


Income Distributions & Dynamics in America

a research collaboration between the Minneapolis Fed & the Census Bureau

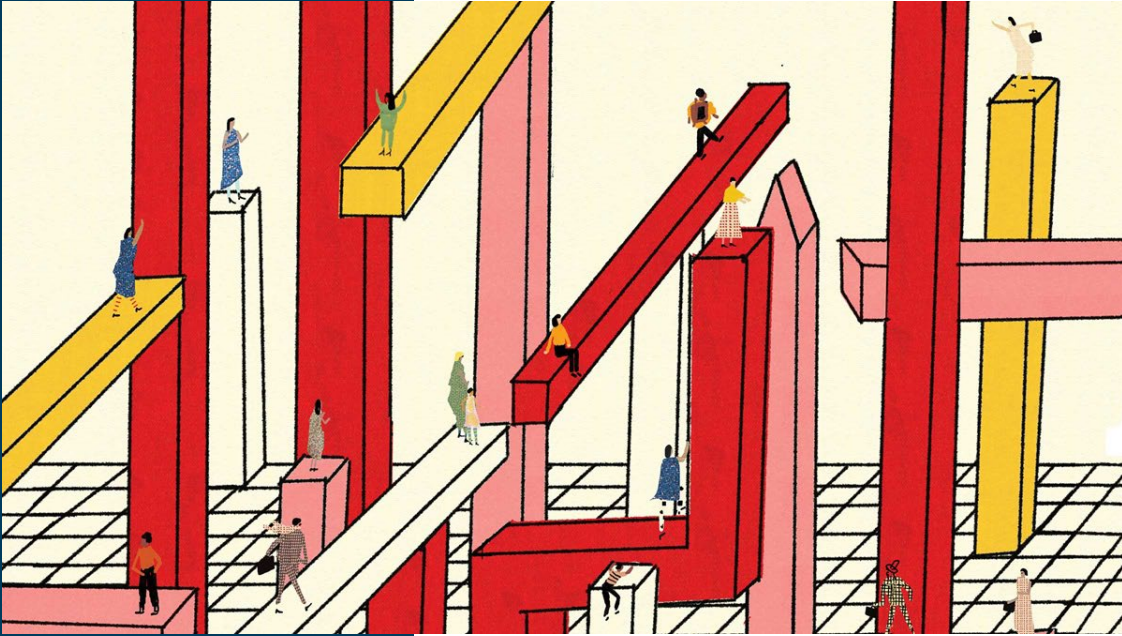
Conversations with the Fed
September 30th 2024

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Any opinions and conclusions expressed herein are those of the authors and do not reflect the views of the U.S. Census Bureau, the Federal Reserve Bank of Minneapolis, or the Federal Reserve System or their staffs. Kevin Rinz's work on this project was conducted primarily while he was a Census Bureau employee and a Visiting Scholar of the Opportunity & Inclusive Growth Institute. The Census Bureau has ensured appropriate access and use of confidential data and has reviewed these results for disclosure avoidance protection (Project 7511151; Disclosure Authorization Numbers CBDRB-FY23-0277, CBDRB-FY23-0373, CBDRB-FY23-CES014-019, CBDRB-FY23-CES014-016, and CBDRB-FY24-0131.)



- The U.S. is seen as a **land of opportunity**
- Yet, it is also a land of **salient divides** across groups
- And, in recent decades, there has been growing interest in **economic inequality**

The missing facets of income differences

Between 1980 and 1989, only 38 articles published in the top five economics journals included the word “inequality” in their abstracts.

This number increased to [...] 148 in 2010–2018. For the conversation to progress in the right direction, we believe that economists need rich microdata that accurately represent the evolution of the income distribution in all of its many facets.

Guvenen, Pistaferri, and Violante
(GRID, 2022)

Exhibit A: Small samples & asterisks

American Indians and Alaska Natives may be described as the “**Asterisk Nation**” because an asterisk, instead of data point, is often used in data displays when reporting racial and ethnic data.

NCAI Policy Research Center

Result is that researchers and policymakers can seldom answer many important but straightforward questions

A need for **granular** income distributions

- Statistically **credible** measures of **granular** income distributions often cannot be tabulated using public microdata sources.
 - for many demographic groups
e.g. race & ethnicity, sex, foreign-born status
 - for administrative units below federal
e.g. individual states
 - for the intersection of these
e.g. **Asian Women in South Dakota**

IDDA overview

- Statistics & dimensions
- Select findings & updates
 - A new data viz feature
 - Gender disparities
 - What surveys may get wrong
 - Racial differences
- Extended Q&A



IDDA (“eye—dah”) 101

A comprehensive resource on income distributions and dynamics for US subpopulations and sub-national geographies

- Public good: data available to researchers and policymakers
- Better understanding of how the U.S. economy works
(including to achieve FOMC mandate)

IDDA statistics

- Large granular dataset constructed by combining two big data sources
 - IRS: tax records
 - all filed individual income tax return Form 1040s
 - all employer-filed wage and tax statement Form W-2s
 - U.S. Census Bureau:
 - individual demographic information, especially race and ethnicity
- Over 6M statistics built on 20+ years (1998-2019) of IRS administrative data and Census demographic data

Key building blocks

- Income Tax Return Form **1040**
 - Total wages, salaries and tips (line 7)
 - Adjusted gross income (line 37)
 - 1998-2019
- Wage and Tax Statement Form **W-2**
 - Total wages and salaries (box 1)
 - Deferred compensation (box 12a-12d)
 - 2005-2019

- Census linkages
 - **Individual** identifier (PIK)
 - **Housing** unit identifier (MAFID)
 - Links to tax records & longitudinally
- Census demographic data
 - Sex, place of birth, year of birth/death
 - Best Race and Ethnicity Administrative Records File

Dimensions of IDDA statistics



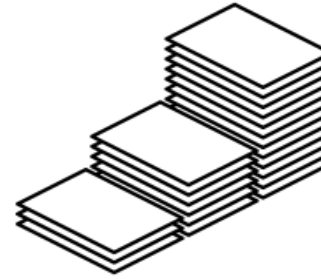
wages & salaries
earnings
including deferrals
gross income (AGI)
non-wage income



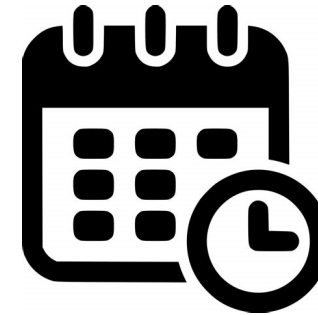
age [10-year bins]
sex [m/f]
race and ethnicity
[6 Census groups]
US-born status
+ two-way pairs



federal
individual states
+ DC
combined Native
areas boundaries



all 1040
households
(addresses)
all W2 earners
prime-age working
W2 earners



year
[1998/2005–2019
for 1040s/W2s]
change window
[1-year changes]
[5-year changes]



income percentile
top income share
change percentile
income mobility
across bins

Large underlying samples: higher resolution

Table 1: IDDA Sample Sizes and Composition (2010)

	Household-1040	Individual-W2	CPS Household	CPS Individual
In Numident	182,200,000	150,400,000	–	–
Has age, gender, and state	181,000,000	146,700,000		
Has race/ethnicity	178,000,000	144,300,000		
Has valid MAFID	169,300,000	–		
Final Sample N	169,300,000	144,300,000	153,586	95,094

Some key limitations in IDDA

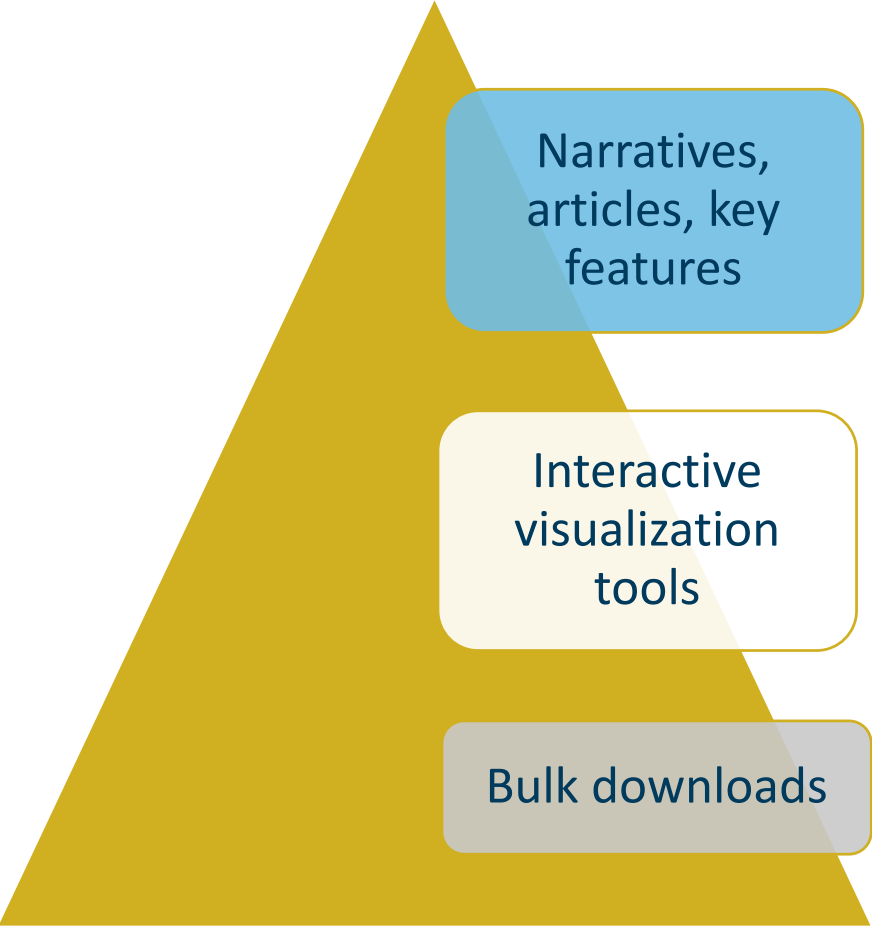
despite the wealth & quality of underlying data

- Statistics reflect pre-tax, pre-transfer income for populations of filers
 - not suitable for post-transfers & post-taxes income analysis at the bottom/top
 - income \neq wealth \neq consumption
- Geographic unit is the state or nation, for 1998-2019 + tribal areas unit
 - not available for finer grained geographic units
- Statistics not available for all feasible demographic group interactions
 - not computed for many other relevant dimensions e.g. education
- Household income not allocated to individual earners



IDDA web data viz
+ (exciting) update

IDDA web product: minneapolisfed.org/idda



Narratives,
articles, key
features

Interactive
visualization
tools

Bulk downloads

- Product overview and novel features
 - Focus on new dimensions of the data source
 - Featured stories and articles highlighting novel insights
- Research papers
- Interactive charts on income disparities
 - Visualization charts with a focus on race, ethnicity, gender, and foreign-born
- Bulk downloads

Race and ethnicity

Sex

U.S./Foreign-born

Age

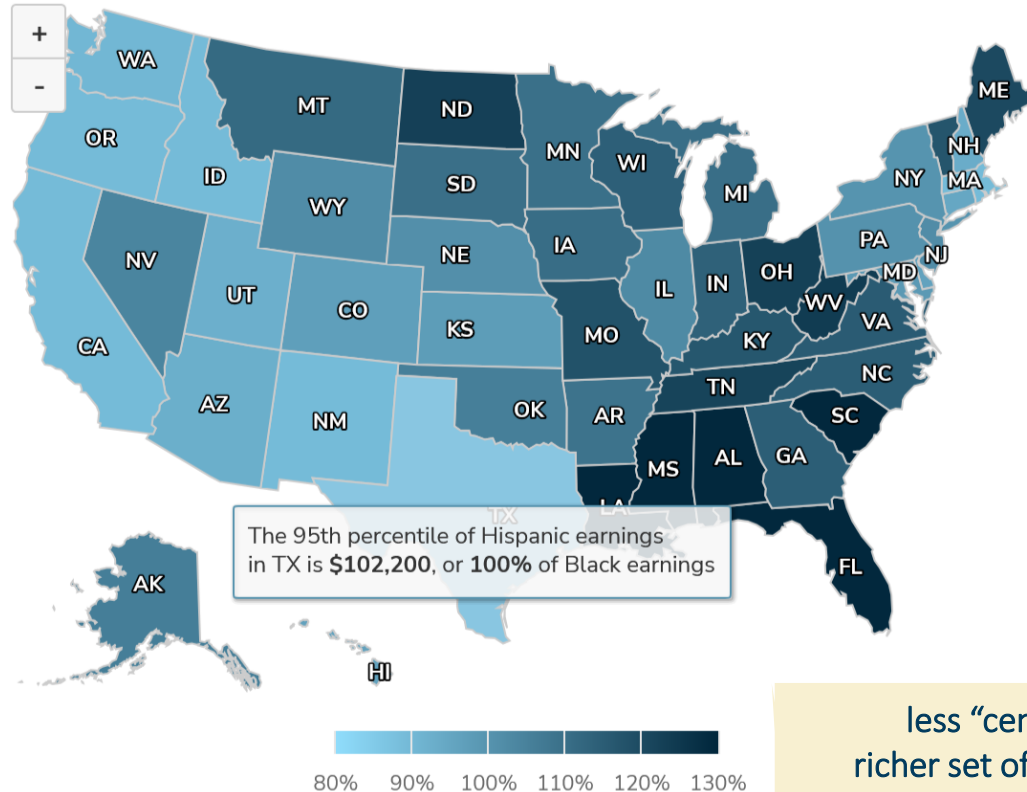
kudos & thanks to our
partners in Public Affairs!

Explore the 95th percentile of the distribution of individual earnings among people who are Hispanic in 2019

Compare these values with incomes among people who are Black

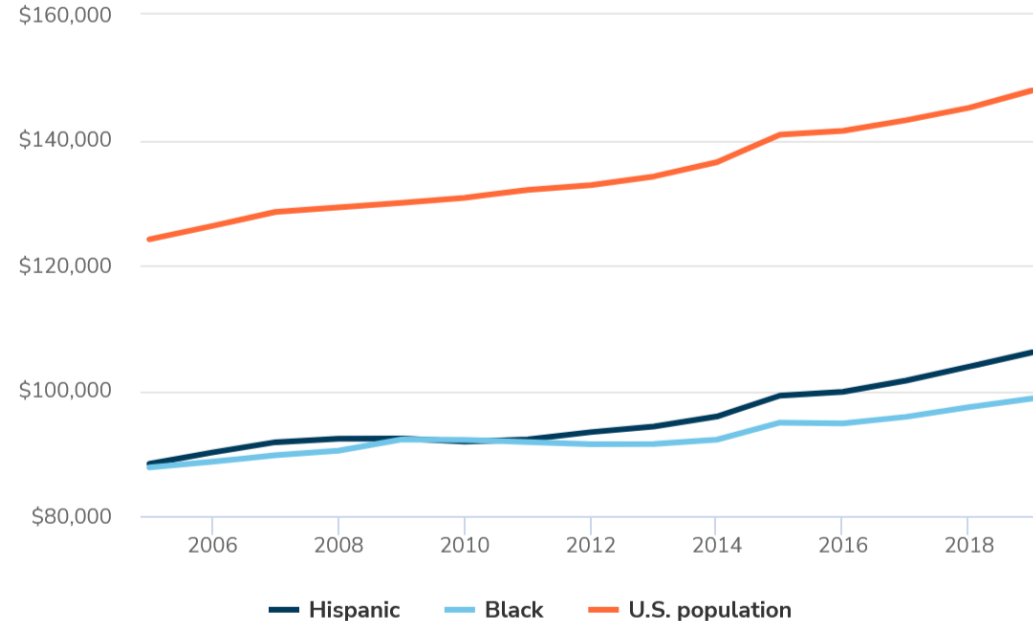
Hispanic individual earnings relative to Black earnings

