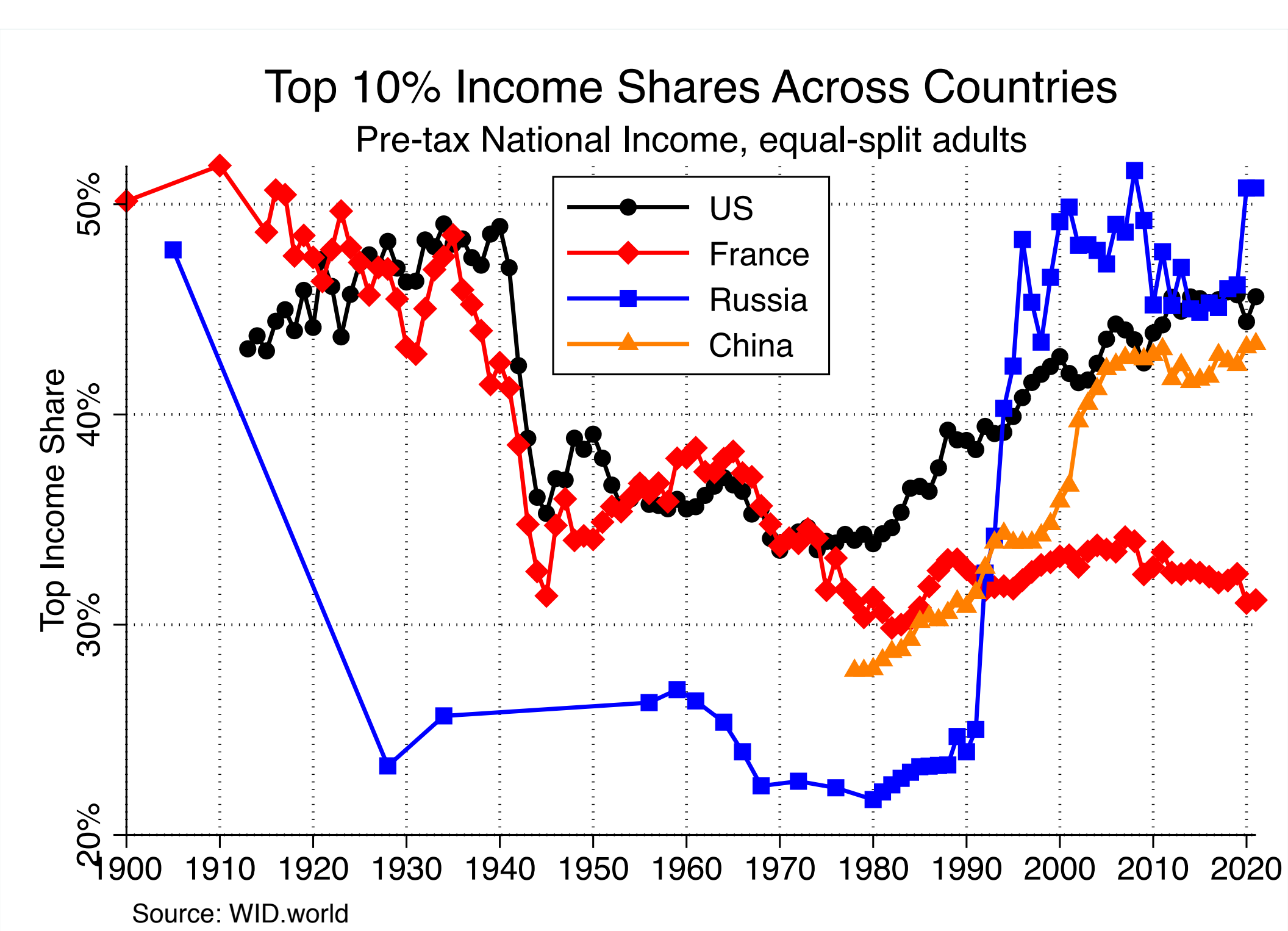
Source: WID.world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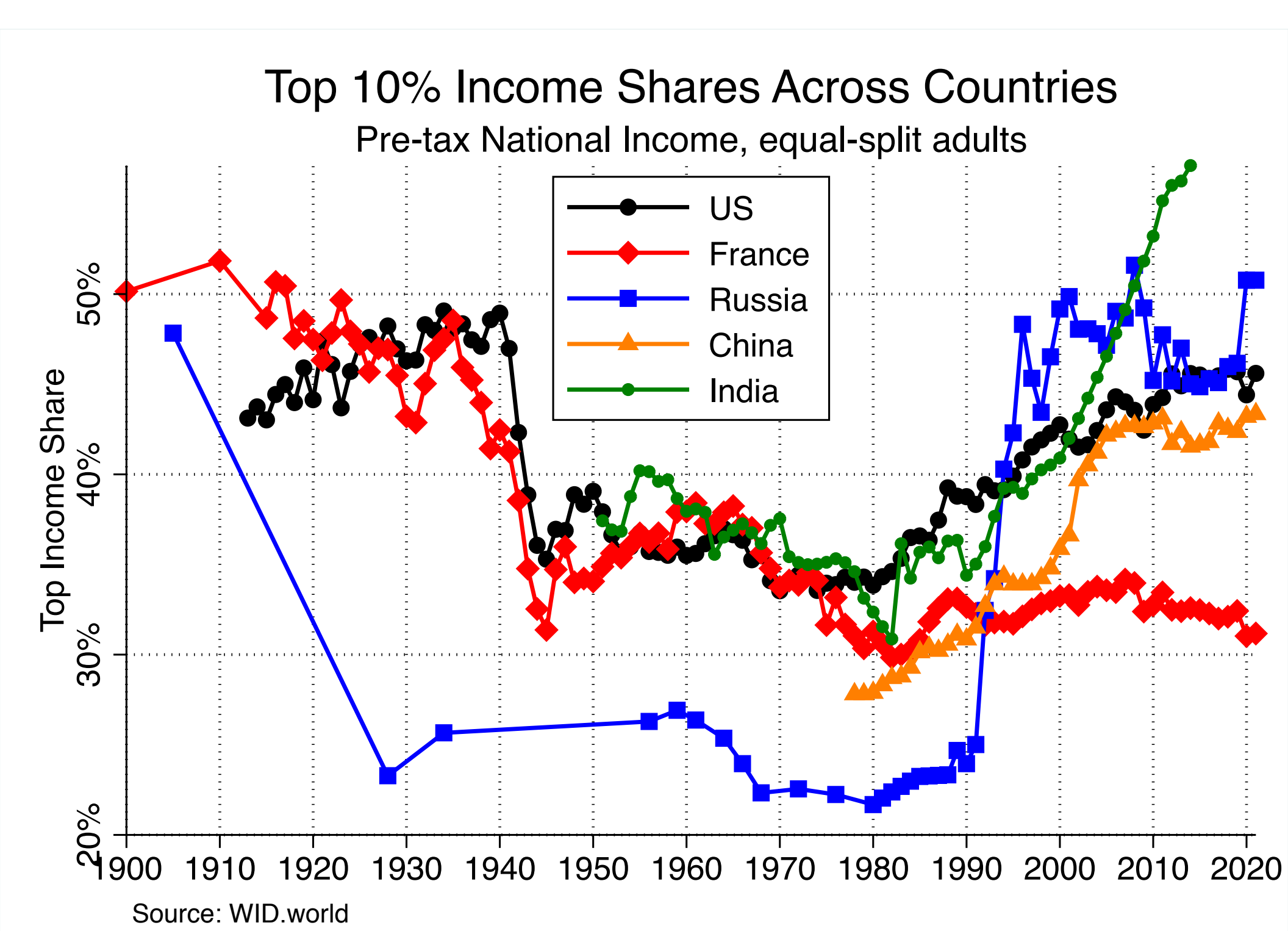
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2000
2010
2020
Source: WID.world

Quiz

What would be a fair distribution of income?

A. When the top 10% earns 10% of total income

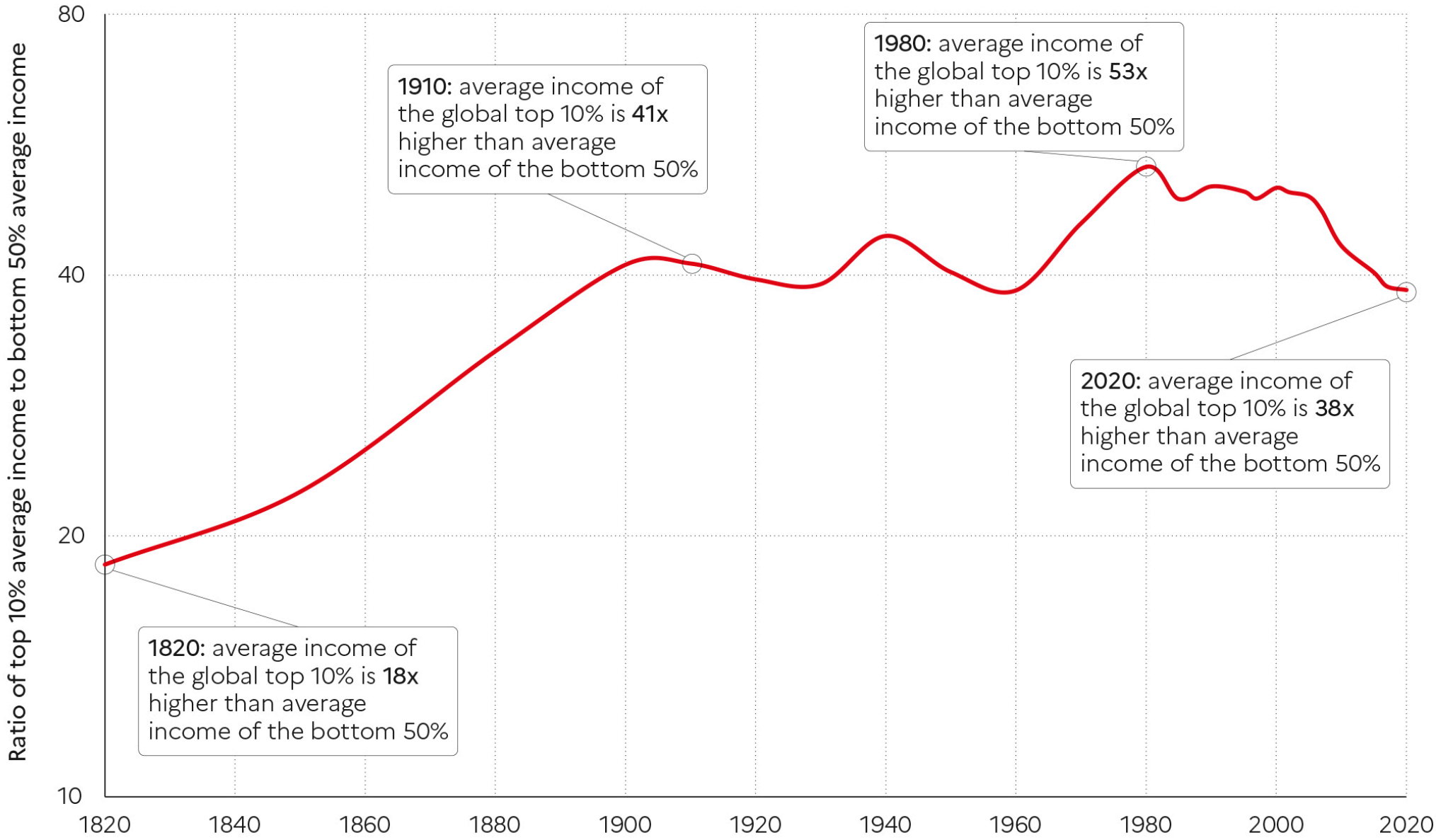
B. When the top 10% earns 30% of total income

C. When the top 10% earns 50% of total income

D. When the top 10% earns 70% of total income

E. The share going to the top 10% is irrelevant

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).*

INEQUALITY AND GROWTH

Inequality provides incentives but can also entrench privilege

Much interest in the relationship between inequality and growth but hard to identify compellingly

Pre-20th century: growth typically associated with increasing inequality (booming cities). Disasters (plagues, wars, state collapse) are equalizing (Scheidel 2017)

Mid-20th century achieves high growth with decreasing inequality in richer countries

Communist countries don't do well in growth after the 1970s (e.g. North vs. South Korea)

Last 4 decades: growth again associated with rising inequality (e.g. India, China)

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)

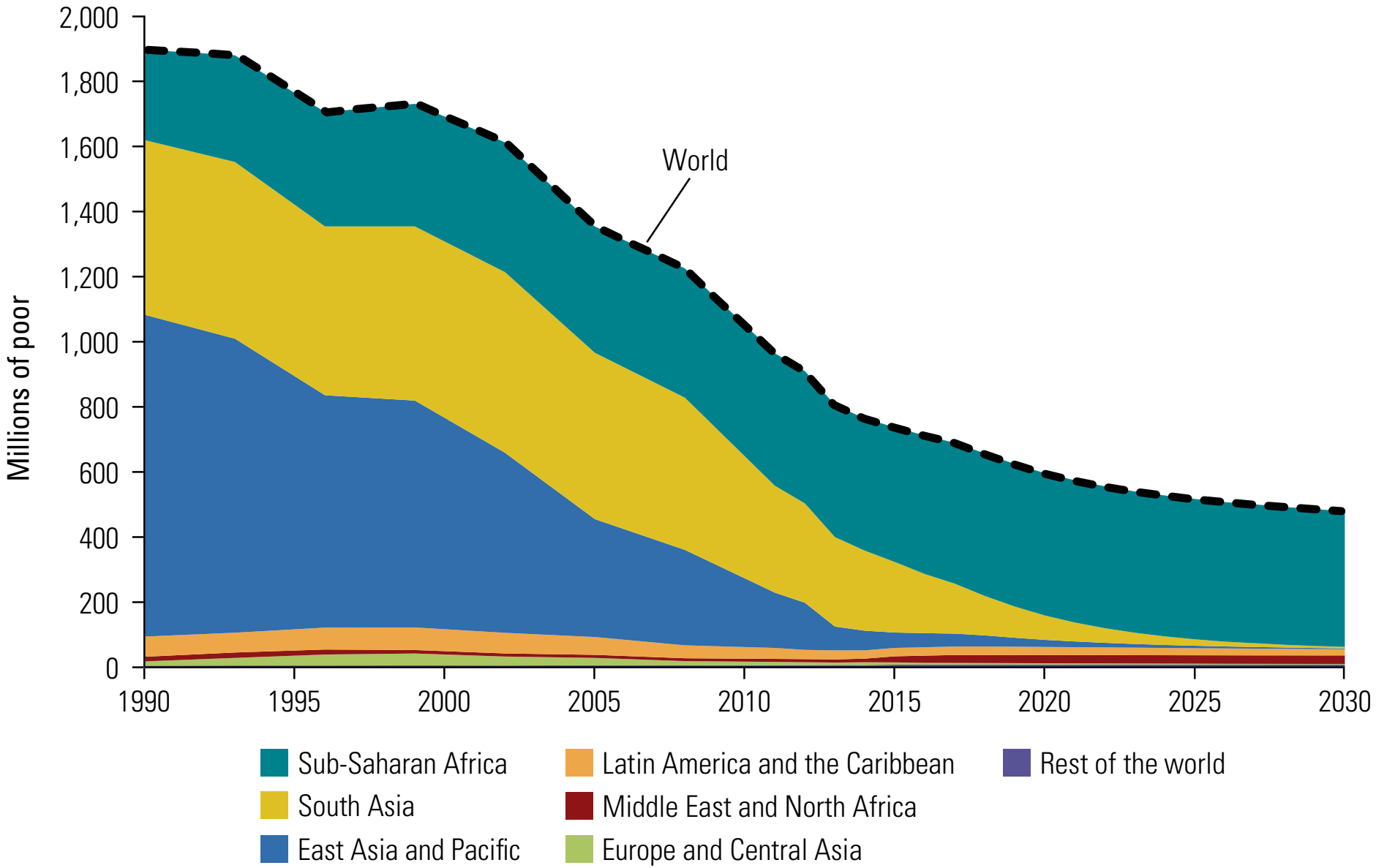
Absolute poverty falls in the long run with economic growth [nobody in the US is World Bank poor] but relative poverty does not

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

The fact that inequality stays in the debate in spite of huge growth since 1800 shows that relative income is the relevant concept

$\Rightarrow$ Health measures (mortality, stunting) are the only 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.

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, etc.] and it is difficult to measure consumption at individual level

Measured poverty is therefore based on consumption or disposable income (income - taxes+cash transfers) at the family level [or unit sharing resources] and everybody within the family has same poverty status

Bigger families need more resources but economies of scale in consumption: scale disposable income by family size

US POVERTY RATE DEFINITION

Based on **money income** = cash market income before taxes + some cash govt transfers + cash private transfers

Poverty thresholds adjusted annually using the official CPI

In 2025: $15.5K for single adult, $21K family of 2, $26.5K for family of 3, $32K for 4

Strikingly: US (absolute) poverty rate has hardly fallen since 1970 in spite of huge economic growth in 50+ years

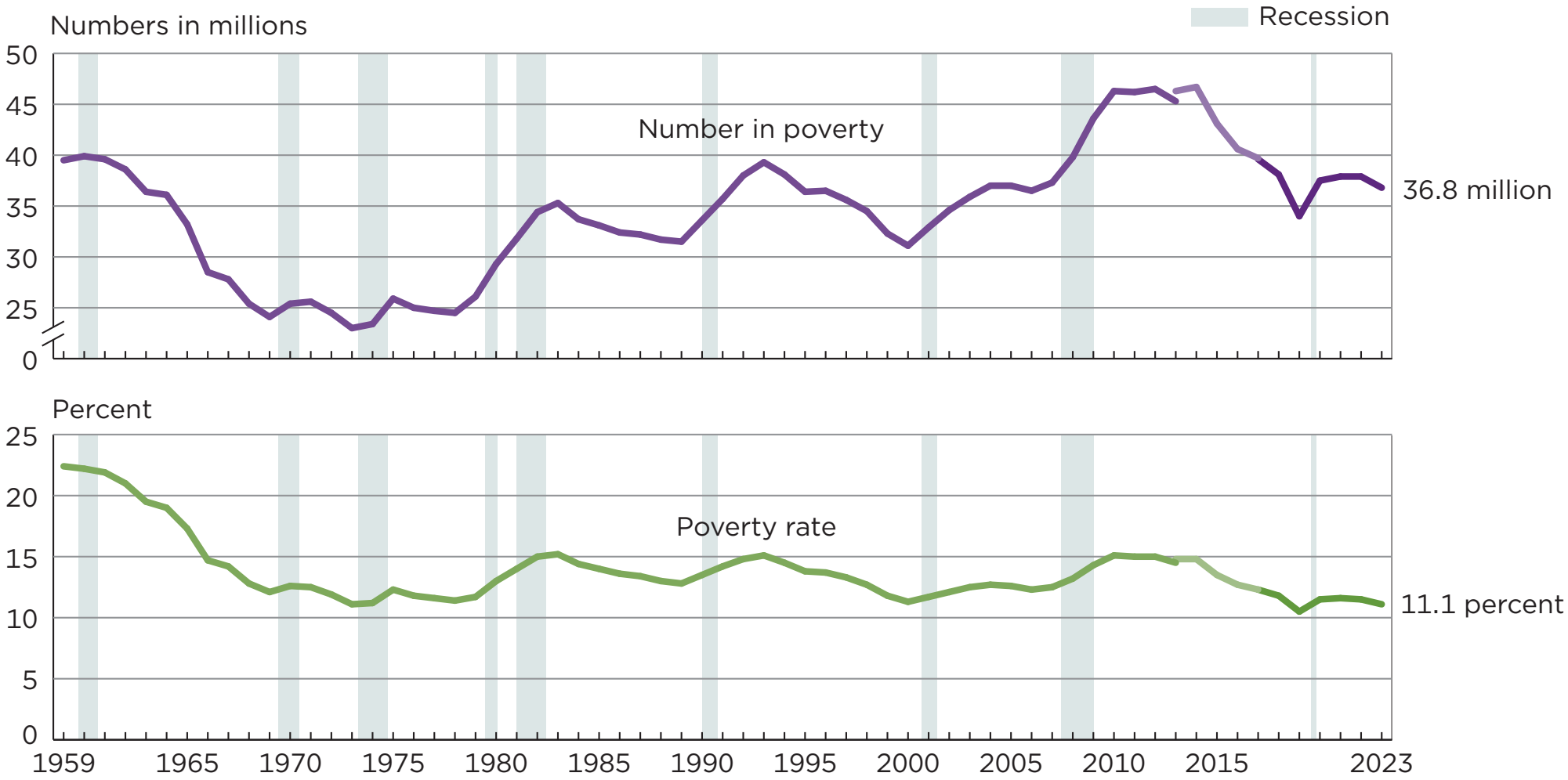
Conceptual weaknesses (politically hard to change definition):

1) Income and employee payroll taxes are NOT deducted, Income tax credits (EITC, Child Tax Credit) are NOT added

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

Figure 1.

Number in Poverty and Poverty Rate Using the Official Poverty Measure: 1959 to 2023



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-3 for historical footnotes. The data points are placed at the midpoints of the respective years. Information on recessions is available in Appendix C. Information on confidentially protection, sampling error, nonsampling error, and definitions is available at <https://www2.census.gov/programs-surveys/cps/techdocs/cpsmar24.pdf>.
Source: U.S. Census Bureau, Current Population Survey, 1960 to 2024 Annual Social and Economic Supplements (CPS ASEC).