95th percentile, 2019



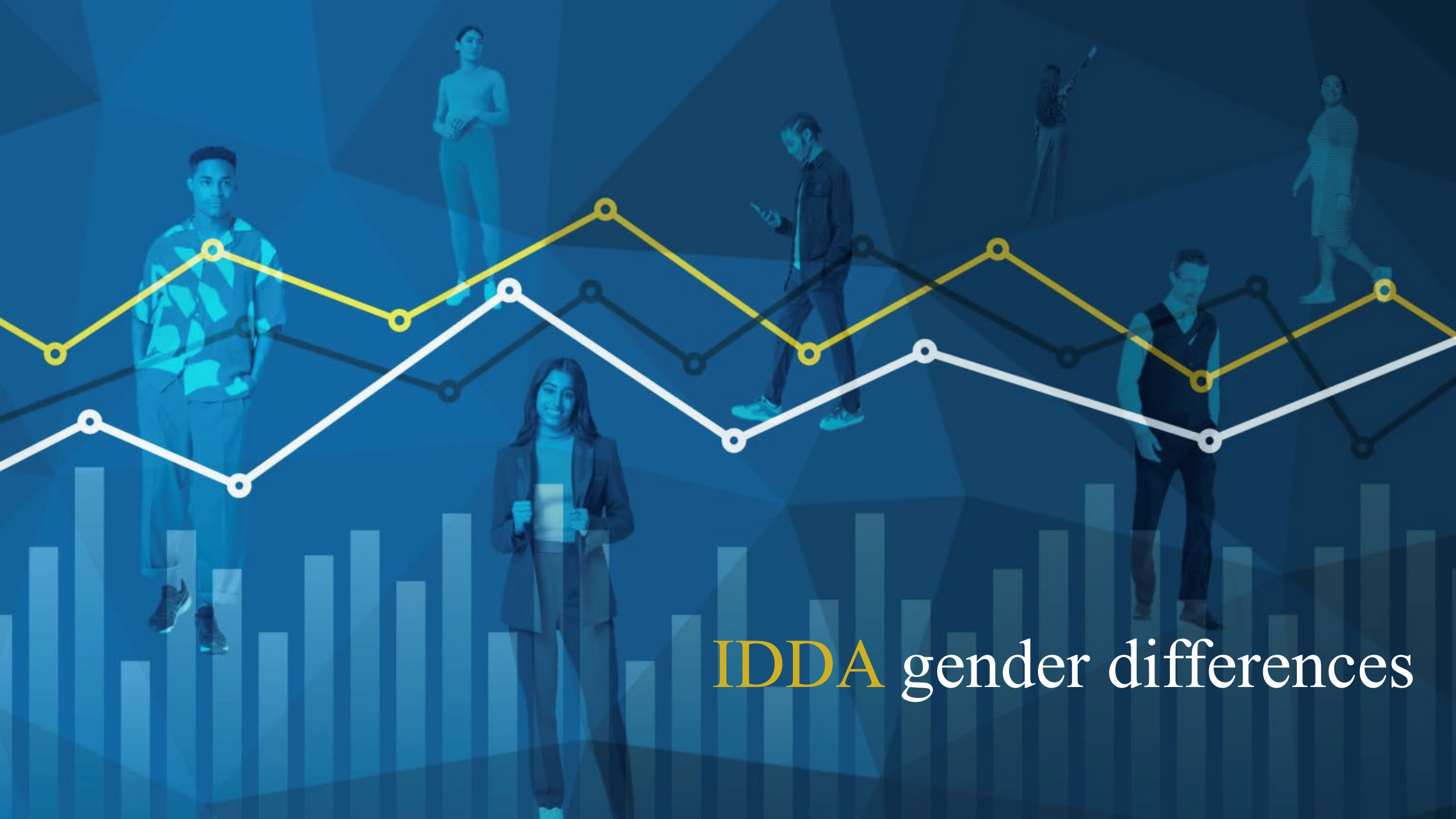
Hispanic individual earnings compared with Black earnings, 2005-2019

95th percentile



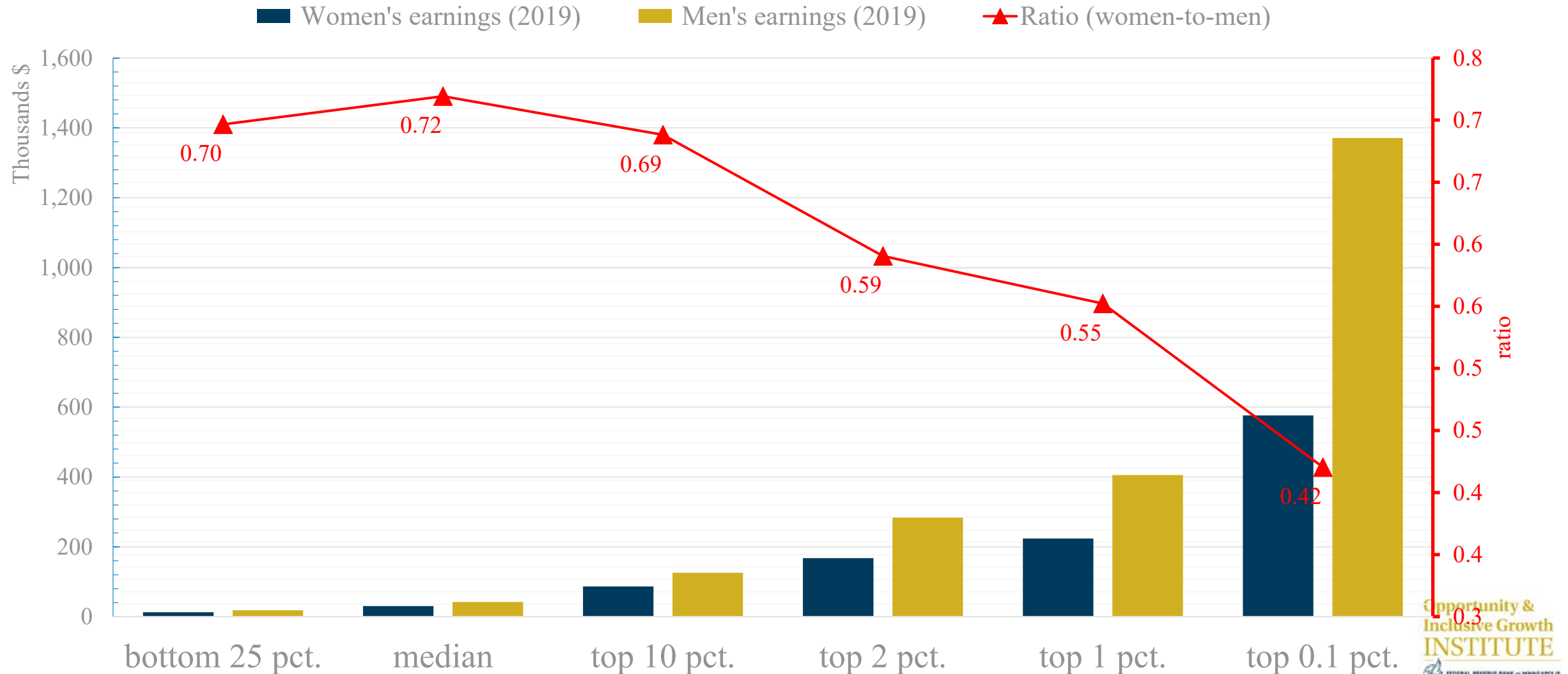
less “centralizing”,
richer set of comparisons

All earnings are inflation adjusted to 2019 dollars. The race and ethnicity groups we consider are Hispanic, non-Hispanic American Indian or Alaska Native, non-Hispanic Asian, non-Hispanic Black, non-Hispanic Native Hawaiian or Pacific Islander, and non-Hispanic White. The map legend shows a truncated range to reduce the visual impact of outliers.



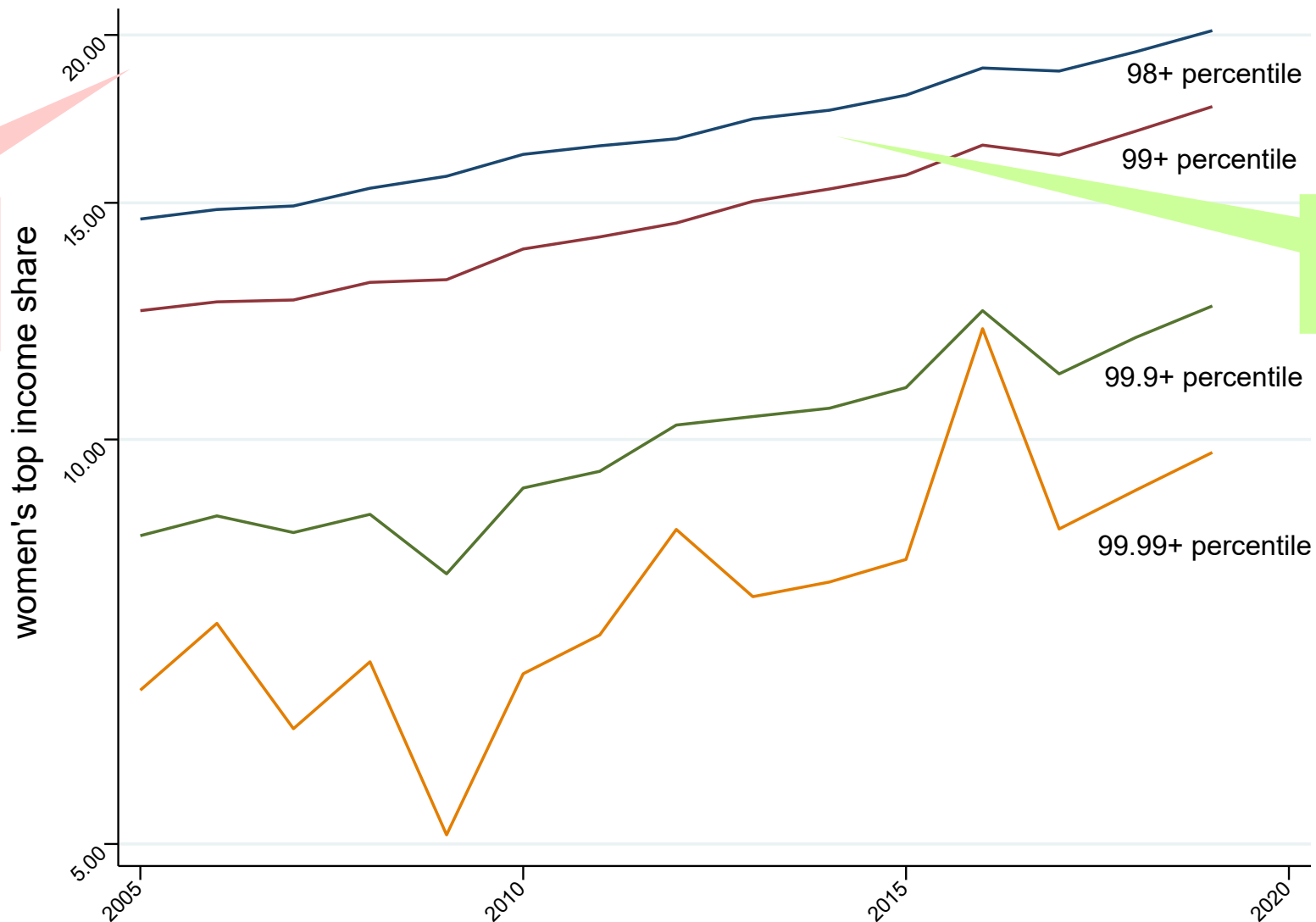
IDDA gender differences

Gender earnings gap widens significantly at the top



Women hold small but growing share of top earnings

women's share of top earnings are **small**



... but women's are steadily **catching up**

Women's top earnings shares don't keep up across states

$$\Delta \text{women's top share}_{\text{year}}^{\text{state}} = \alpha_t + \beta \times \Delta \text{top income share}_{\text{year}}^{\text{state}}$$

across states,
the more earnings goes to the top,
the smaller women's share

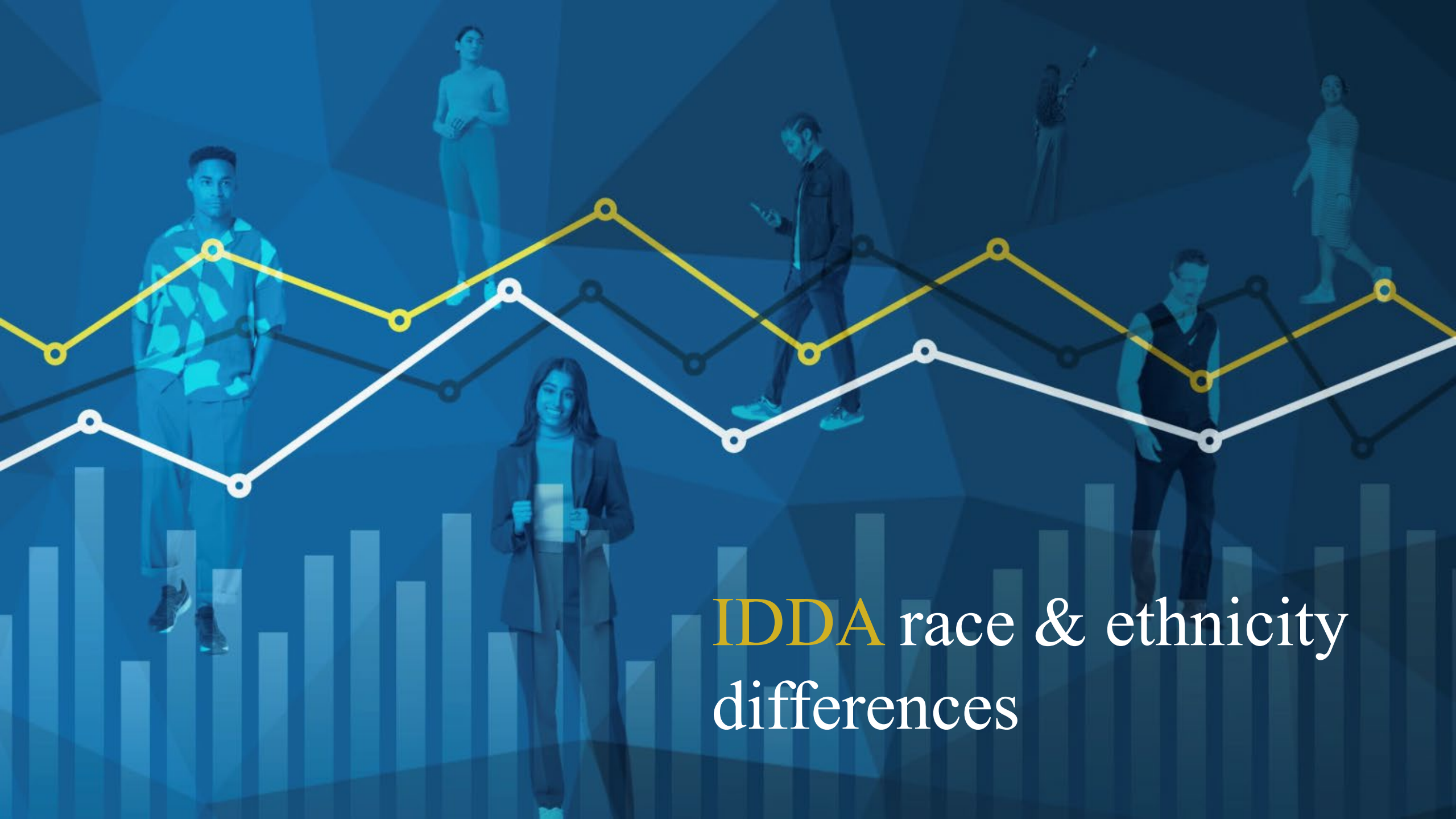
β	change in women's share of state's top 2 percent earnings
1-year changes in state's top income share	−0.28
	(.05)
3-year changes in state's top income share	−0.23
	(.06)

Super-earners: an unequal gender concentration

$$\Delta \text{top share among women}_{year}^{state} = \alpha_t + \beta \times \Delta \text{top share among men}_{year}^{state}$$