Measuring Intergenerational Income Mobility

Strong consensus that children's success should not depend too much on parental income

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

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

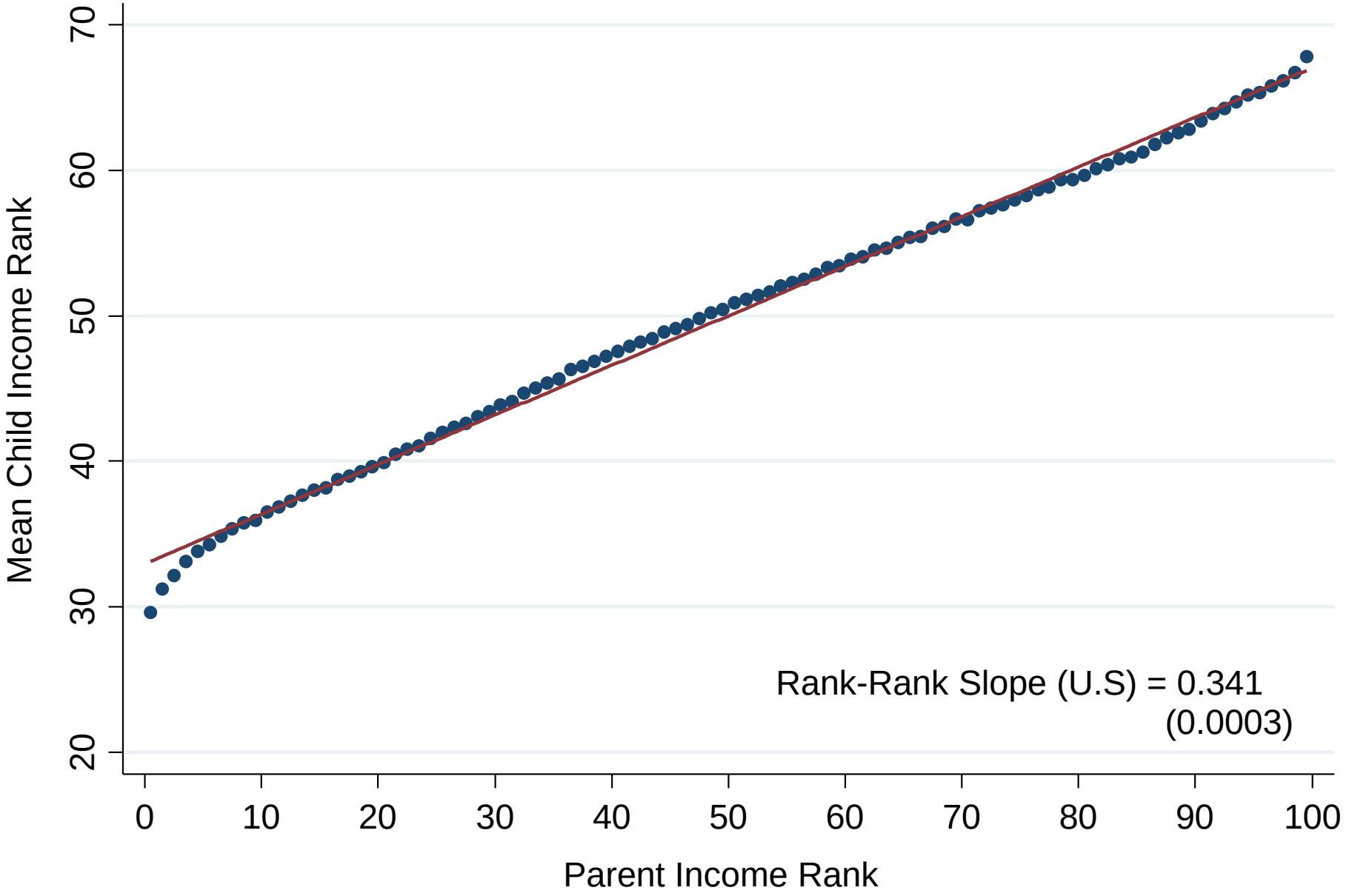
1) US has less mobility than European countries (especially Scandinavian countries such as Denmark)

2) Substantial heterogeneity in mobility across cities in the US

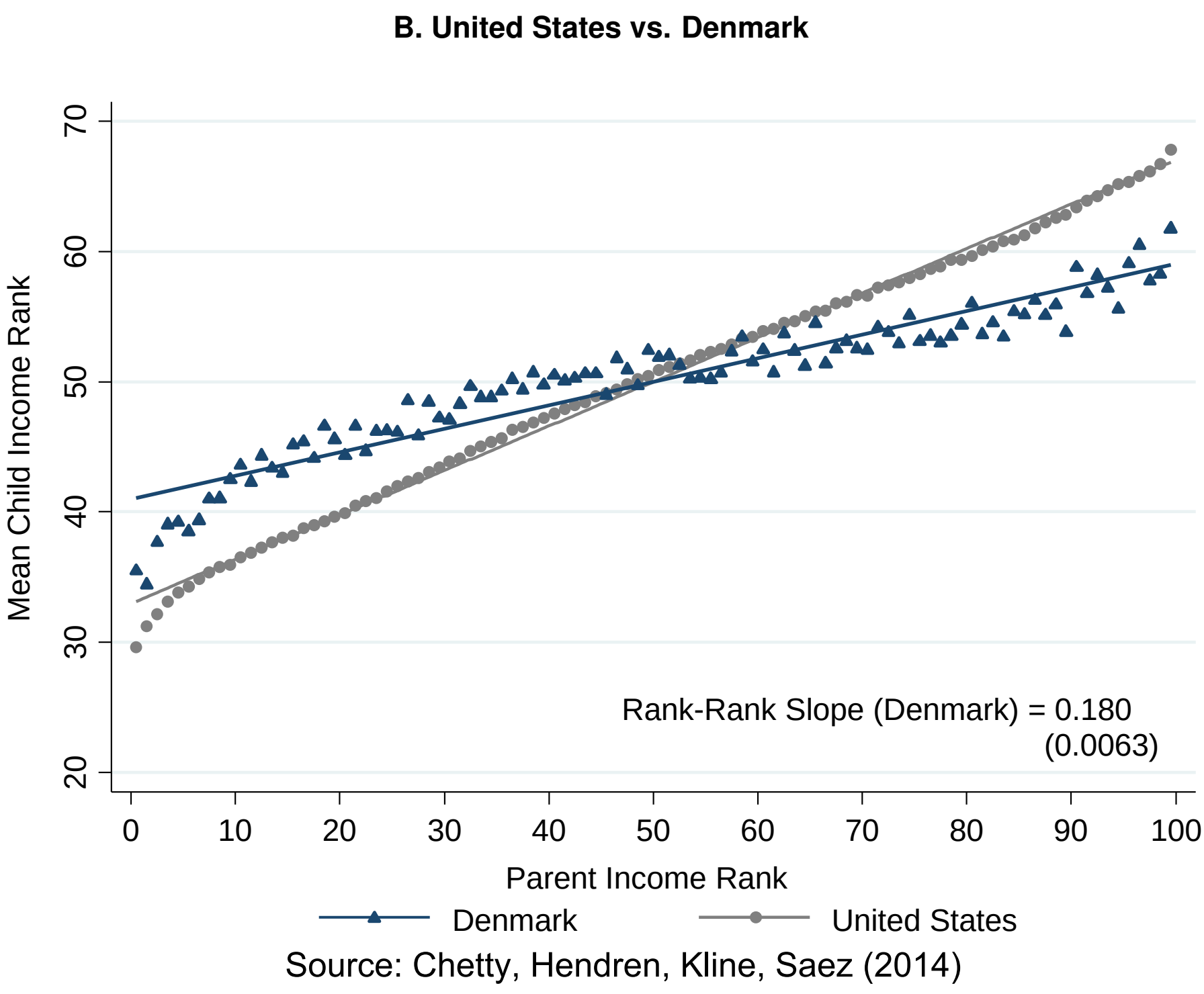
3) Places with low segregation, low income inequality, good K-12 schools, high social capital, high family stability tend to have high mobility [this is a correlation not necessarily causal]

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

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

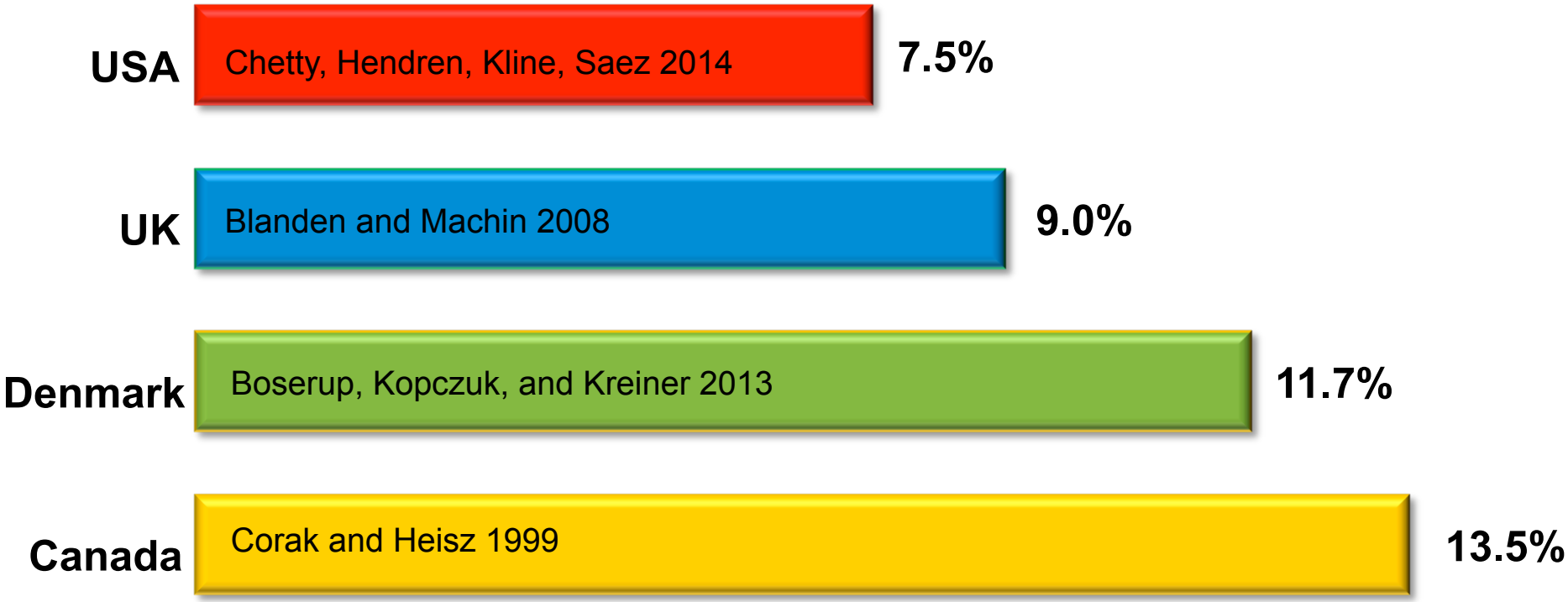


Source: Chetty, Hendren, Kline, Saez (2014)


B. United States vs. Denmark
Mean Child Income Rank
20
30
40
50
60
70
0
10
20
30
40
50
60
70
80
90
100
Parent Income Rank
Rank-Rank Slope (Denmark) = 0.180
(0.0063)
Denmark
United States
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:

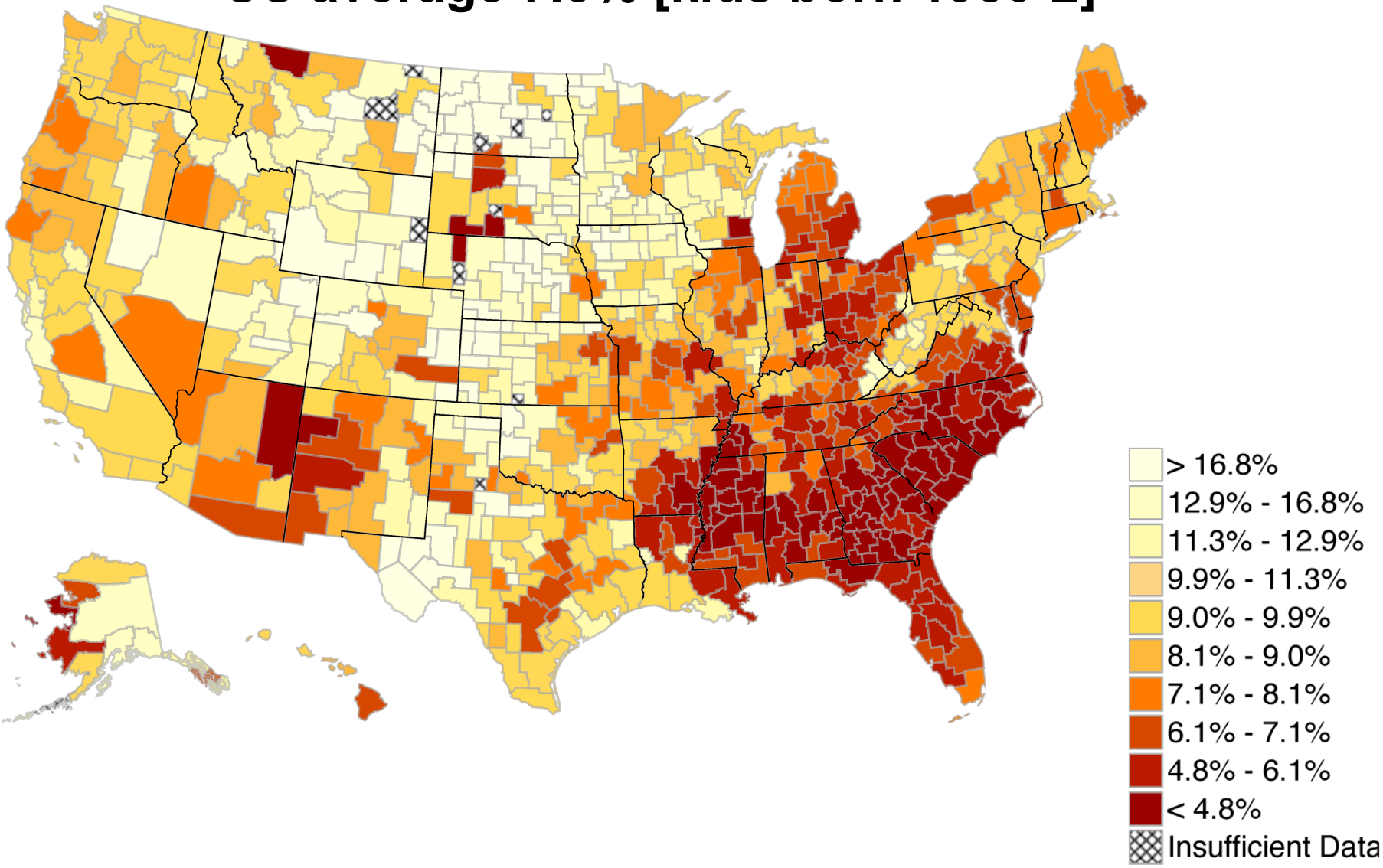


→ Chances of achieving the “American Dream” are almost two times higher in Canada than in the U.S.

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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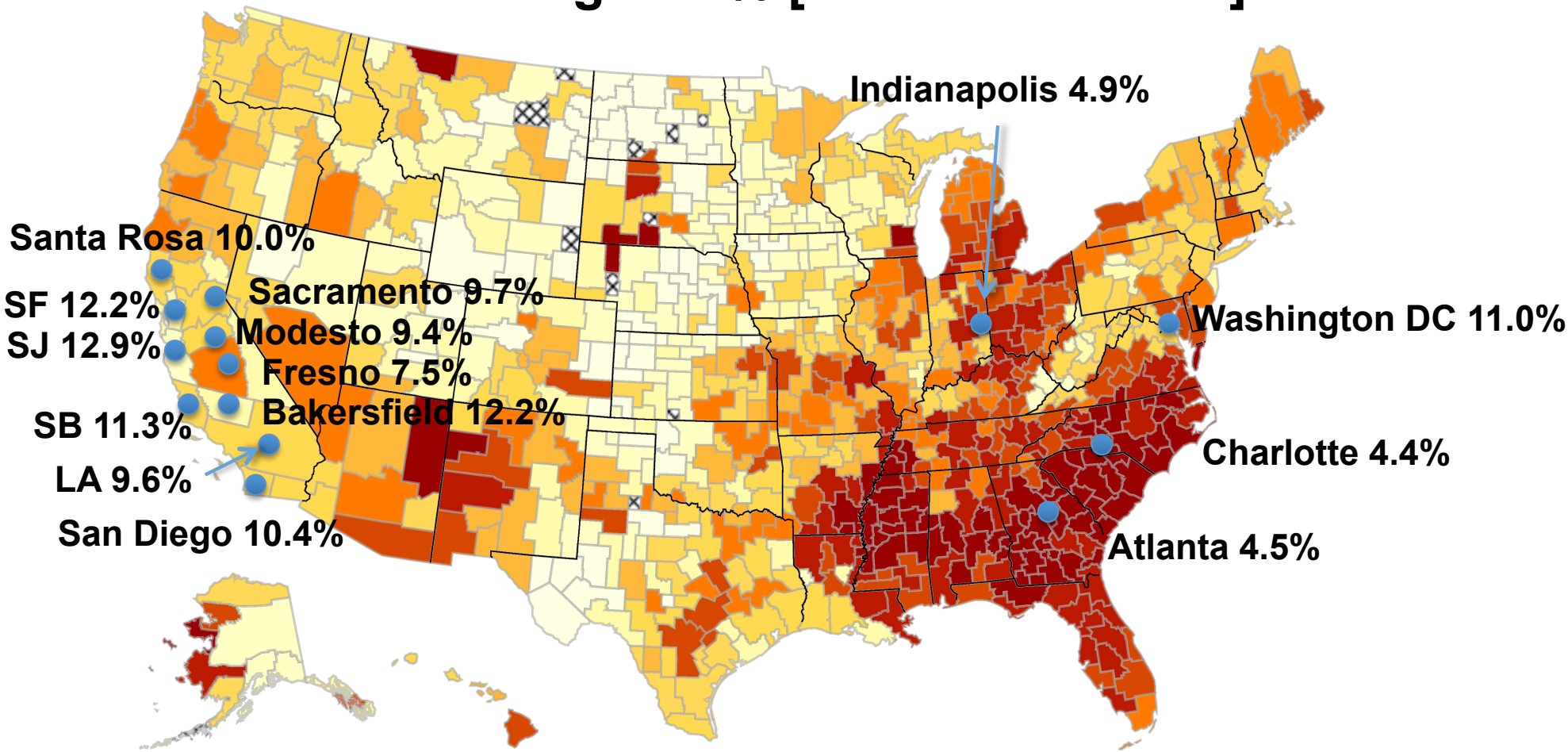


Note: Lighter Color = More Upward Mobility

Download Statistics for Your Area at www.equality-of-opportunity.org

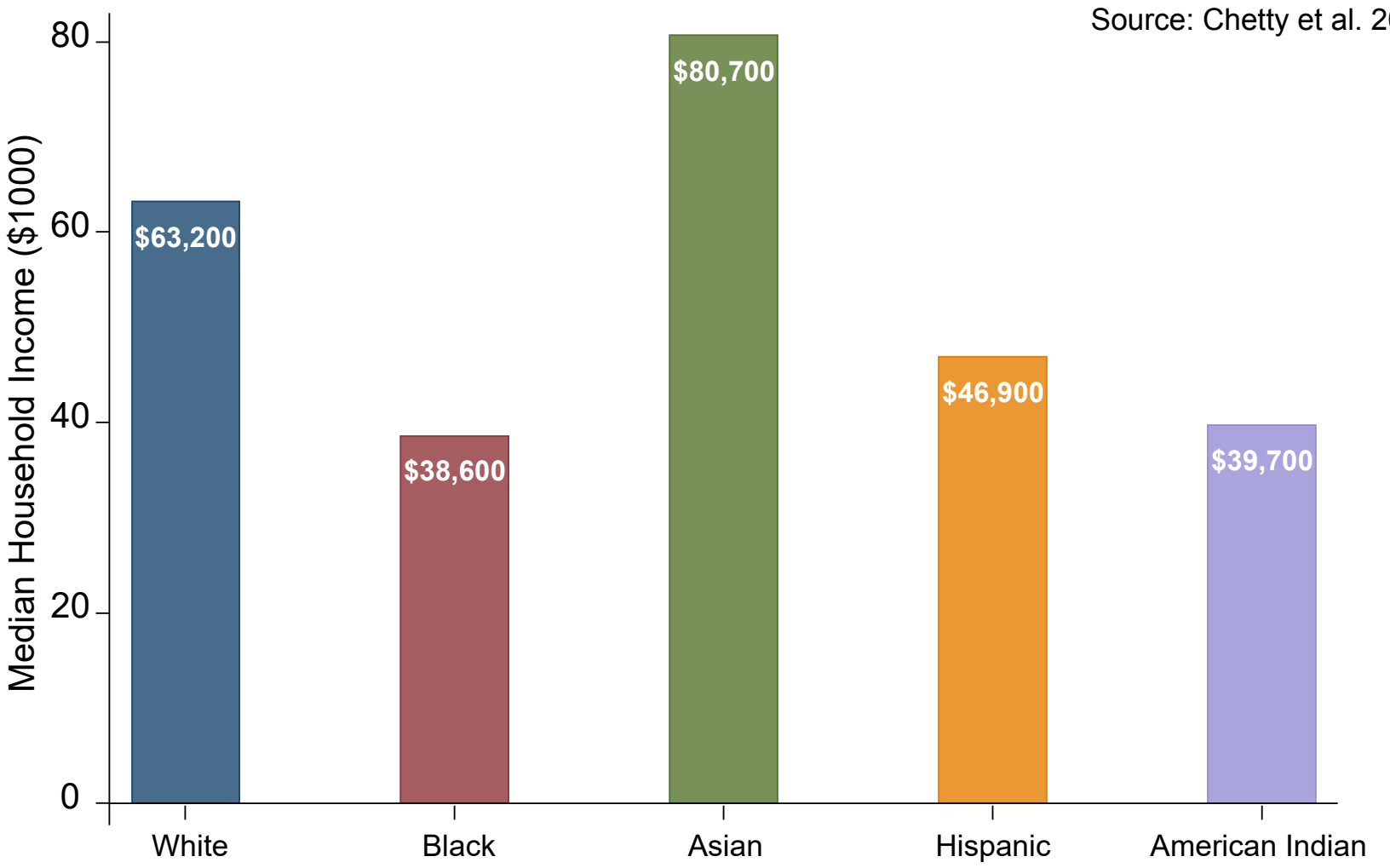
TABLE 1. Upward Mobility in the 50 Largest Metro Areas: The Top 10 and Bottom 10

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%

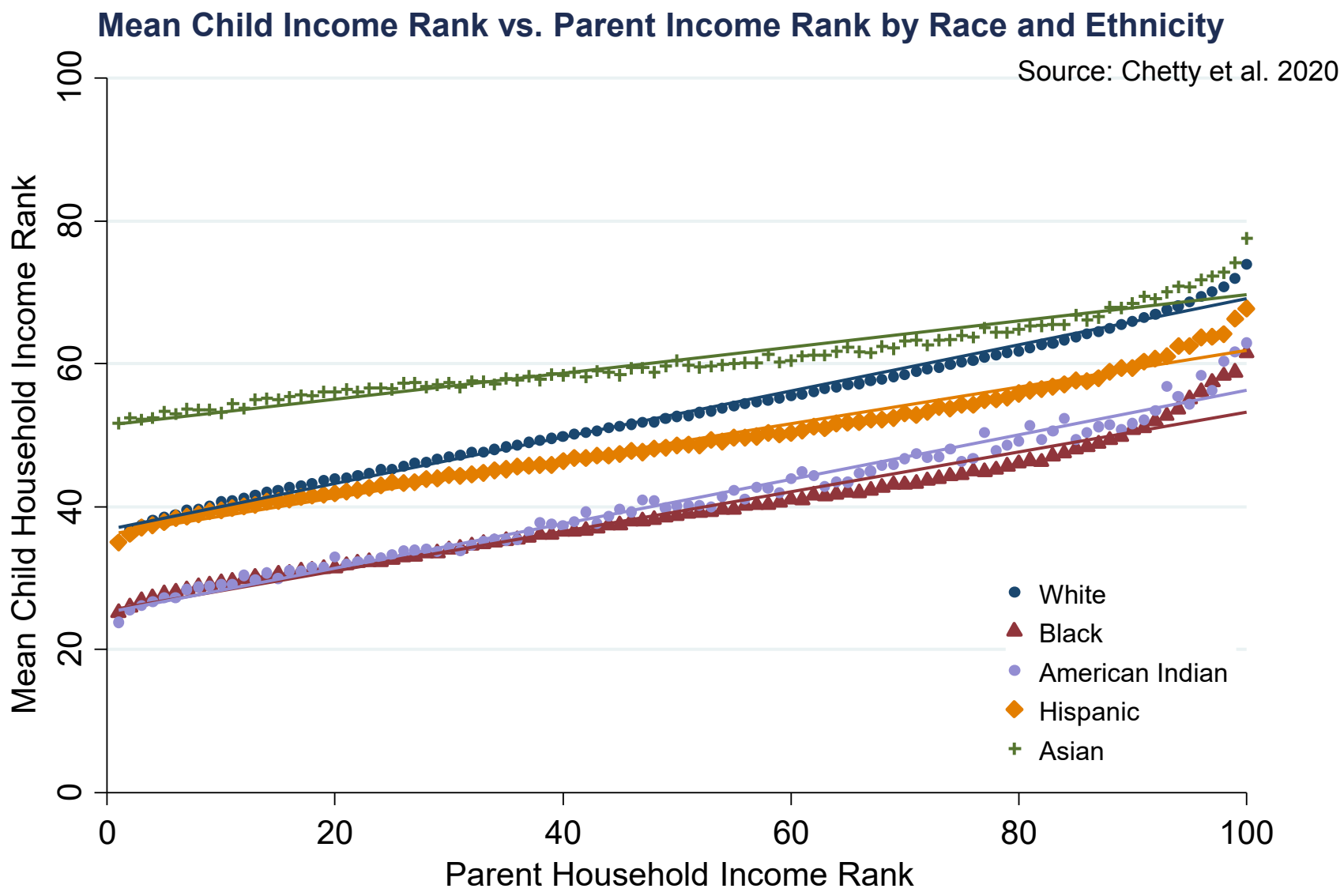
Note: This table reports selected statistics from a sample of the 50 largest commuting zones (CZs) according to their populations in the 2000 Census. The columns report the percentage of children whose family income is in the top quintile of the national distribution of child family income conditional 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