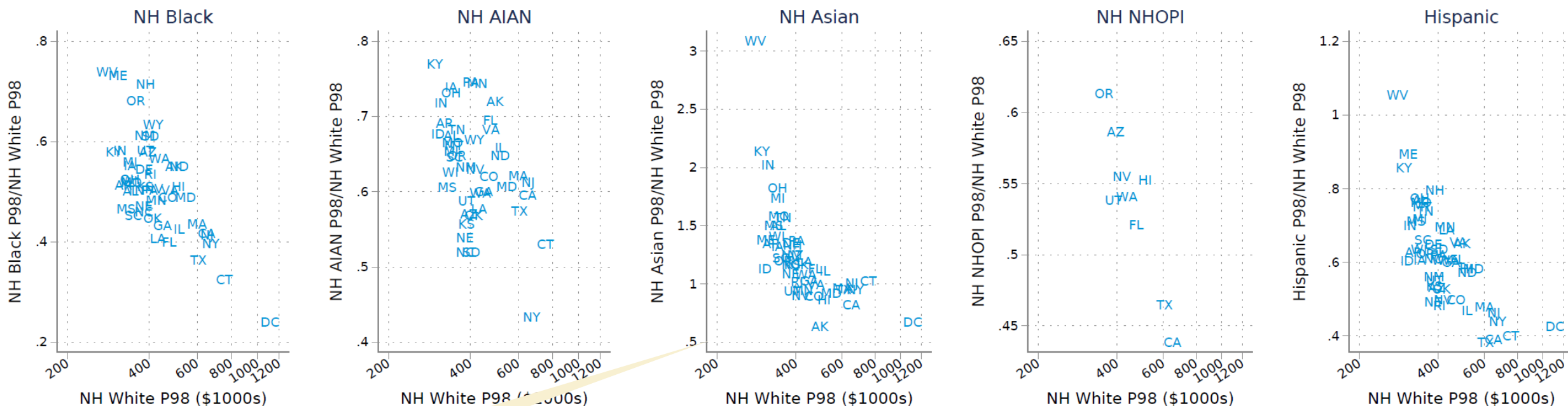
Women super earners
don't out-earn women
as much as
men super-earners
outpace their peers

β	change in top 2 percent earnings share among women
1-year changes in top share among men	+0.17
	(.01)
3-year changes in top share among men	+0.22
	(.02)



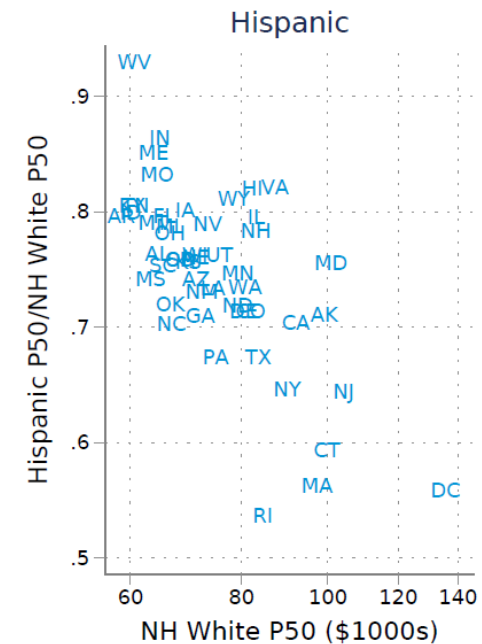
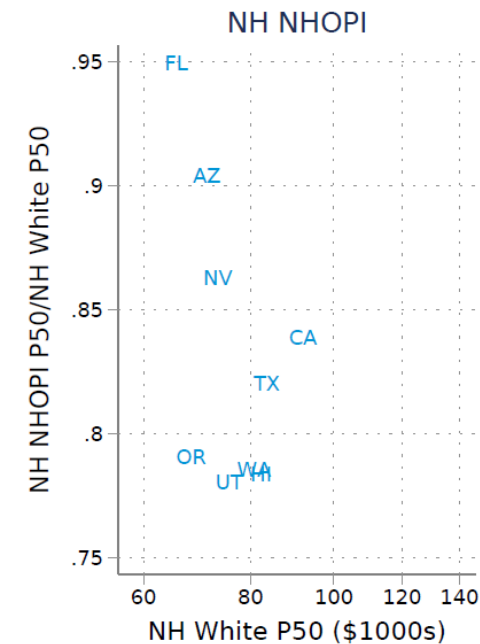
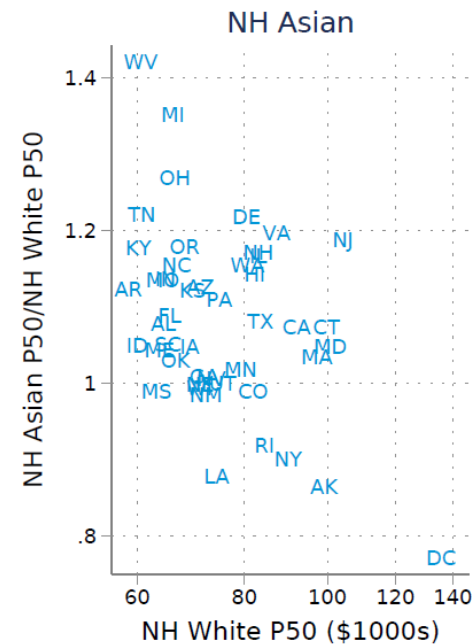
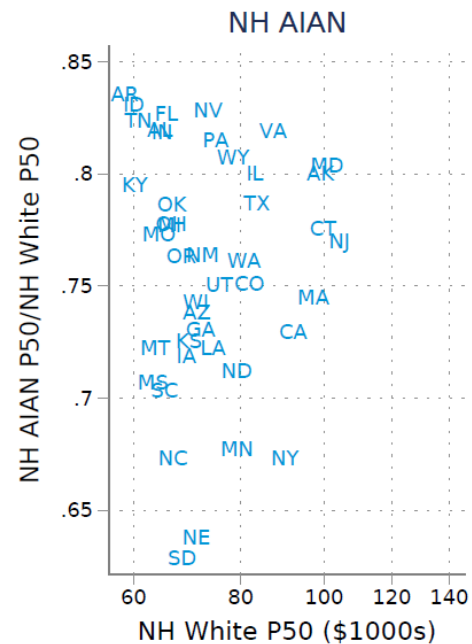
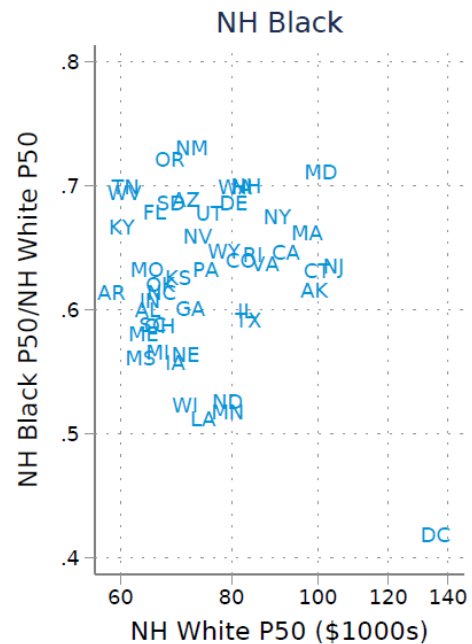
IDDA race & ethnicity
differences

At the top, higher income states have larger racial gaps



Relative earnings vary a lot across groups

... but, not so clearly, using median incomes





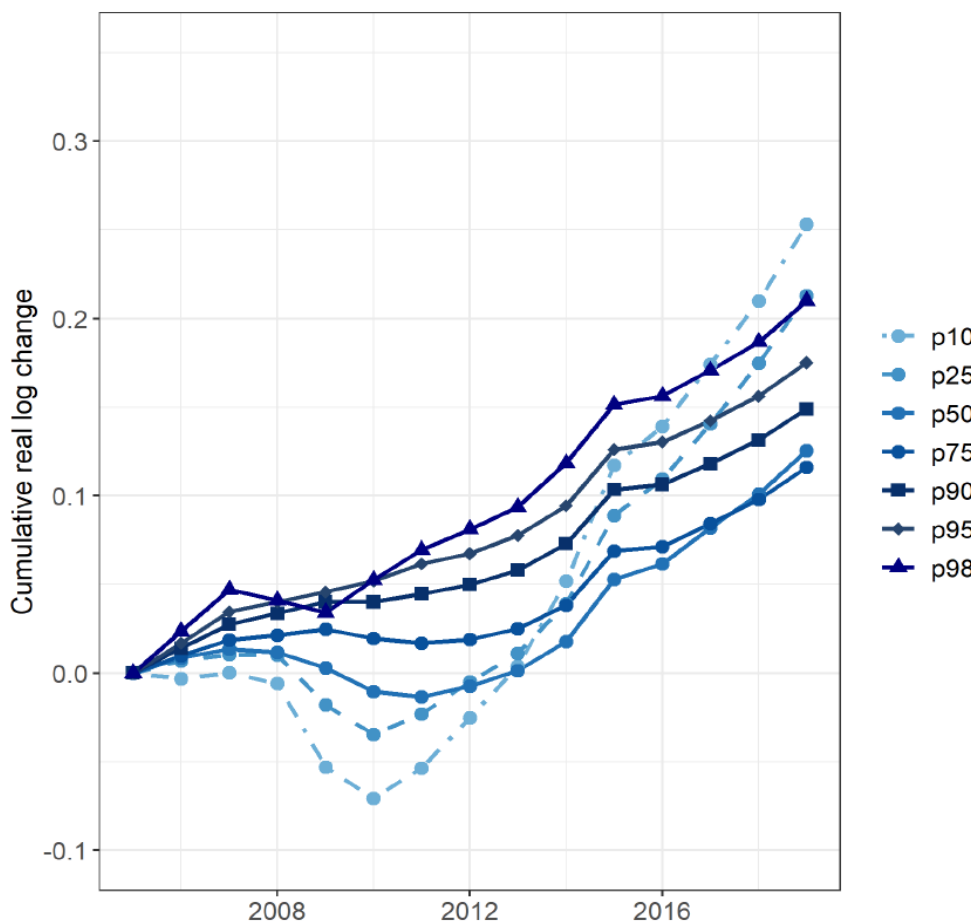
IDDA vs. with survey-based (CPS)
inequality trends

Mapping income concepts in IDDA & CPS

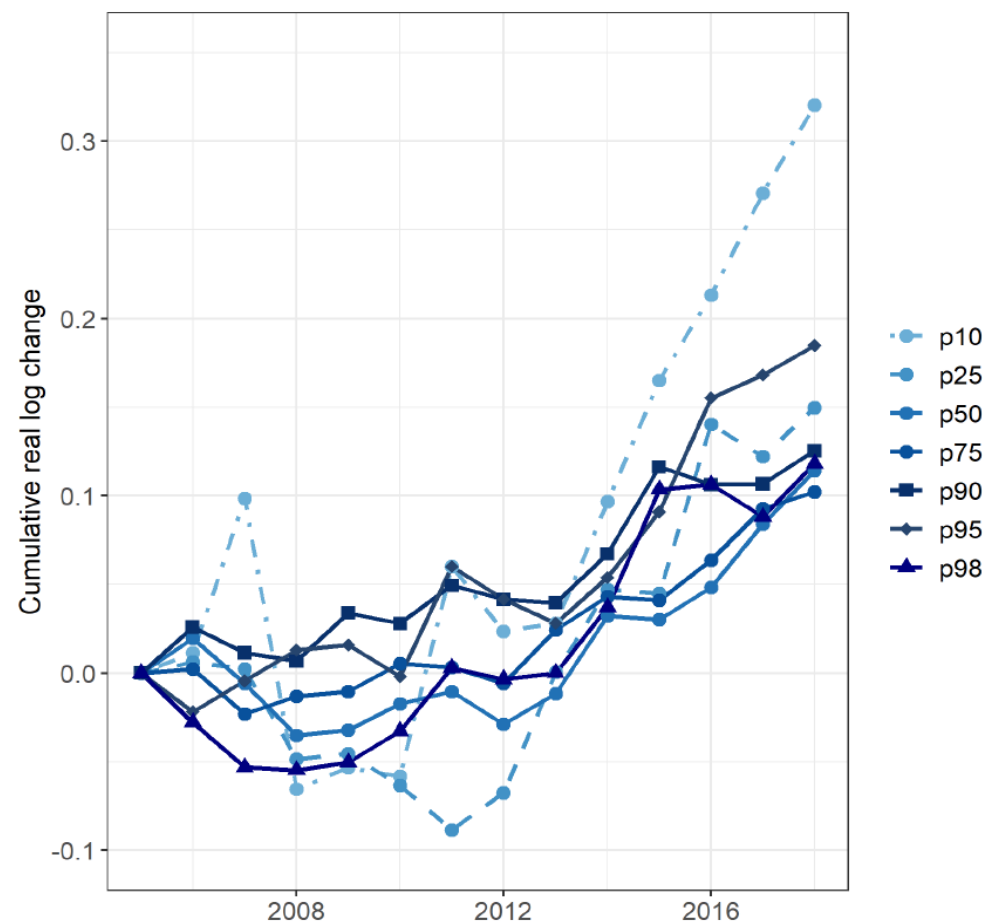


CPS Income	Types of Income Included in CPS measure	IDDA Income	Major CPS-IDDA Differences
Individual wage/salary earnings (WSAL VAL)	Earnings from longest job if received wage/salary income in longest job + total wage or salary earnings from additional jobs. Includes tips, bonuses. Excludes self-employment, except if respondent owns an incorporated business and receives wages from it.	Individual- W2, wage compensation (WC) or total compensation (TC)	Neither the CPS nor IDDA wage income concept includes self-employment income. However, research has shown some CPS respondents misclassify self-employment income as wage income. TC includes elective deferrals reported in Box 12 of form W-2. In this section, individual earnings comparisons are based on WC.
Household wage/salary income (HWSVAL)	Total of WSAL VAL aggregated across all earners in a household	Household-1040, wage/salary income (WS)	See row above. Addresses may not align between the CPS and IRS data sources, causing household assignment to differ across the two sources for a given individual.
Total household income (HTOTVAL)	Total income aggregated across all earners in a household. This includes wage and salary income and self-employment income, as well as non-wage income sources: <i>Social Security, SSI income, public assistance and welfare, disability income, interest and dividends, rental income, veterans' benefits, workers' compensation, survivor's income, alimony, child support payments, distributions from pension or private retirement accounts, and unemployment compensation.</i>	Household-1040, Adjusted gross income (GI)	CPS measure includes some types of nontaxable or partially taxable income that are excluded in IDDA (in italics). The CPS measure excludes above-the-line deductions on Form 1040, for example deductions from health savings accounts and student loan interest payments, which are subtracted from household AGI. The CPS measure excludes capital gains, which are included in household AGI.

W-2 earnings fan out more in IDDA at the top, but less bottom compression in IDDA

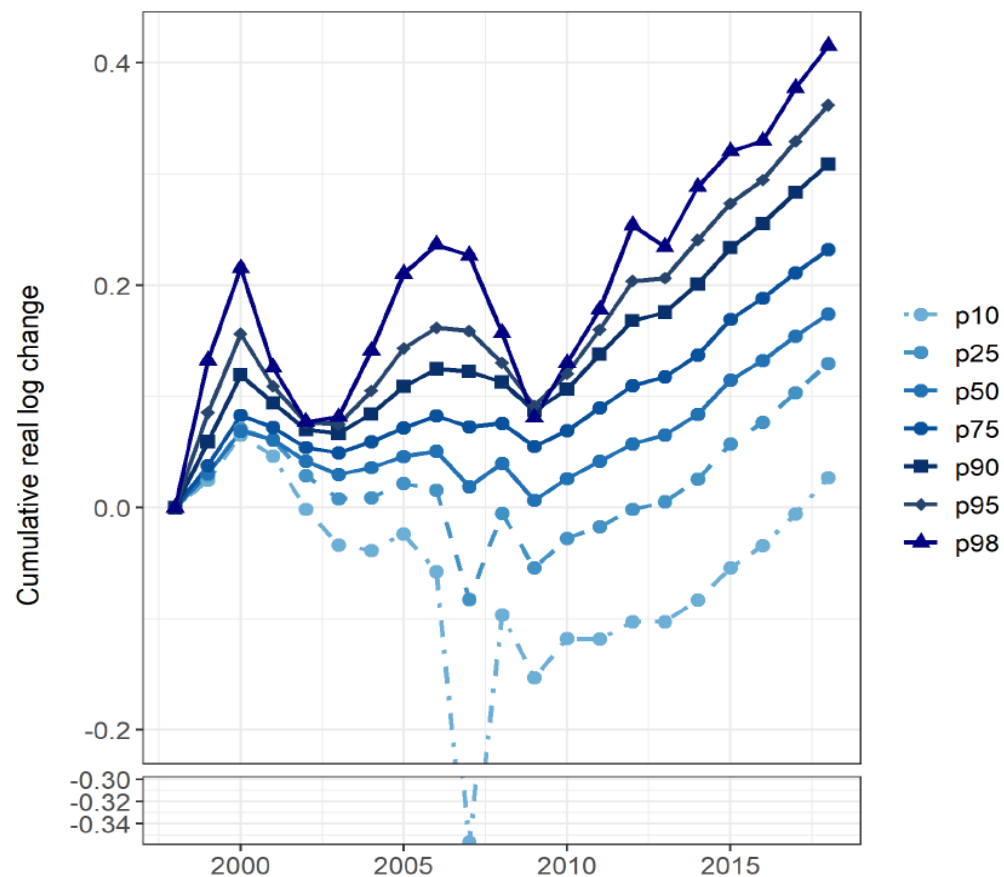


(a) IDDA earnings growth



(b) CPS earnings growth

Household income growth fans out more in IDDA, but bottom sensitive to tax reforms ins-and-outs

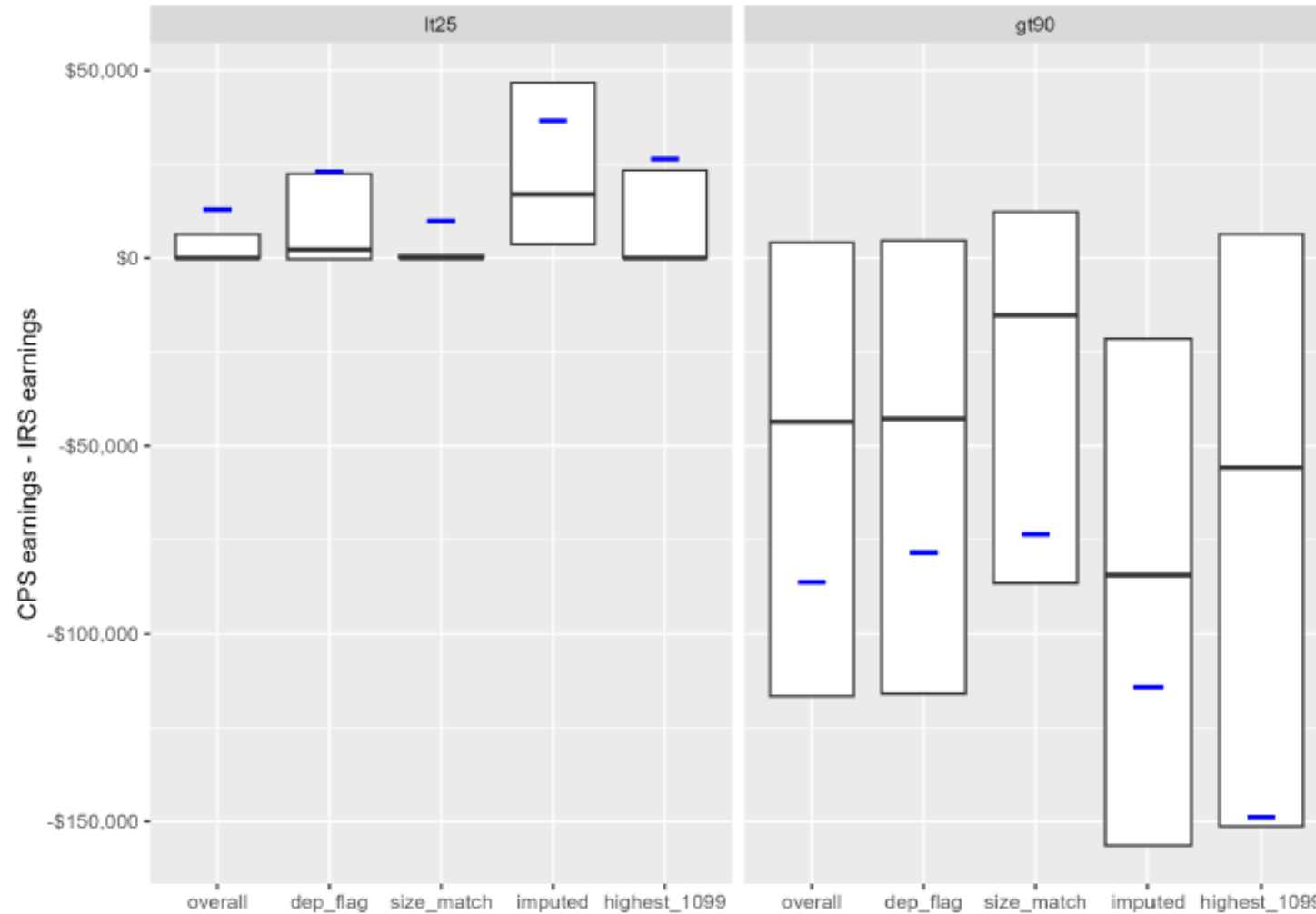


(a) IDDA household income growth



(b) CPS household income growth

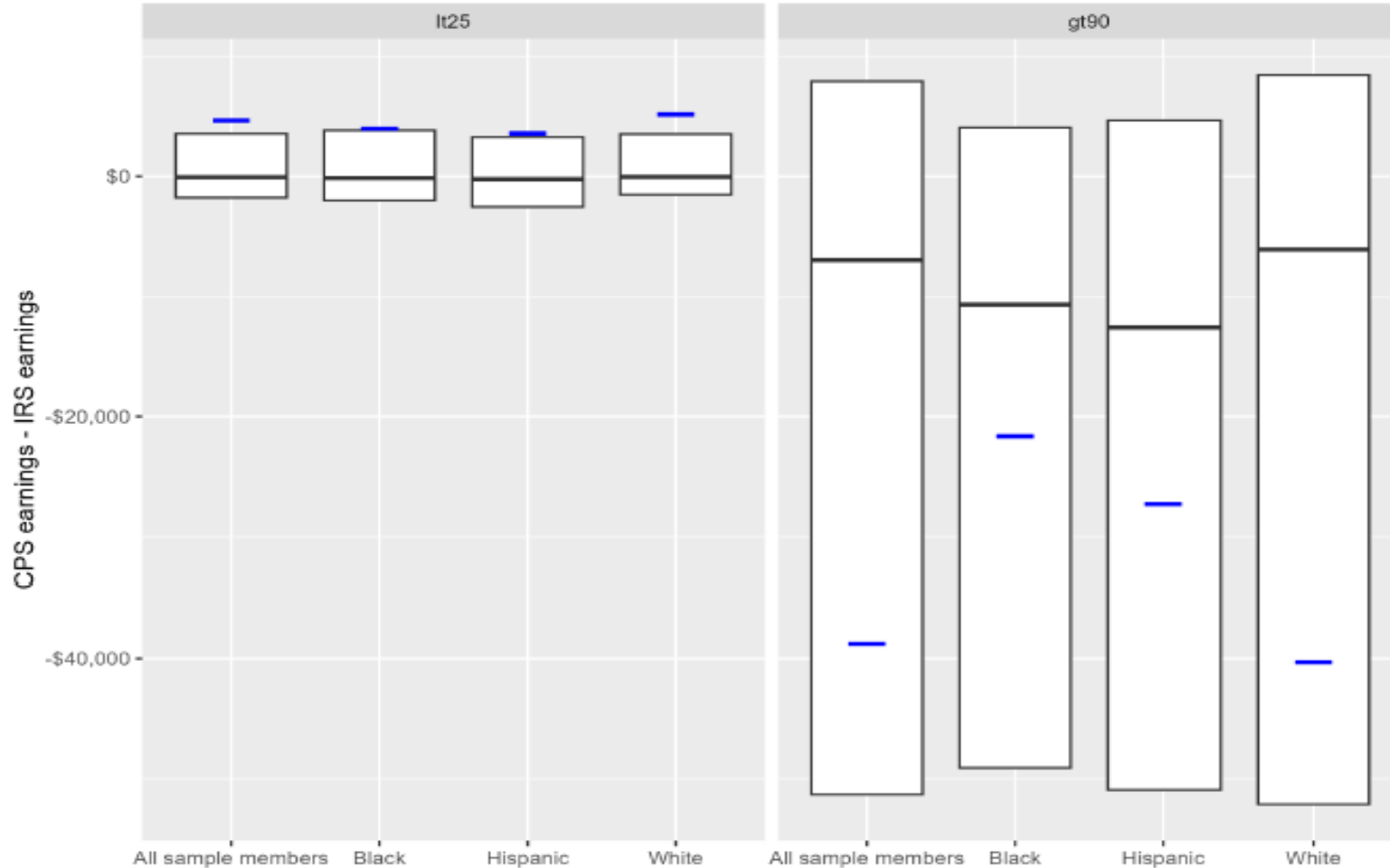
IDDA-CPS comparison using CPS restricted-use micro data