Govt Redistribution with Taxes and Transfers

Govt 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 $z \Leftrightarrow$ tax and transfer system is redistributive (or progressive)

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

a) If $y = z \cdot (1 - t)$ with constant t, tax/transfer system is neutral

b) If $y = z \cdot (1 - t) + G$ where G is a universal transfer, then tax/transfer system is progressive

Actual tax/transfer systems in rich countries roughly like b) with G welfare state transfers [education, health, retirement]

US Distributional National Accounts

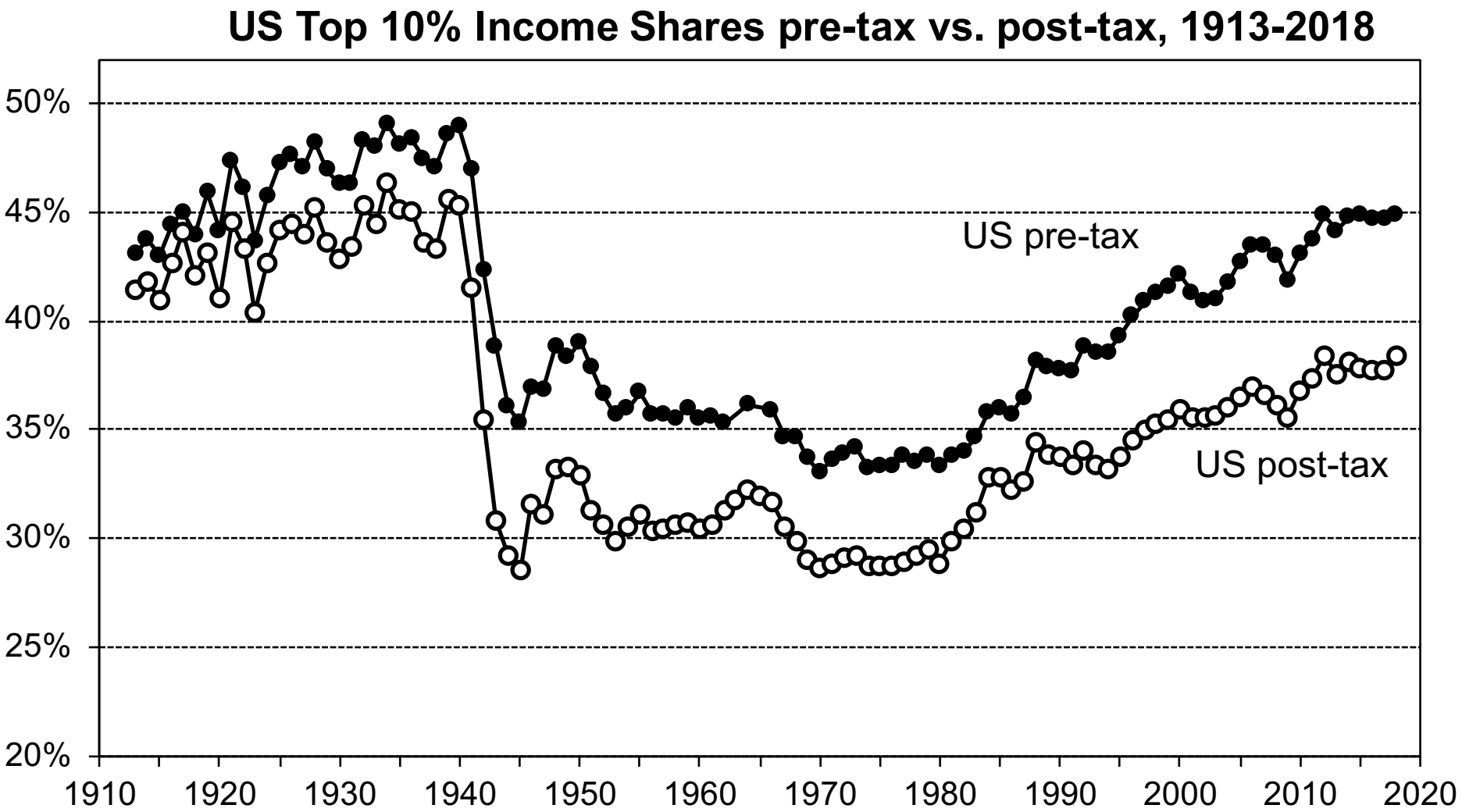
Piketty-Saez-Zucman (2018) distribute both pre-tax and post-tax US **national income** across adult individuals

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: $y = z - T(z) + G$

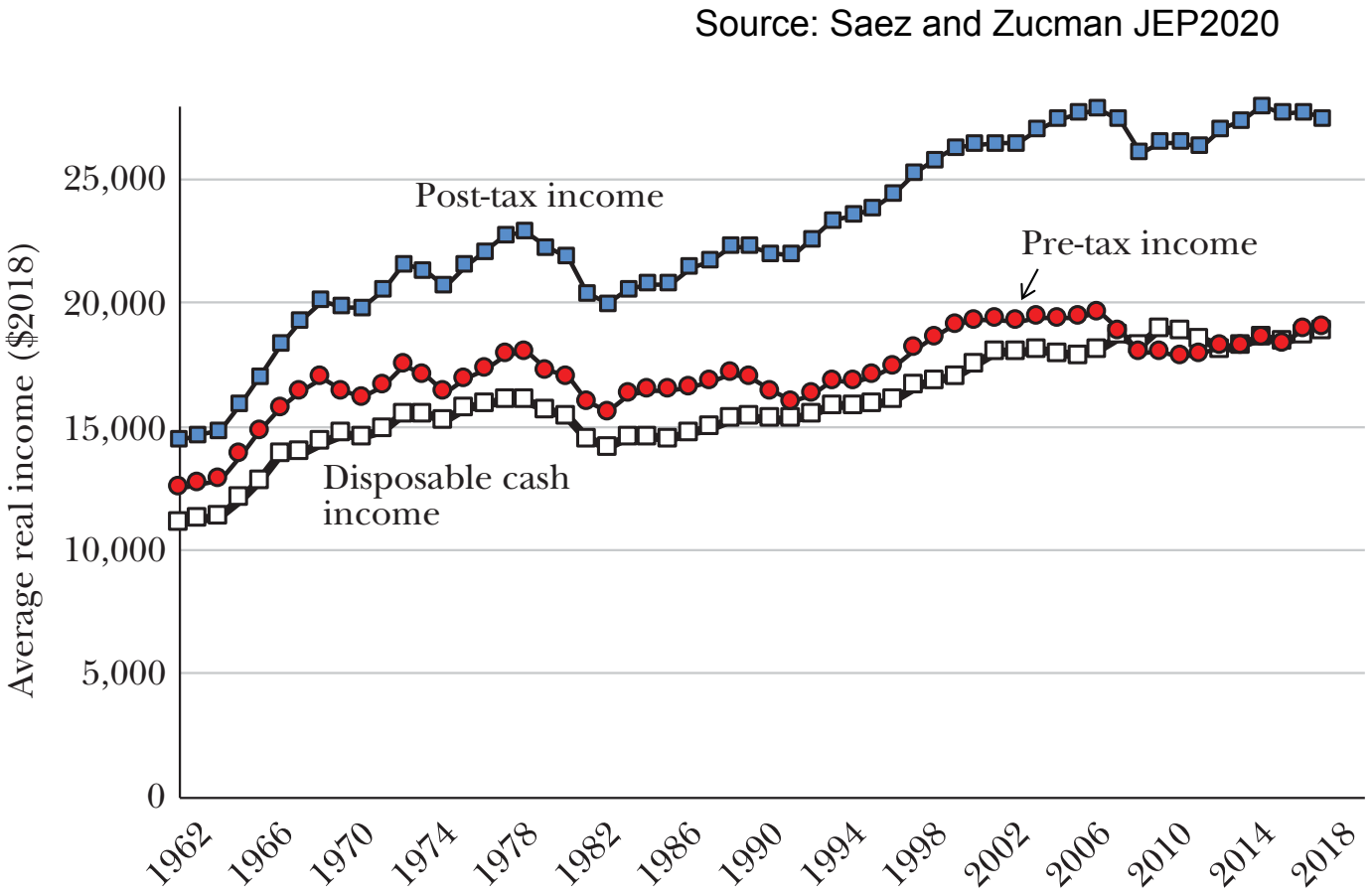
Both concepts add up to national income and provide a comprehensive view of the mechanical impact of government redistribution



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 realtimeinequality.org provides US inequality statistics in real time by projecting inequality based on monthly aggregates and employment

1) COVID had a large negative impact on **factor income** (labor+capital income), especially among low earners (job loss)