HH characteristics
& income sources
matter
+
CPS imputations

Earnings differences in top 10 percent and bottom 25 percent of W-2 earners

IDDA-CPS comparison using CPS restricted-use micro data



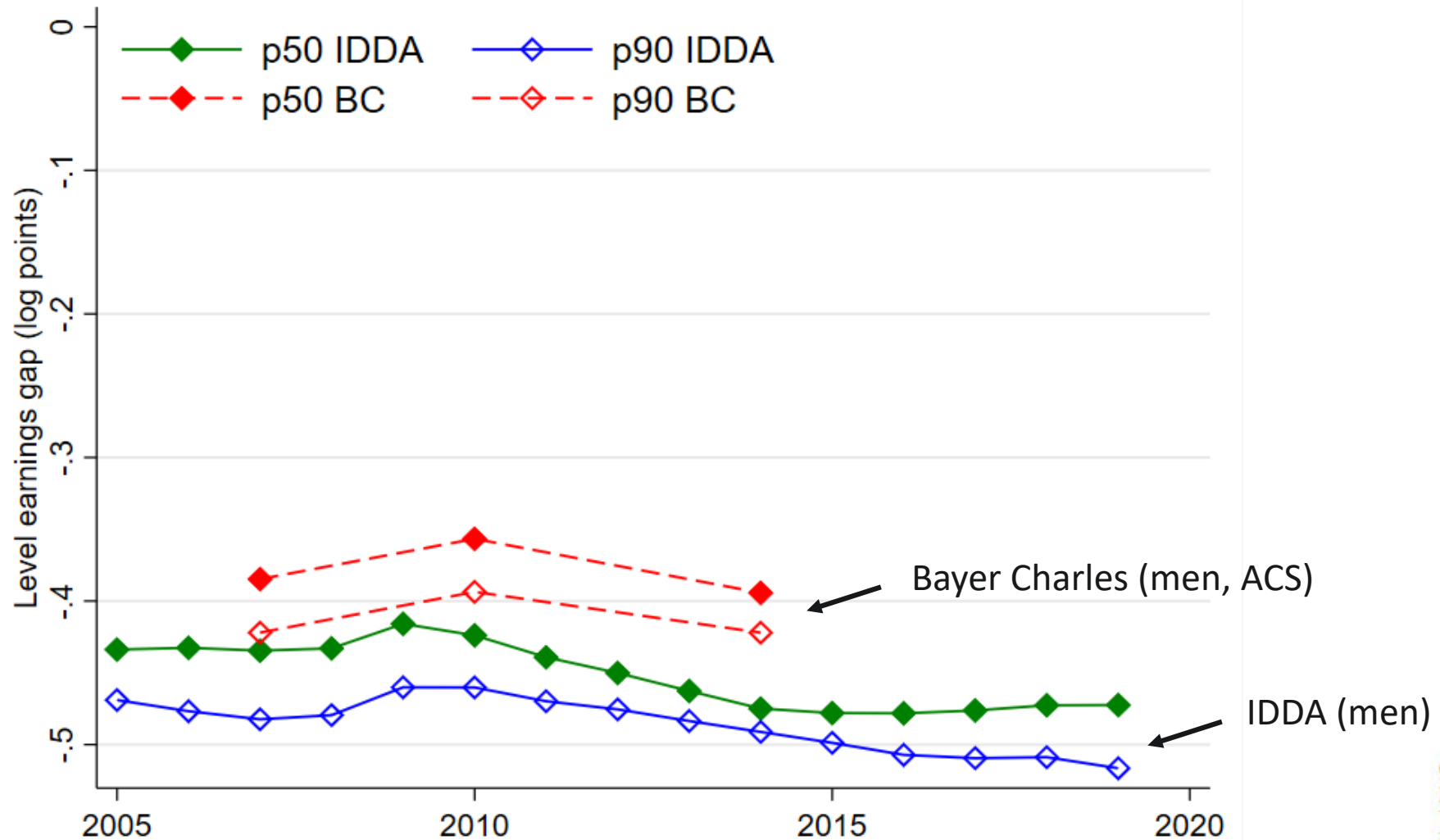
large differences
at the top

Earnings differences in top 10 percent and bottom 25 percent of W-2 earnings



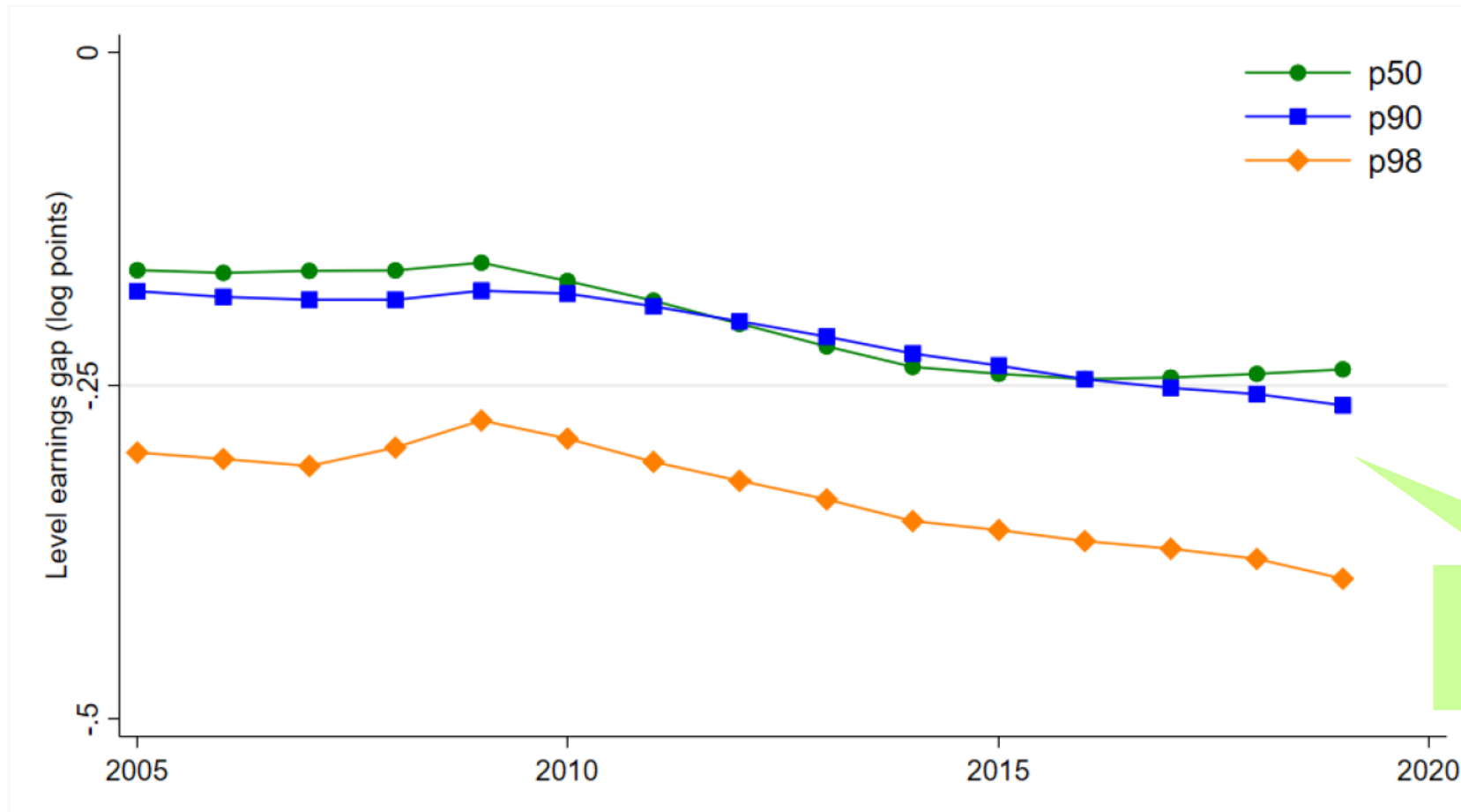
IDDA Black-White
earnings gaps persist

Widening Black-White earnings gaps for men



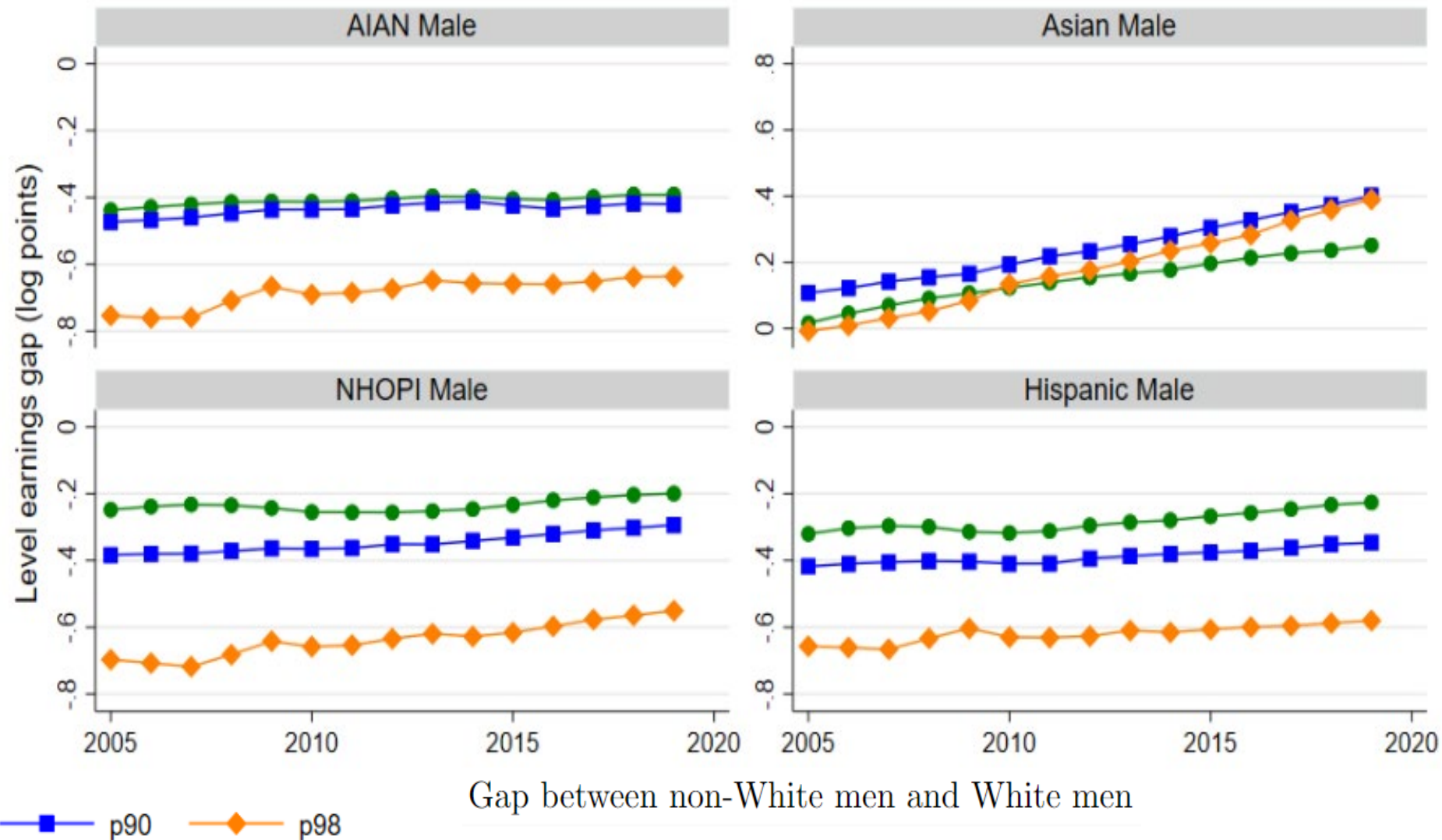
Widening Black-White earnings gaps for women too

(a) Gap between Black women and White women



... even though we saw that women's overall are steadily catching up

Earnings relative to White men are falling behind only for Black earners

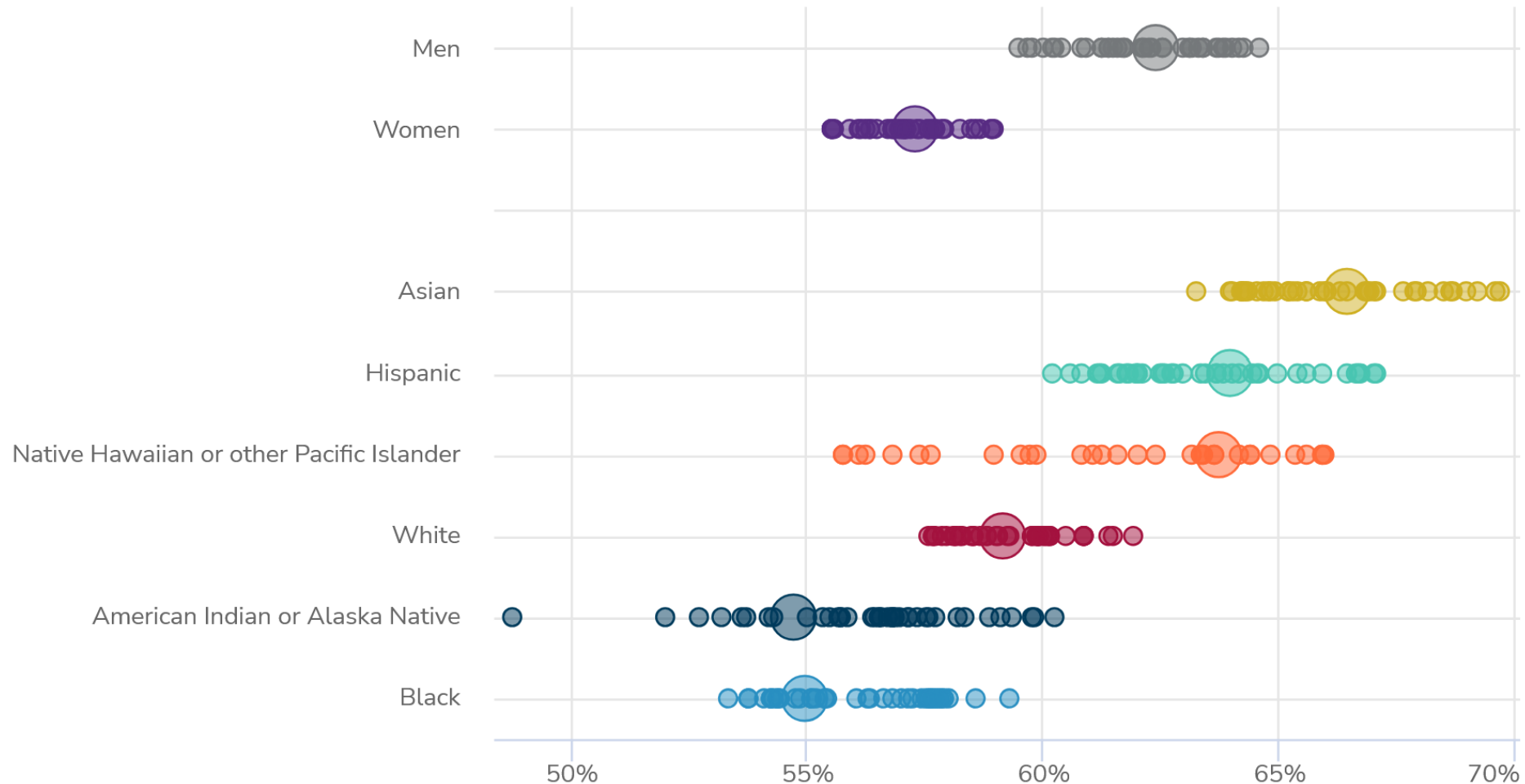




IDD A earnings upward mobility

Racial differences in climbing the earnings ladder

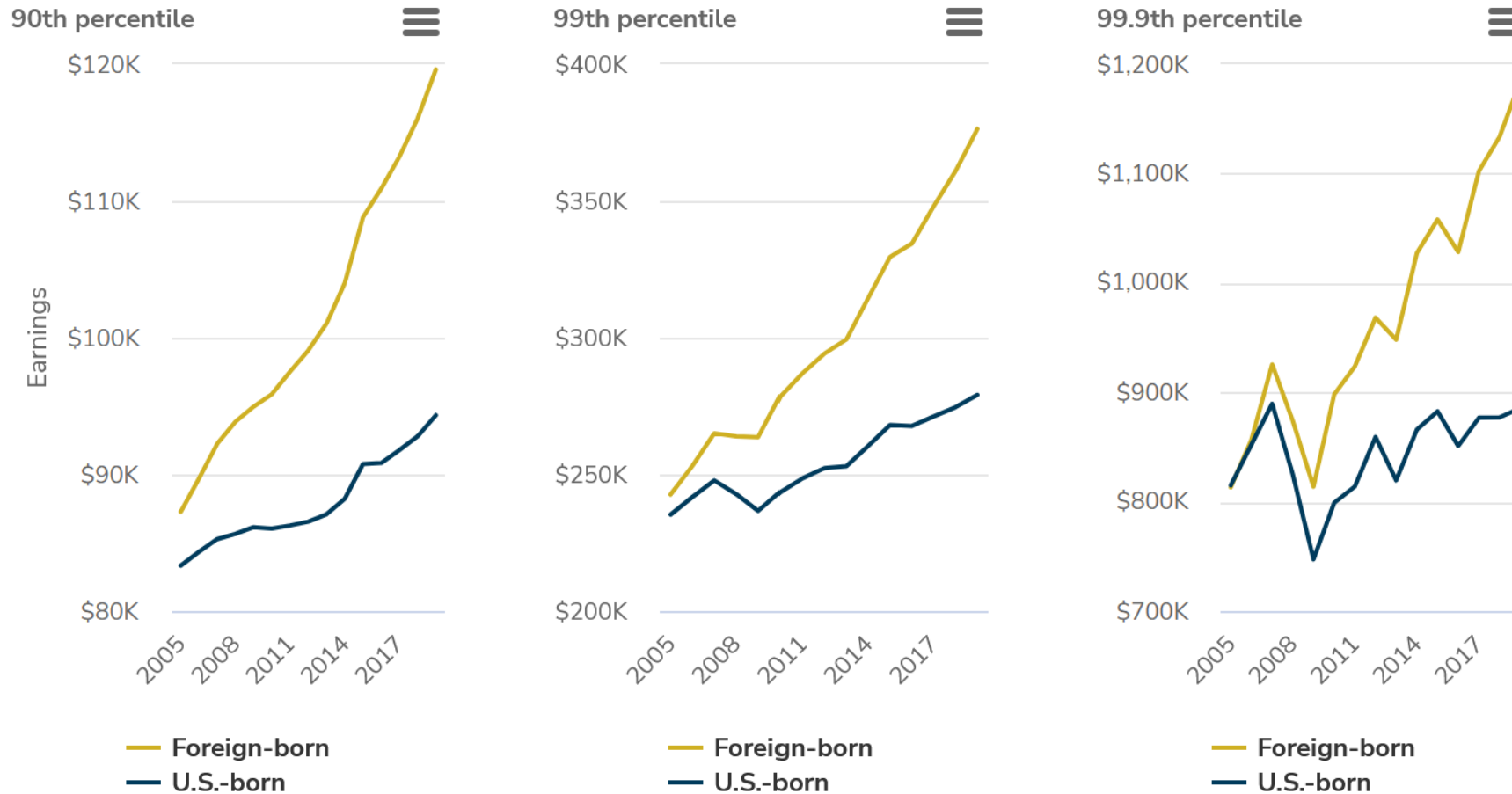
Probability of moving up from lowest earnings quartile from 2014 to 2019





IDDA U.S.- & foreign-born workers

The staggering growth of top foreign-born earnings



Note: All values are inflation adjusted so they represent an individual's purchasing power in 2012.



IDDA

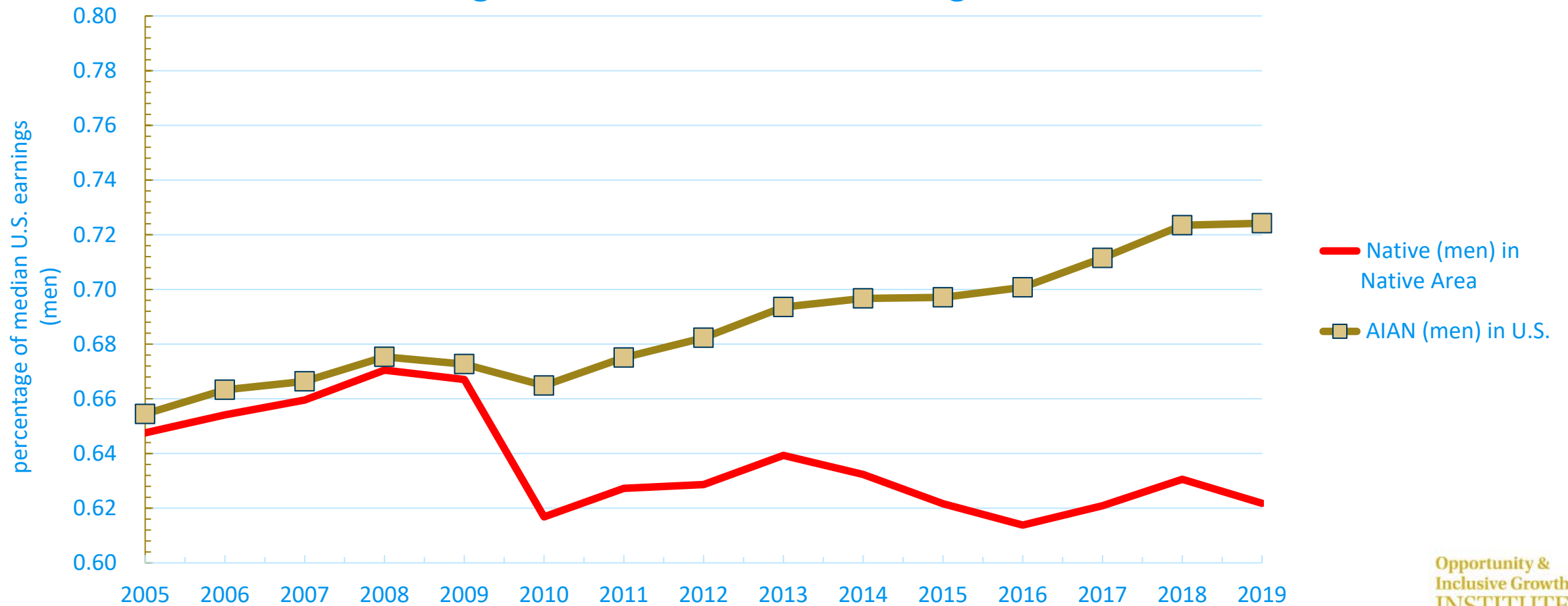
Native Areas

Native Incomes in IDDA

- Reliable state-level income information for
 - non-Hispanic American Indian or Alaska Native (AIAN) individuals, and
 - non-Hispanic Native Hawaiian or other Pacific Islander (NHOPI) individuals
- And in Native areas delineated by the U.S. Census Bureau for
 - Native individuals, and
 - non-Native individuals

Native earnings in Native areas vs. overall US have diverged since the Great Recession

Median earnings relative to median earnings in the U.S. for men



An aerial photograph of a parking lot with many empty spaces, overlaid with a semi-transparent blue filter. A bright yellow triangle is positioned in the bottom right corner, separated from the rest of the image by a thin white diagonal line. The text "arrivederci" is centered in the middle of the image.

arrivederci

IDDA helps broaden our perspectives

- Race, gender, and ethnicity continue to be key markers of income differences
- IDDA is a comprehensive resource to help advance our understanding of the quilt of income experiences in America
 - thanks to quality subnational-level group-level data
- Explore, visualize, and use at minneapolis.org/idda
 - stay tune for updates: new research & insights, new data viz, new use cases, new data

Income Distributions & Dynamics in America

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Augustine
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Bertelson
Cabot
Horvath
Leo
Wallace
Washington

Kevin
John

Rinz
Voorheis

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Andrew Huff, H Trostle,
Jean Hinz, Katie Meyer,
Veeresh Mathad

thank you

thank you!

minneapolisfed.org/IDDA

The views expressed here are the presenter's and do not necessarily represent those of the Federal Reserve Bank of Minneapolis or the Federal Reserve System.