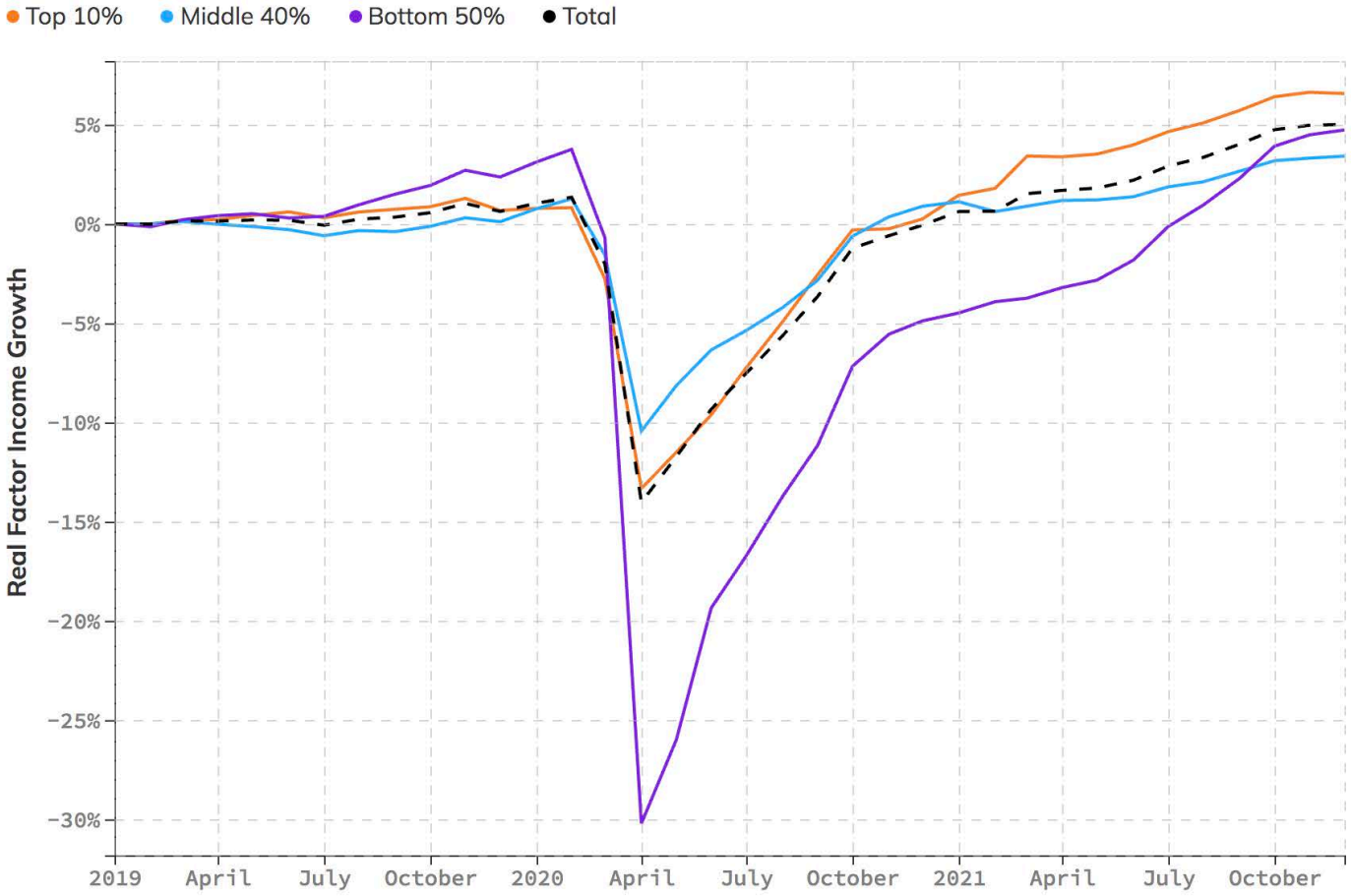
But all income groups recovered fast (in contrast to Great Recession of 2008)

2) But **disposable income** increased a lot during COVID, especially so for bottom 50% due to government transfers:

(a) direct checks to families, (b) extra unemployment benefits for job losers, (c) paycheck protection program for businesses, (d) 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.



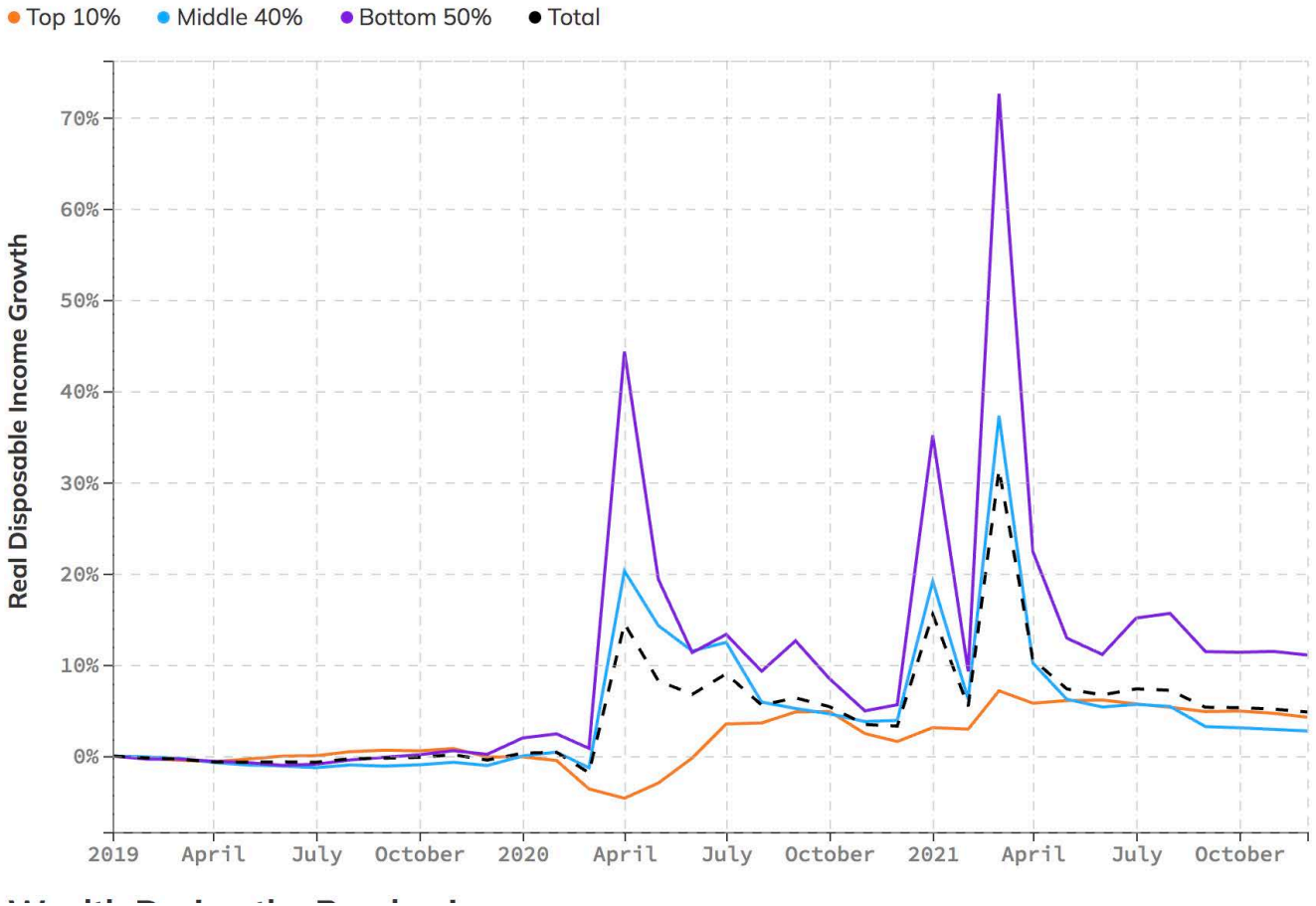
Factor income growth per unit

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%.