Broad availability of granular stats (Form 1040)



Table 3: Availability of Statistics by Demographic Group: Form 1040 data (1998–2019)

IDDA Module	Defined	All	Age	BPL	Race	AgeXRace
US Household-1040						
Income Levels	154,176	100	100	100	90.8	83.9
Income Changes	51,300	100	100	100	100	
Transition Matrix	59,850	100	100	100	100	
State Household-1040						
Income Levels	587,928	100	100	100	94.6	
Income Changes	1,395,360	100	100	100	94.9	
Transition Matrix	1,395,360	100	100	100	92.2	

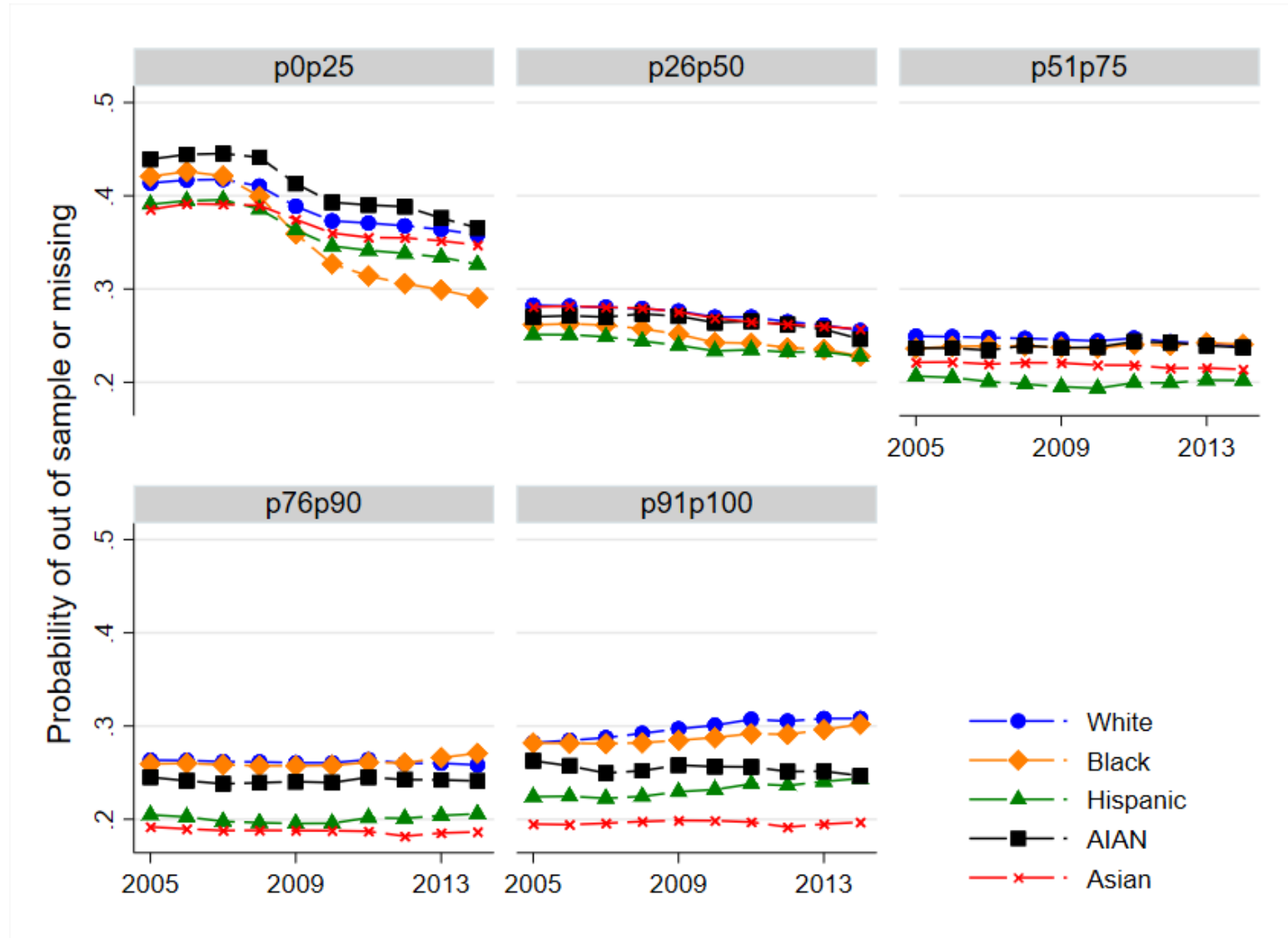
Broad availability of granular stats (W-2)



Table 4: Availability of Statistics by Demographic Group: Form W-2 Data (2005-2019)

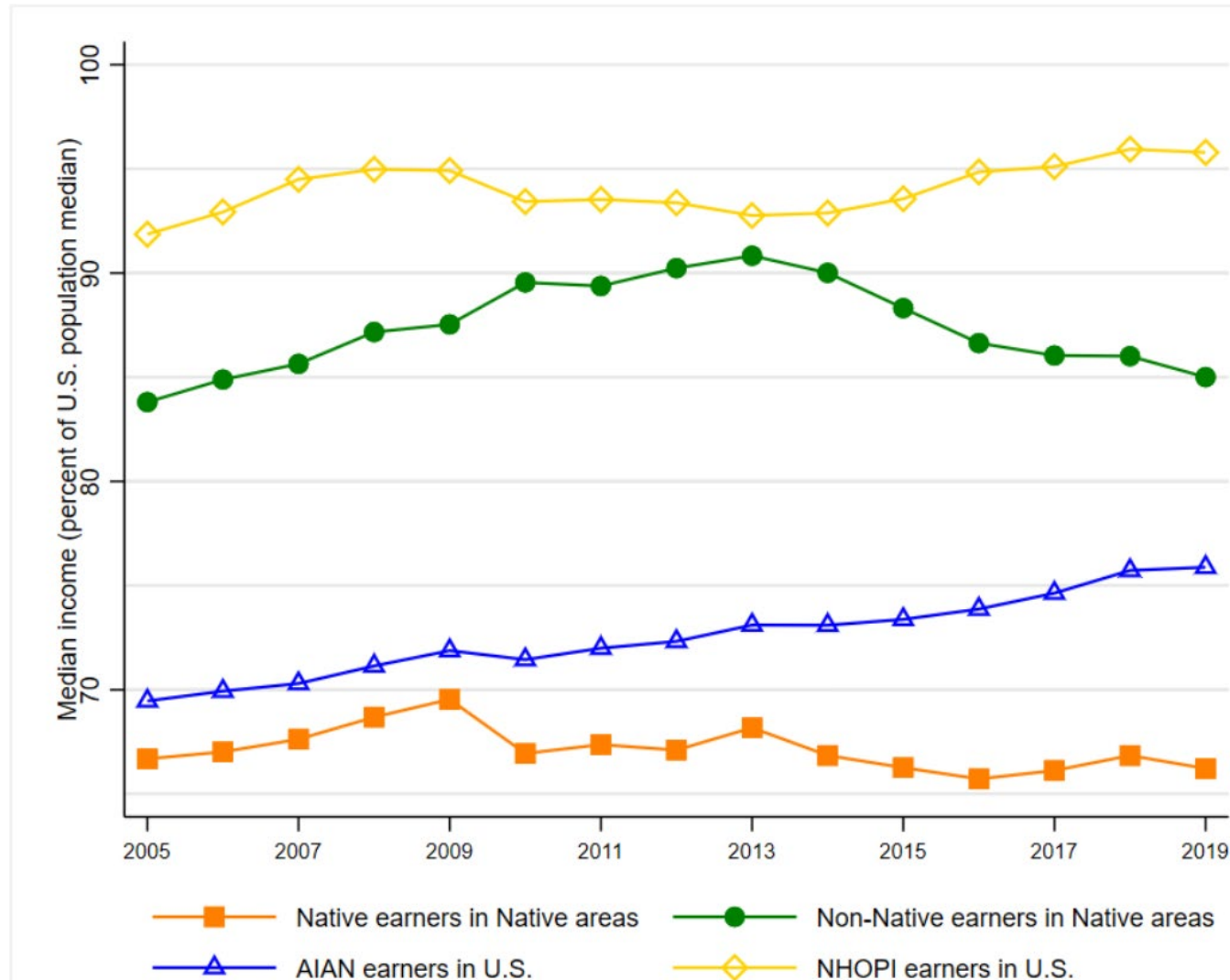
IDDA Module	Defined	All	Age	BPL	Race	Sex	AgeXRace	AgeXSex	RaceXSex
US Individual-W2									
Income Levels	121,680	100	97	100	91.2	100	80.6	91.9	86.7
Income Changes	110,880	100	100	100	100	100	99.3	100	100
Transition Matrix	129,360	100	100	100	100	100	94.8	100	99.3
US PAW-W2									
Income Levels	80,370	100	99.5	100	90.5	100	85.1	94.6	84.8
Income Changes	72,000	100	100	100	100	100	100	100	100
Transition Matrix	120,816	100	100.0	100.0	99.9	100	95.4	100.0	98.7
State Individual-W2									
Income Levels	1,054,170	100	97.9	100	95.8	100	74.9	93.2	89.8
Income Changes	499,392	100	100	100	95.9	100			
Transition Matrix	499,392	100	98.8	99.6	86.2	100			

Earnings growth by race and ethnicity: Probability not in sample after 5 years

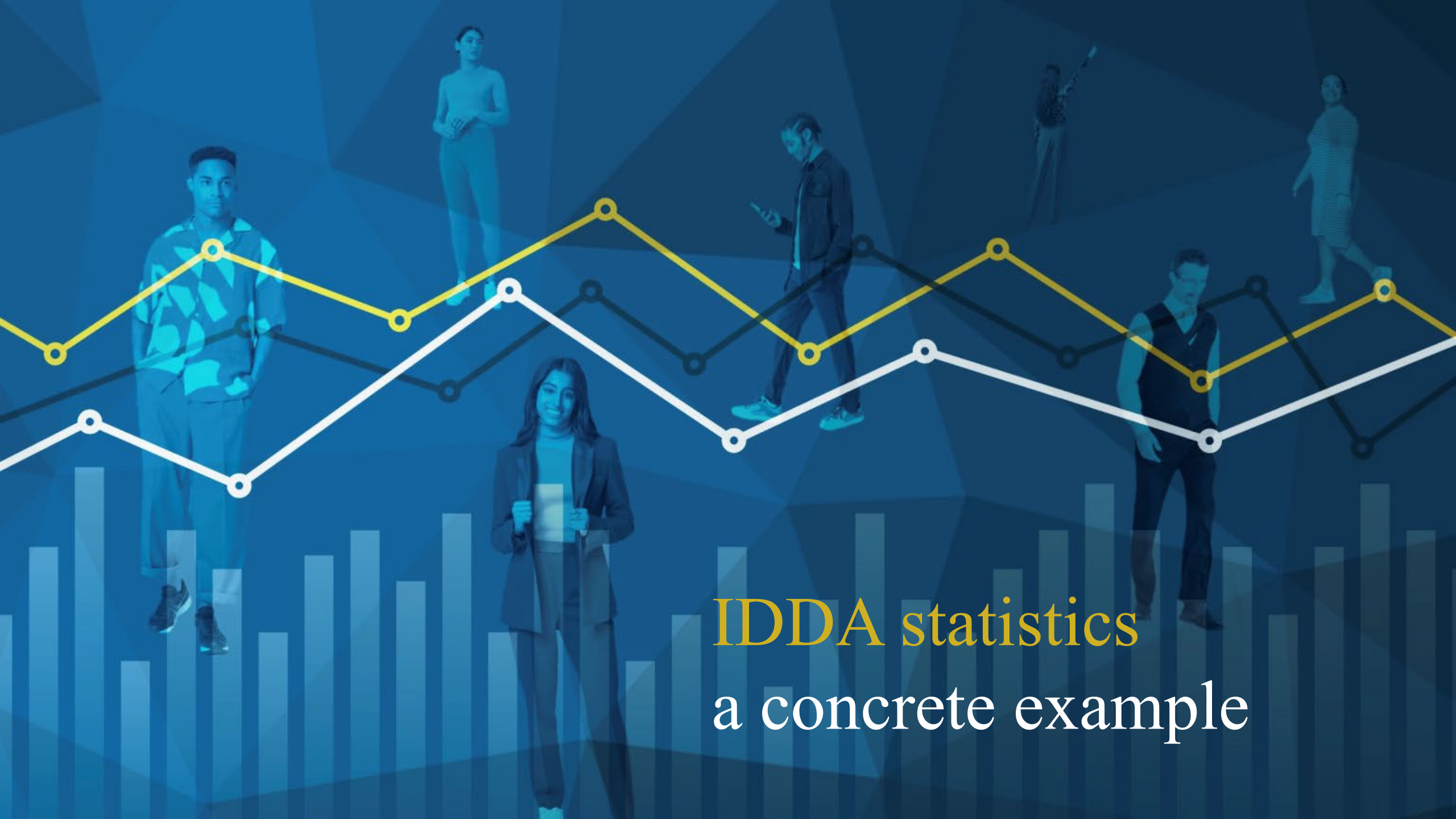


- PAW sample

Native areas supplement: Earnings gaps for Native earners differ inside and outside of Native areas



Native areas supplement
contains additional 70K stats.



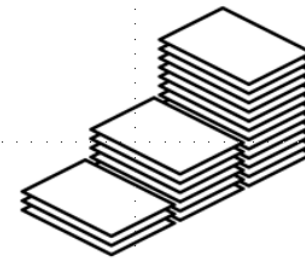
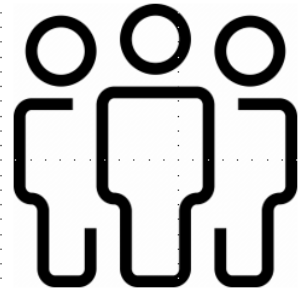
IDDA statistics

a concrete example

What statistics are in IDDA?

To illustrate the statistical modules available in IDDA, consider

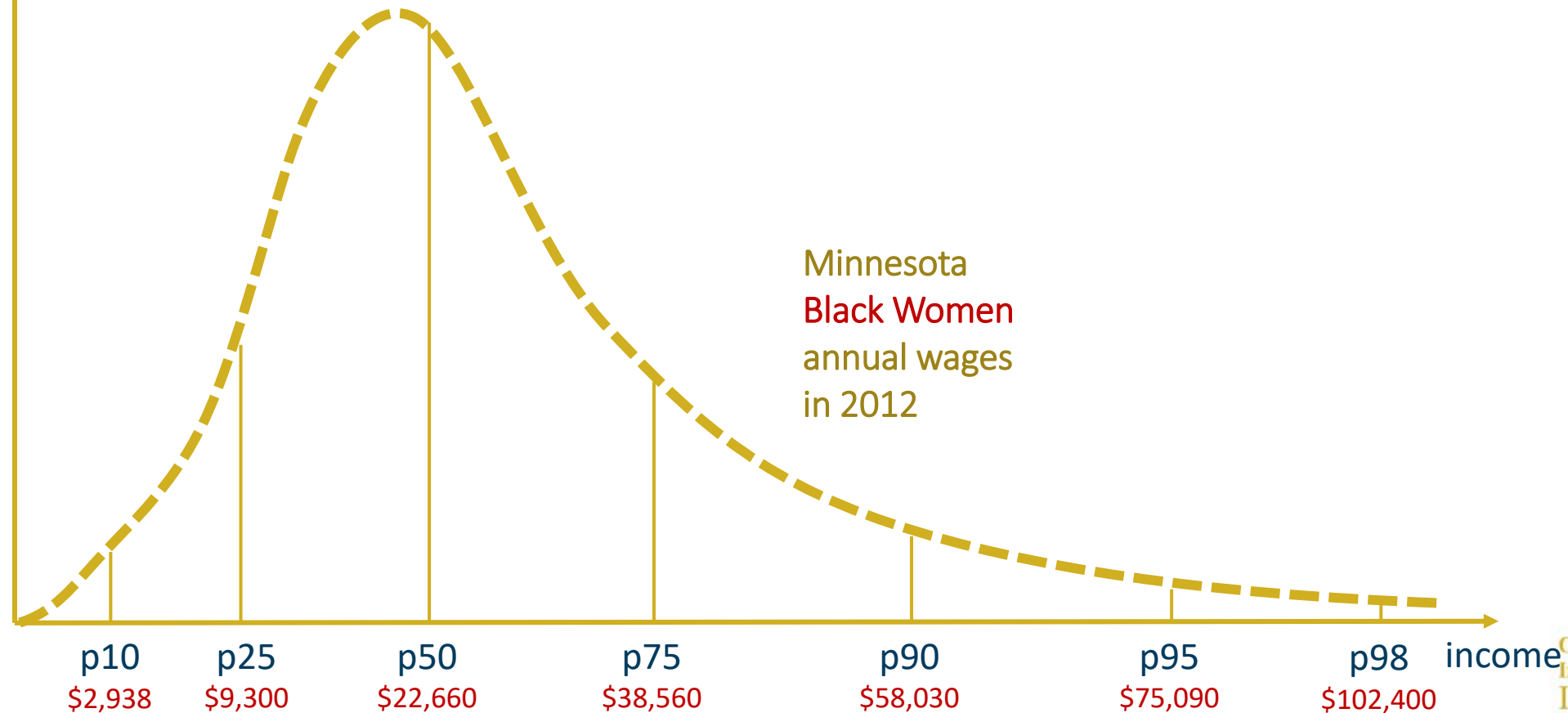
Earnings for Black Women in Minnesota in 2017



Top to bottom income values: percentiles

probability

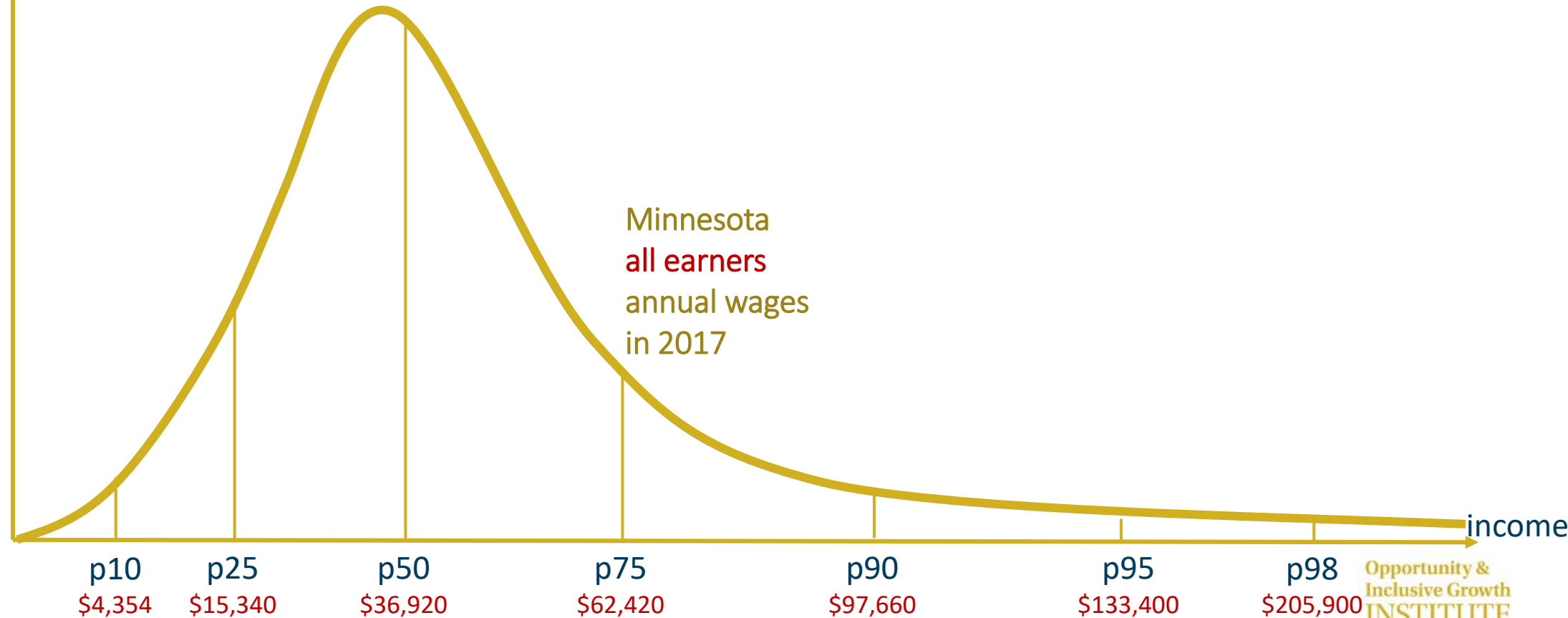
How much is the bottom/top decile of earnings?



Top to bottom income values: percentiles

probability

How much is the bottom/top decile of earnings?



Fractal top income **shares** within group

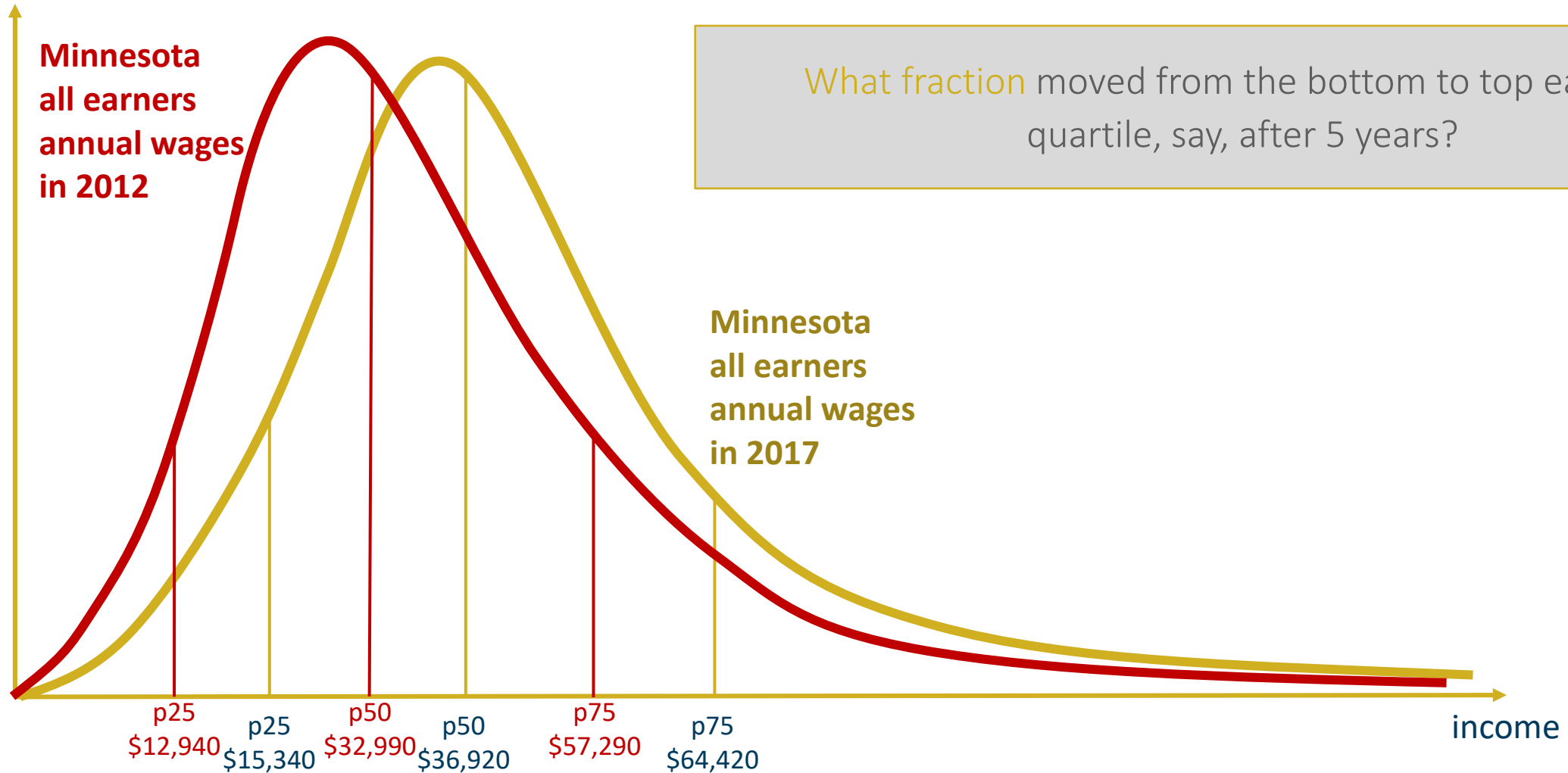
What share of earnings **within** this group goes to the top?

Earnings MN, 2017	Black Women	Hispanic Women	Asian women	AIAN women
Top decile (p90+)	32%	33%	35%	32%
Top ventile (p95+)	20%	22%	23%	20%

Strikingly fractal
within group
concentration

Income mobility: quartile-to-quartile transitions

probability

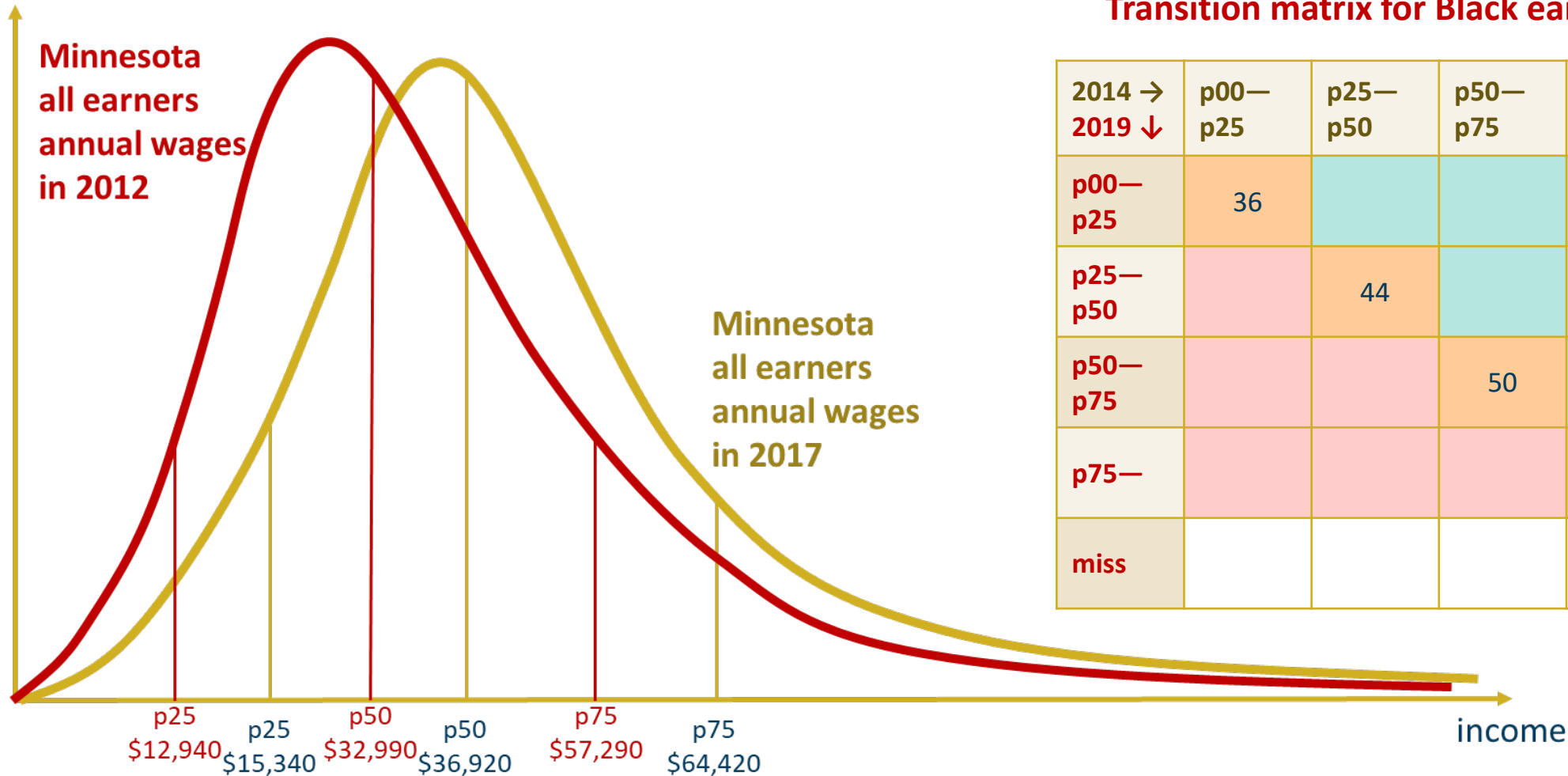


Income mobility: **quartile-to-quartile** transitions

probability

**Minnesota
all earners
annual wages
in 2012**

**Minnesota
all earners
annual wages
in 2017**



Transition matrix for Black earnings in MN

2014 → 2019 ↓	p00— p25	p25— p50	p50— p75	p75—	miss
p00— p25	36				
p25— p50		44			
p50— p75			50		
p75—				71	
miss					

Income mobility: **quartile-to-quartile** transitions

Asian earnings in MN

2014 → 2019 ↓	p00— p25	p25— p50	p50— p75	p75—	miss
p00— p25	25				
p25— p50		43			
p50— p75			52		
p75—				82	
miss					

+11 pp.
for Black earnings relative
to Asian earnings
@ bottom MN earnings

Black earnings in MN

2014 → 2019 ↓	p00— p25	p25— p50	p50— p75	p75—	miss
p00— p25	36				
p25— p50		44	25	4	
p50— p75			50	18	
p75—				71	
miss					

+11 pp.
for Asian earnings relative
to Black earnings
@ top MN earnings

Income mobility: **quartile-to-quartile** transitions

Asian Women in MN

less upward moves
for Black earnings
from bottom MN
earnings

Black Women in MN

2014 → 2019 ↓	p00— p25	p25— p50	p50— p75	p75—	miss
p00— p25	25	36	16	5	17
p25— p50	10	43	29	6	11
p50— p75	4	15	52	20	9
p75—	2	2	8	82	7
miss	62	26	8	8	

2014 → 2019 ↓	p00— p25	p25— p50	p50— p75	p75—	miss
p00— p25	36	32	9	2	21
p25— p50	15	44	25	4	12
p50— p75	6	18	50	18	9
p75—	3	4	13	71	8
miss	70	24	5	1	

less downward moves
for Asian earnings
from top MN earnings

Income dynamics: **income change** distribution

How much did earnings **change** annually for Black vs Asian earners over **5 years**?