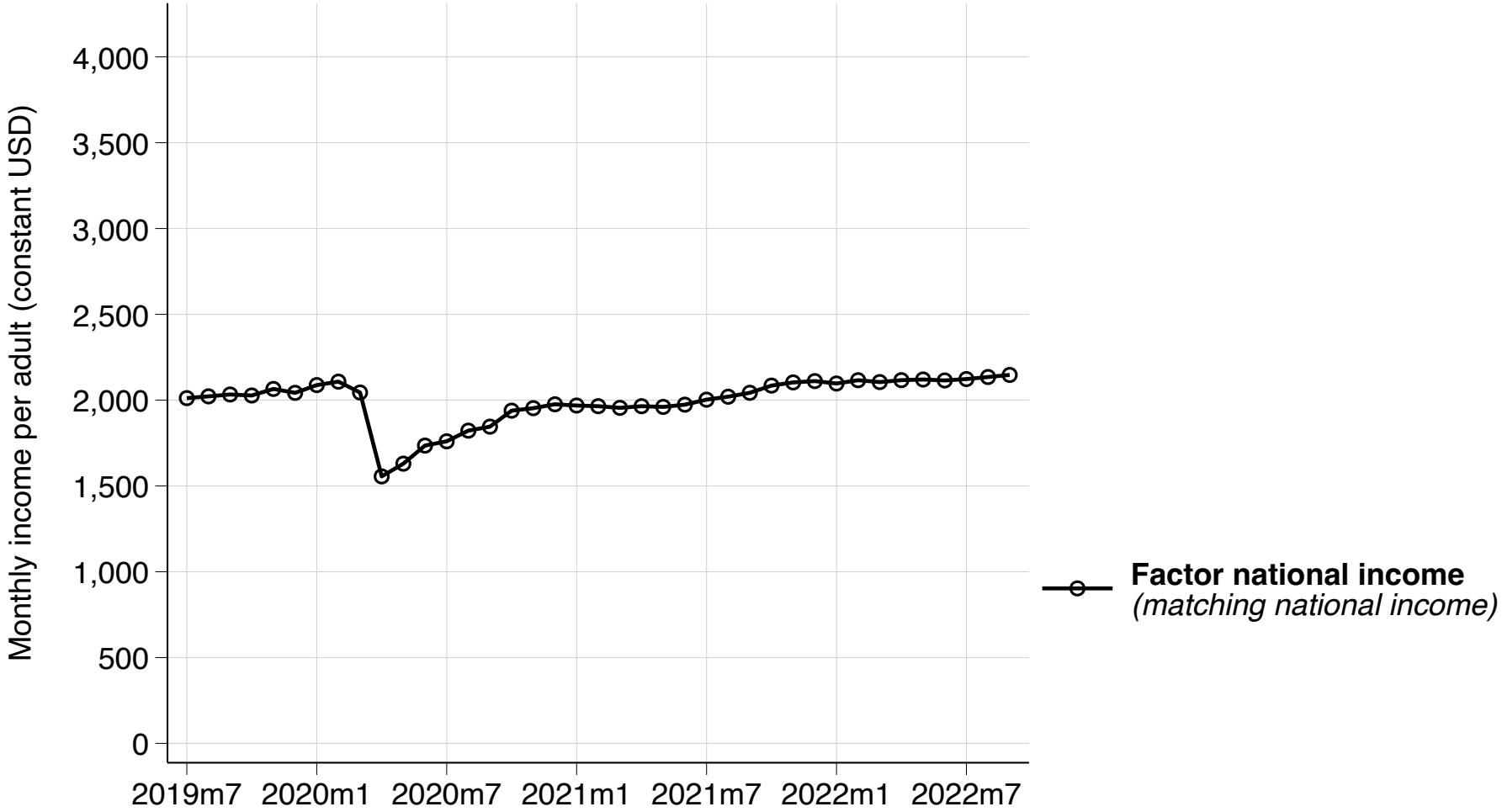


Disposable income growth per unit

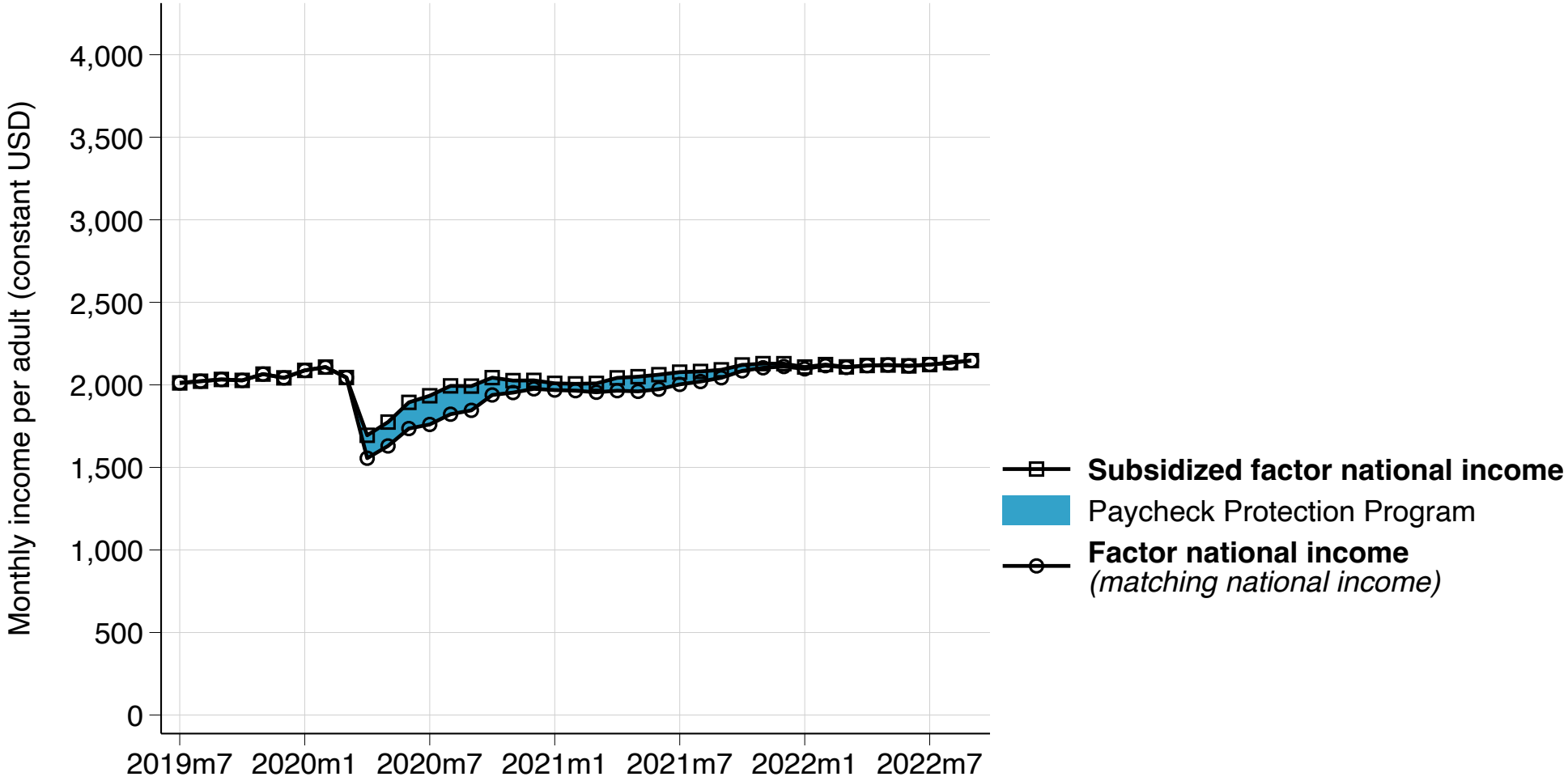
From 01/2019 to 12/2021

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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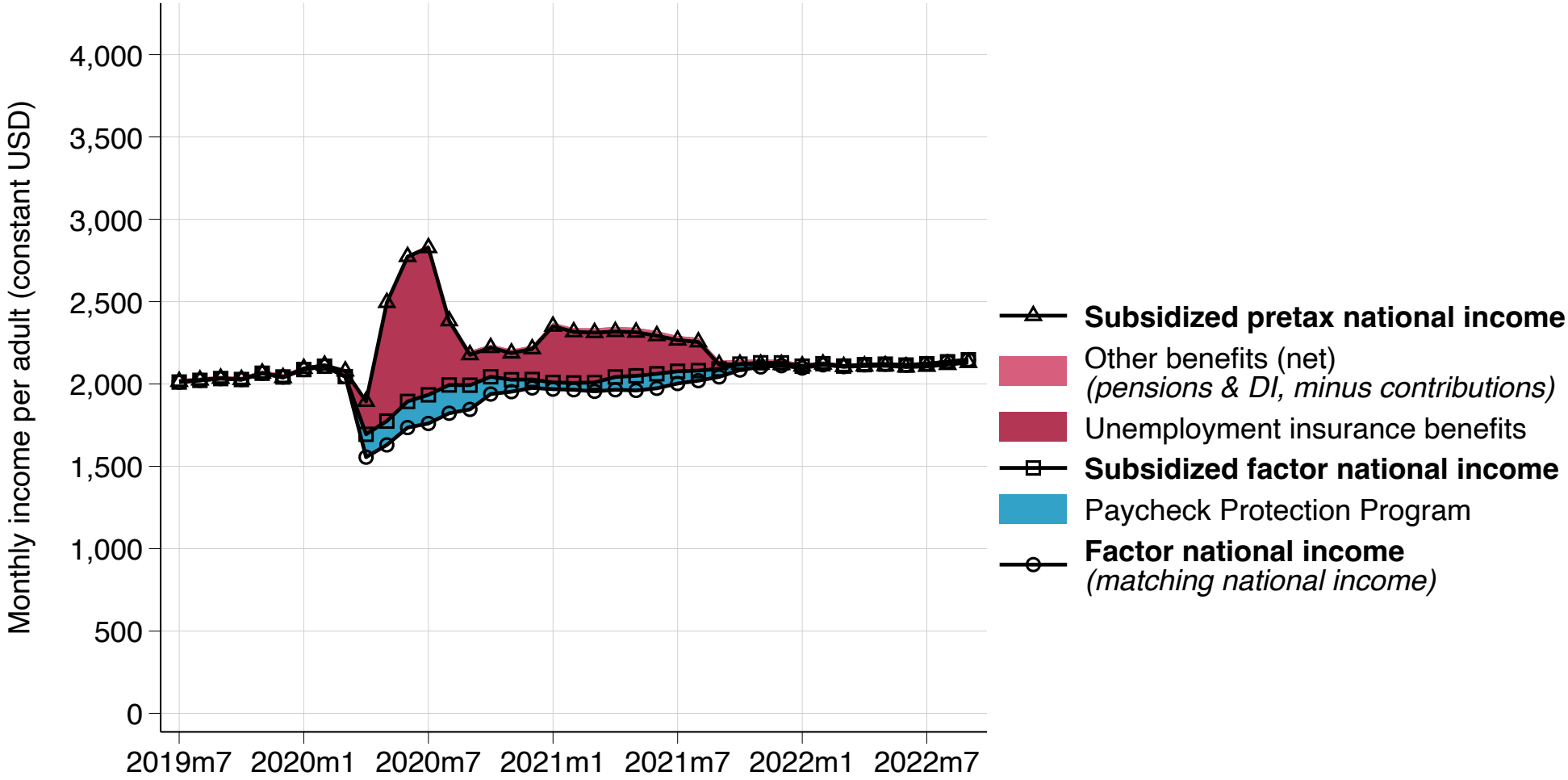
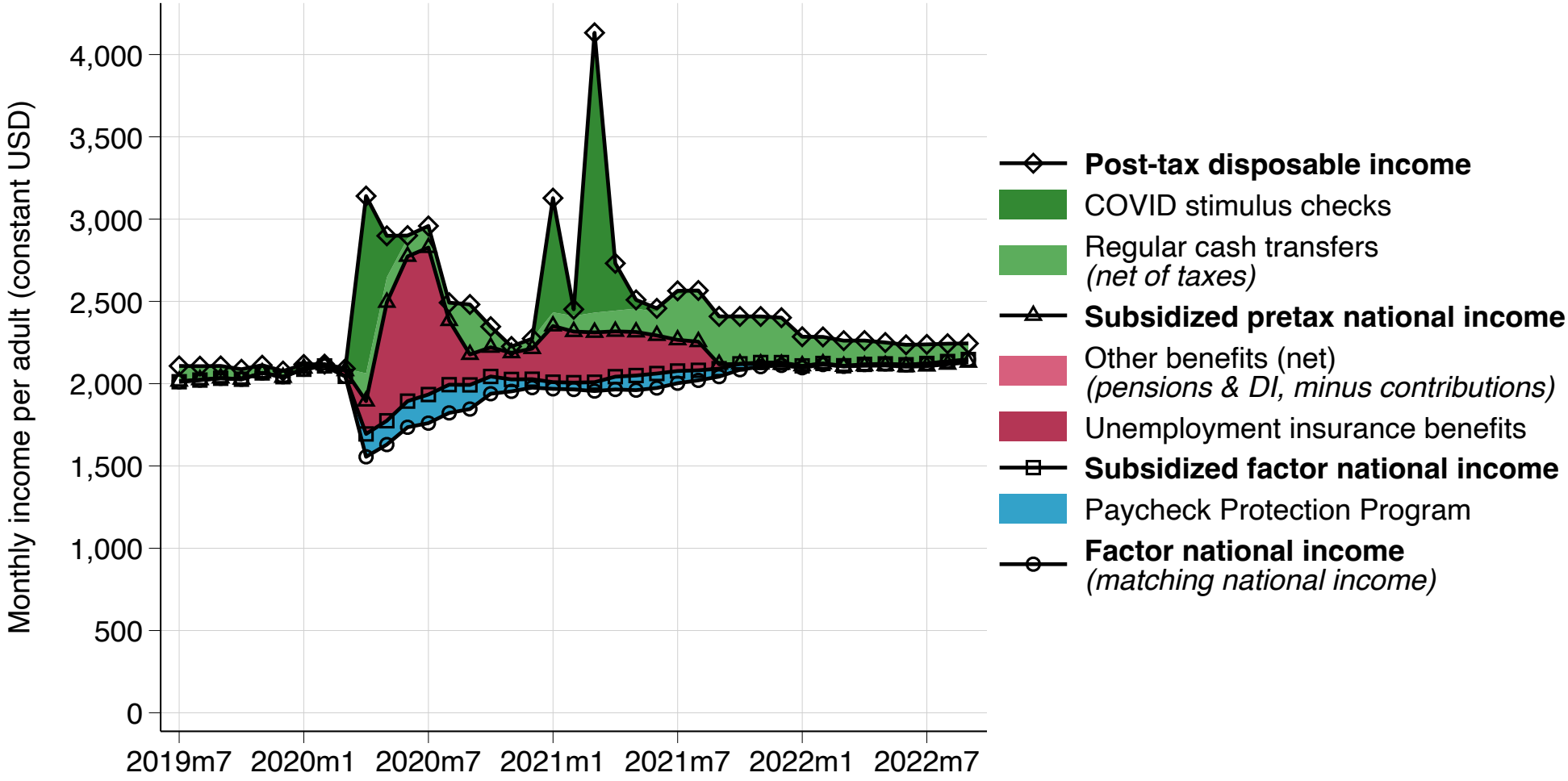


Bottom 50% Incomes (aged 20-64): The Role of Government Transfers



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

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

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

3) Corporate income tax (on capital income) [progressive] (15% of revenue)

4) Estate taxes (on capital income) [very progressive] (1% of revenue)

5) Minor excise taxes (on consumption) [very regressive] (3% of revenue)

Fed agencies (CBO, Treasury, Joint Committee on Taxation) and think-tanks (Tax Policy Center) provide distributional Fed tax tables

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 (famous Tiebout 1956 model) hence favored by conservatives