+\$5k for top Asian earnings changes compared to Black changes

2014 to 2019	p10	p25	p50	p75	p90
p00—p25	\$141	\$1,611	\$4,181	\$6,899	\$10,310
p75—	-\$4,711	\$585	\$3,576	\$7,876	\$15,610

Asian earnings changes in MN

2014 to 2019	p10	p25	p50	p75	p90
p00—p25	-\$263	\$650	\$2,541	\$4,959	\$7,486
p75—	-\$6,912	-\$632	\$2,440	\$5,671	\$10,860

-\$2k for lowest Black earnings changes compared to Asian changes

Black earnings changes in MN

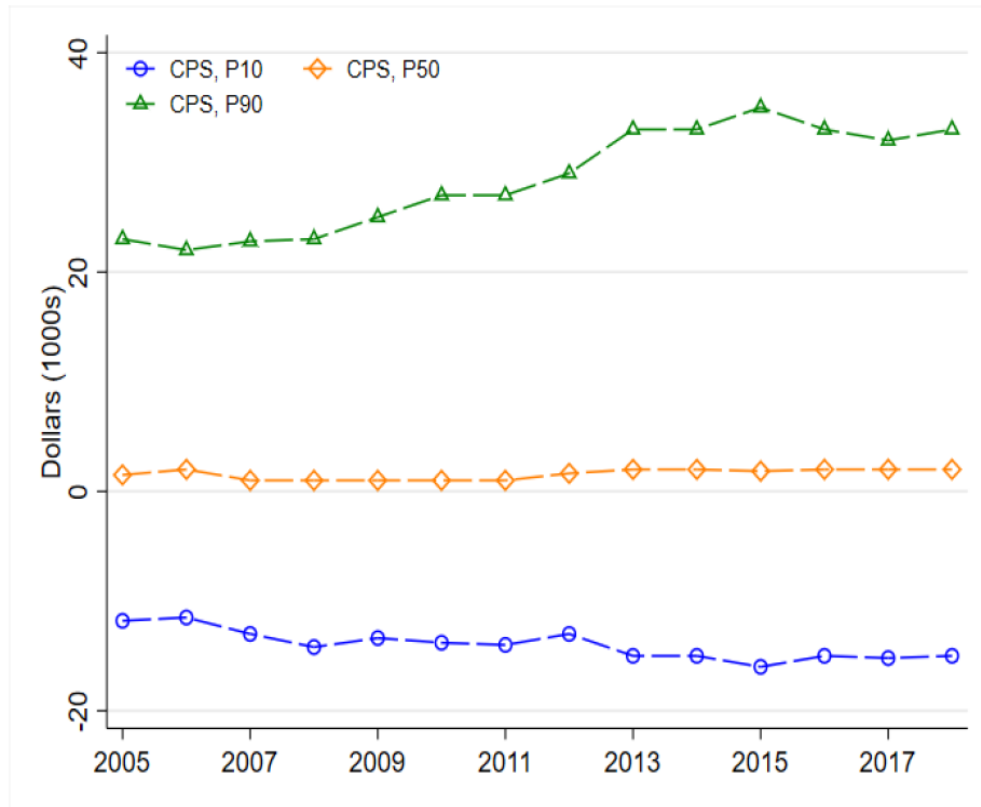
IDDA statistics

income distribution @ a point in time & in a geography	within group	income (level) percentiles: p10, p25, p50, p75, p90, p95, p98 & deeper tails for US top incomes share of group's total income
	by group	group's share all top incomes group's share all top income earners
income dynamics over time & horizon & in a geography + by initial income bins	within group	transition matrix probabilities <ul style="list-style-type: none">• across income quartile/decile bins• over 1- and 5-year horizons
	within group	income (level) change percentiles <ul style="list-style-type: none">• over 1- and 5-year horizons

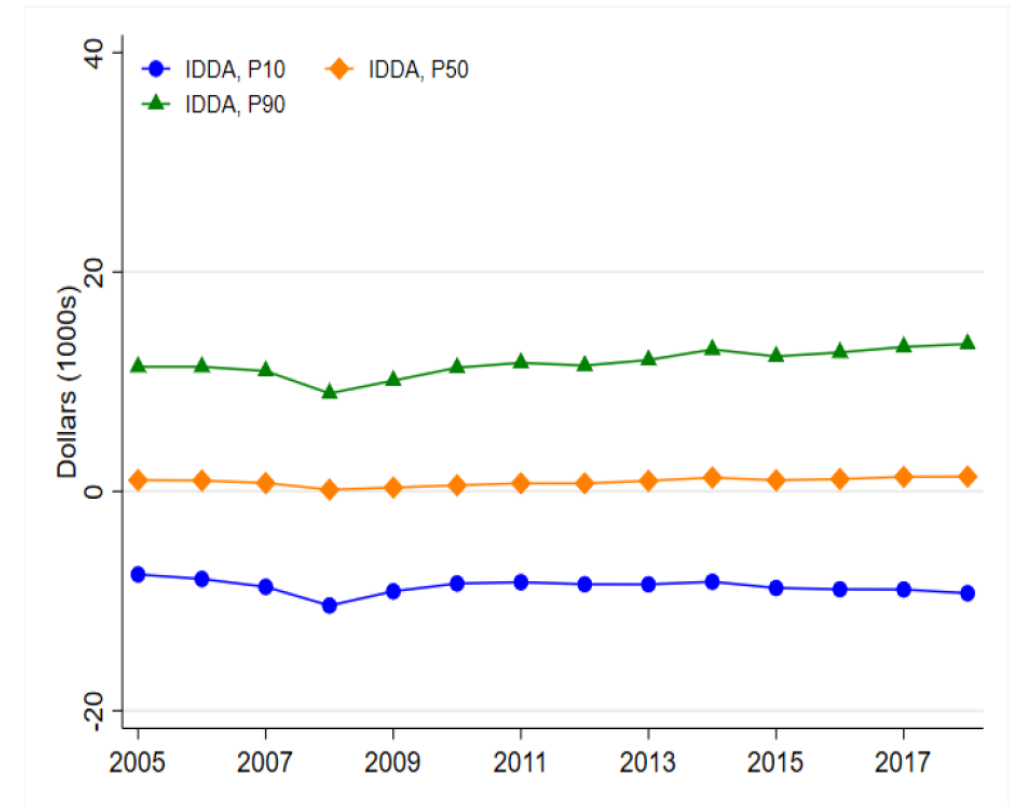
IDDA earnings growth is less dispersed than CPS

(here, for lower middle earnings)

(a) Percentiles of individual wage and salary income, CPS



(b) Percentiles of individual wage and salary income, IDDA

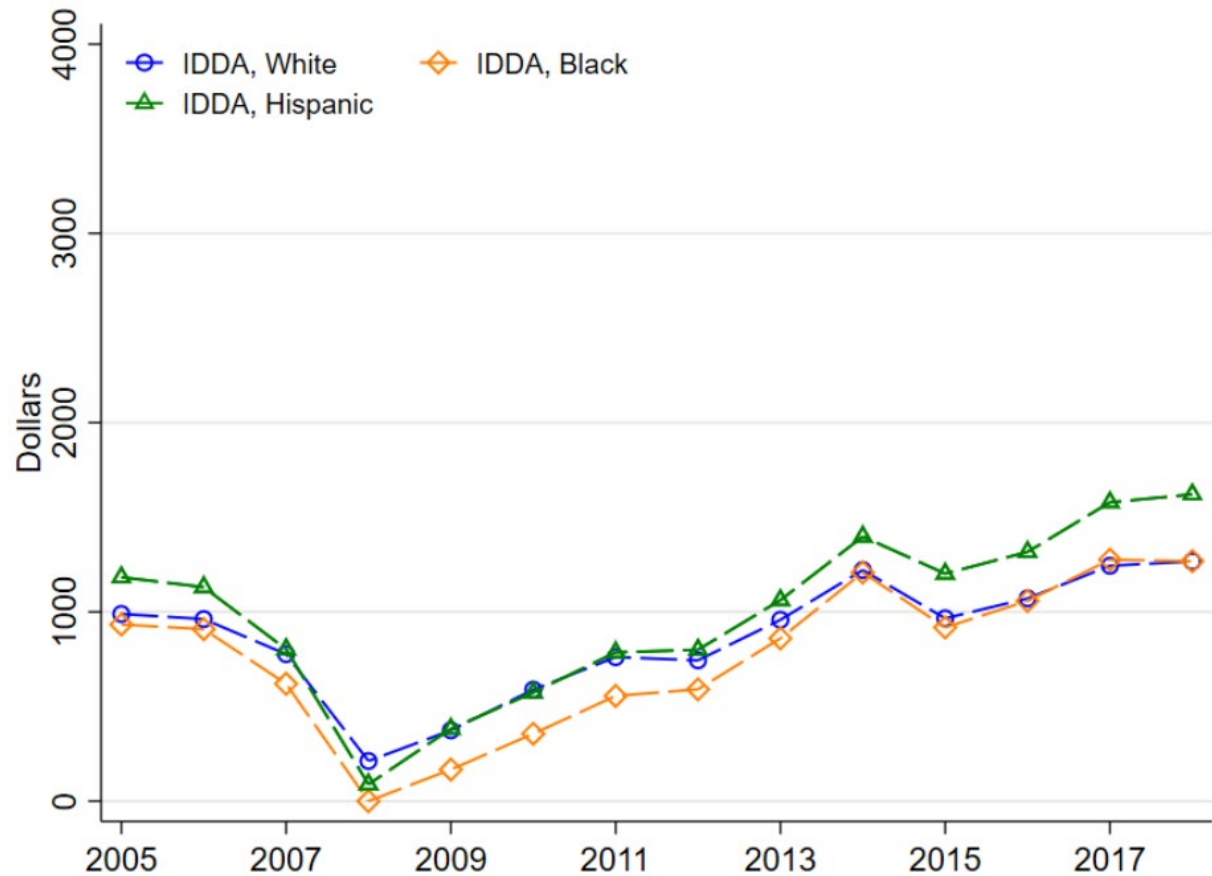


Source: CPS, IDDA and authors' calculations.

Note: Values are in nominal dollars. Adjusted gross income (AGI) in panel (d) is aggregated to the household level by summing across tax returns filed from the same address. Wage and salary income in other panels is aggregated across employers within person. Growth measures are computed at the individual level. Growth is calculated among people with income in the 26th through 50th percentiles of base year income. Release authorization CBDRB-FY23-0277.

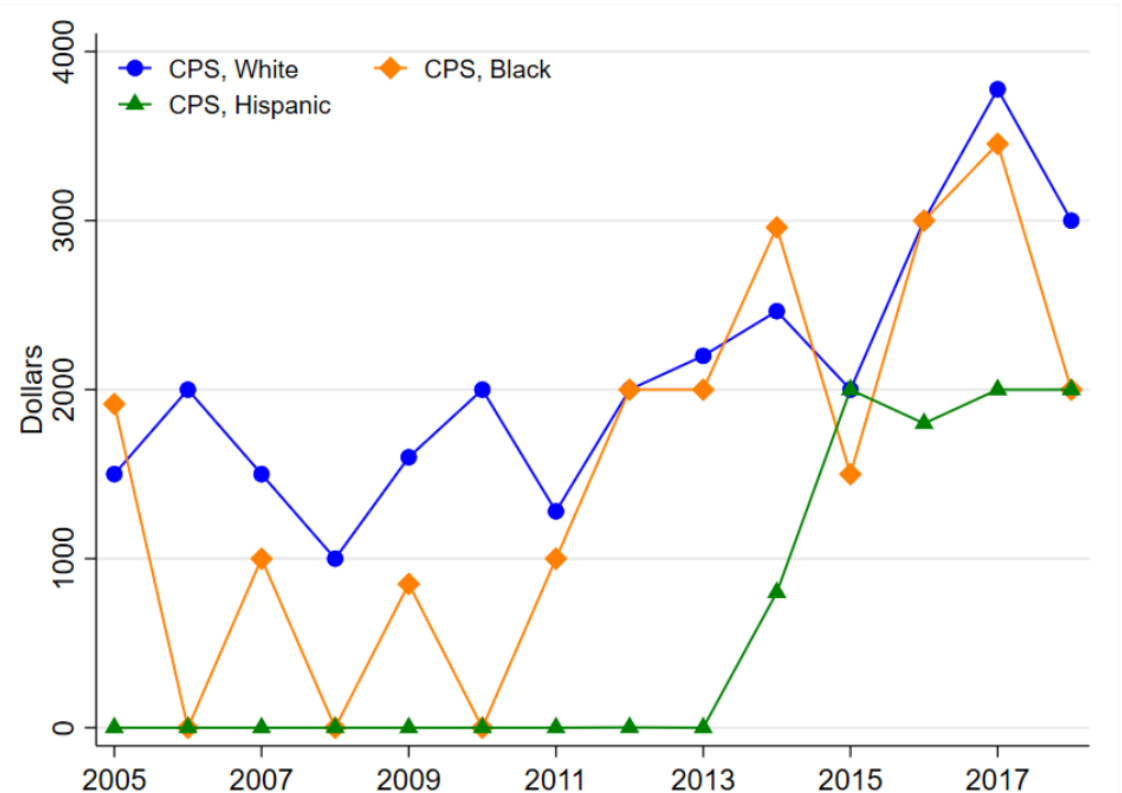
Earnings growth, by race and ethnicity

(a) IDDA



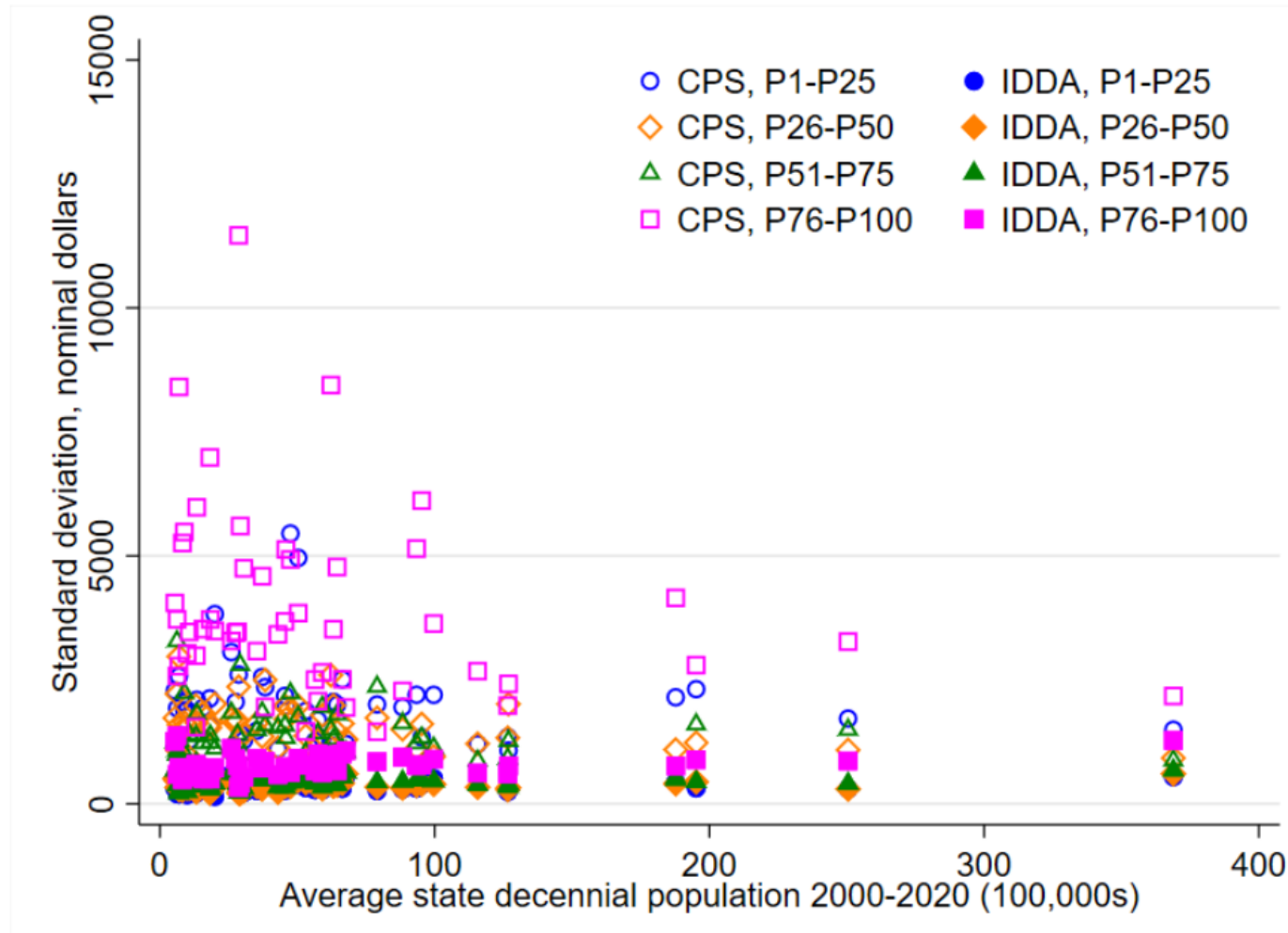
(b) CPS

(a) Median wage and salary income growth by race, CPS



- Median one-year earnings growth for p26-p50 shown

CPS state-level earnings growth variance higher



- Std dev of median W-2 earnings growth within state over 2005-2018 plotted, by initial earnings quartile.