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

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

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

See ITEP (2018) "Who Pays" for systematic state level distributional tax tables

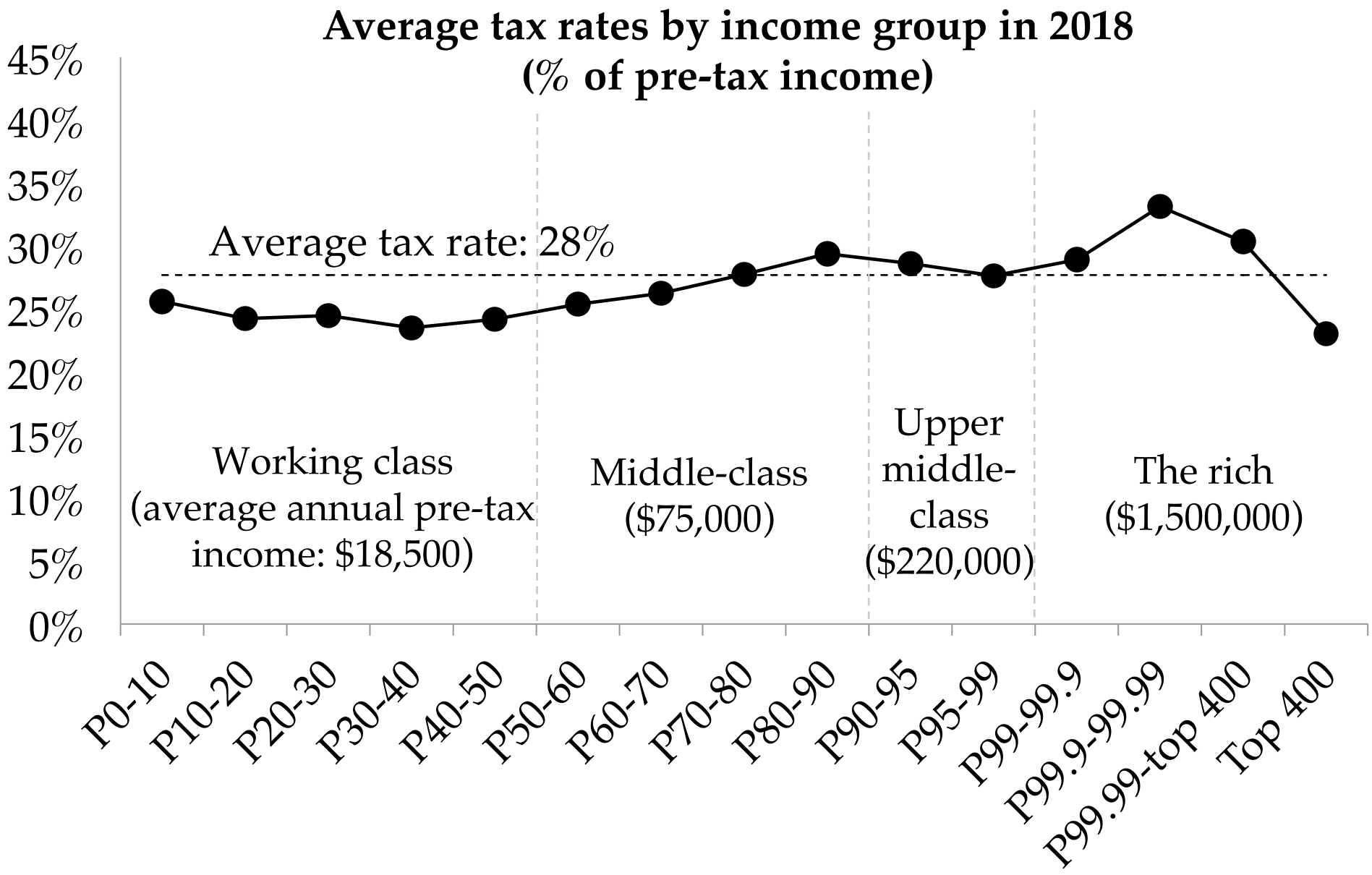
US Census provides Census of Government data

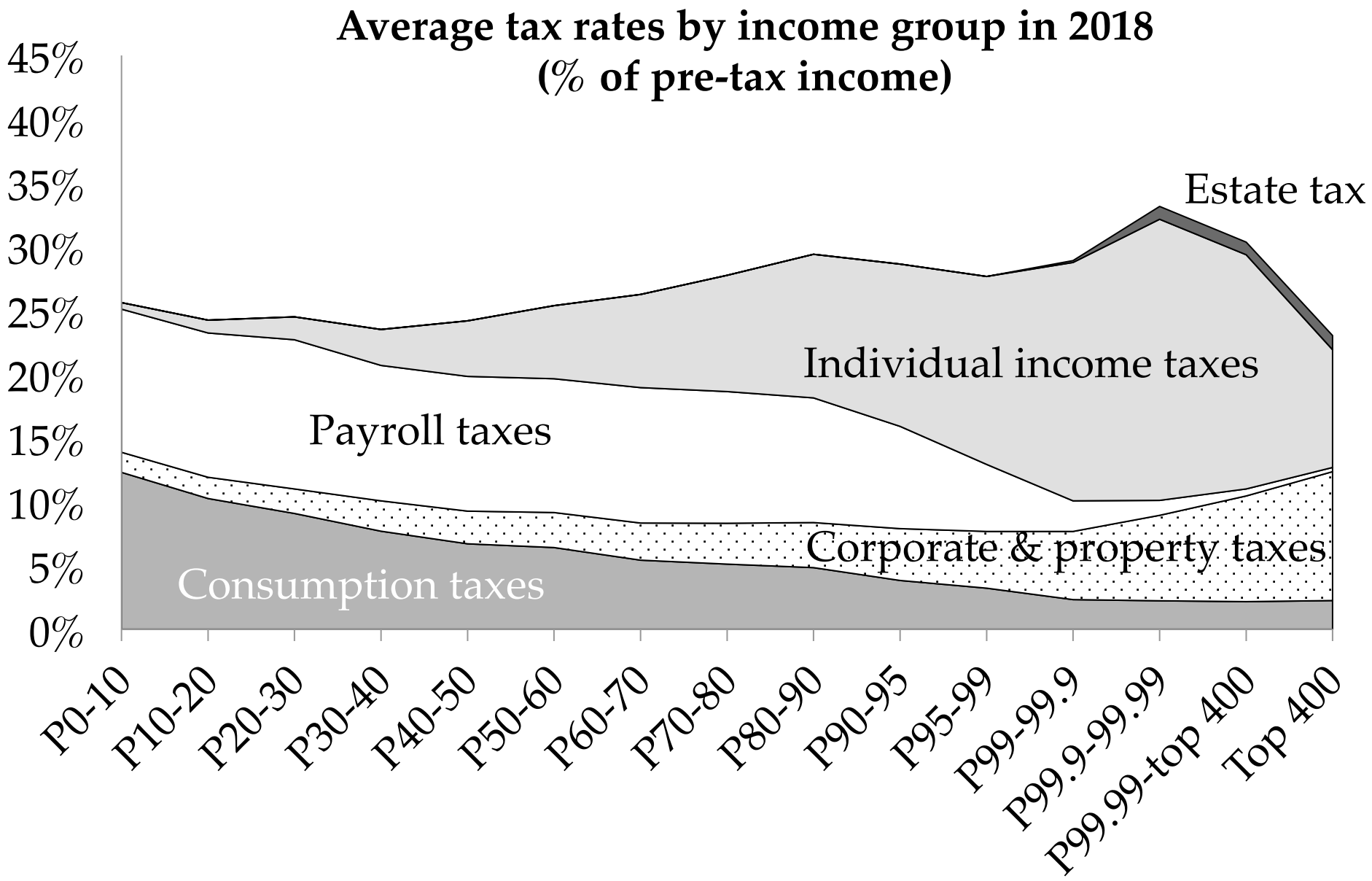
US tax/transfer System: Progressivity and Evolution

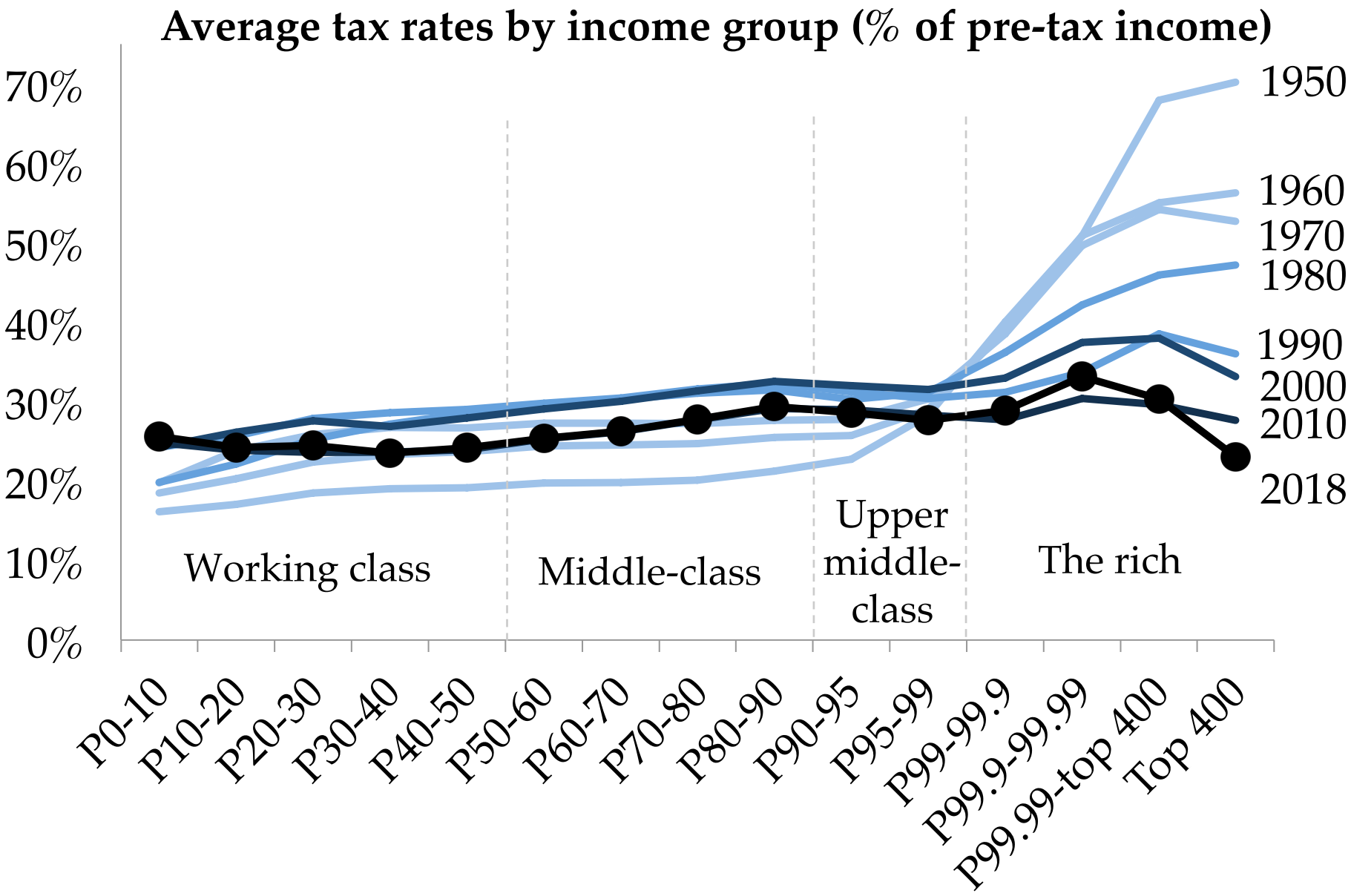
0) US Tax/Transfer system is progressive overall: pre-tax national income is less equally distributed than post-tax/post-transfer national income

1) Long Term Changes: Before 1913, US taxes were primarily tariffs, excises, and real estate property taxes [slightly regressive], minimal welfare state (and hence small govt)

2) Medium Term Changes: US Tax progressivity has declined since 1950 (Saez and Zucman 2019) but govt redistribution through transfers has increased (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

Plan for Lectures on Taxation/Redistribution

1) Tax incidence, efficiency costs of taxation, optimal tax on consumption goods

2) Taxation of labor:

Optimal design of labor income taxation and means-tested transfers

Empirical analysis of tax and transfer programs on labor supply and earnings

3) Taxation of capital (savings, wealth, and corporate profits)

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