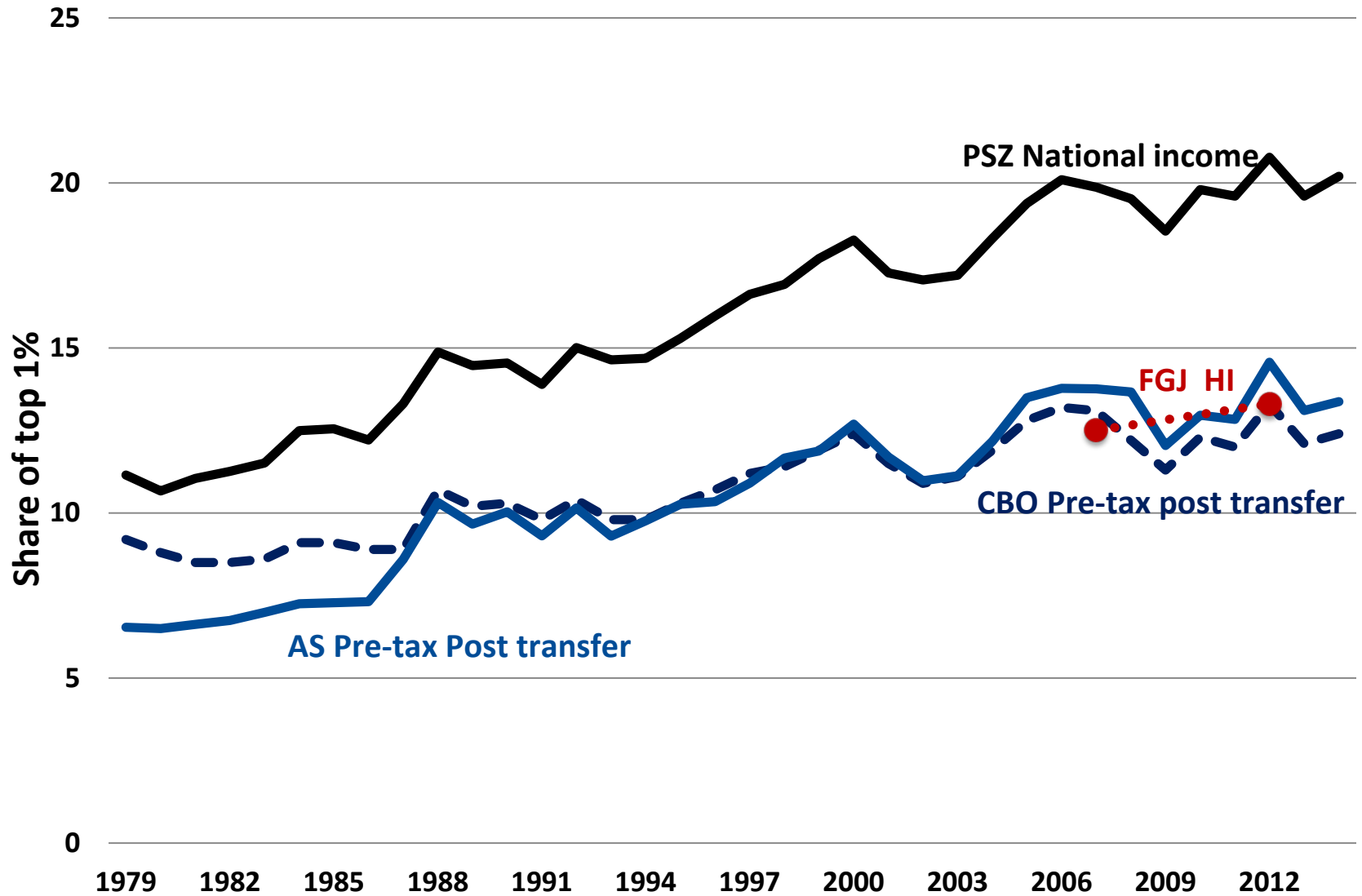


# Improving the Measure of the Distribution of Personal Income

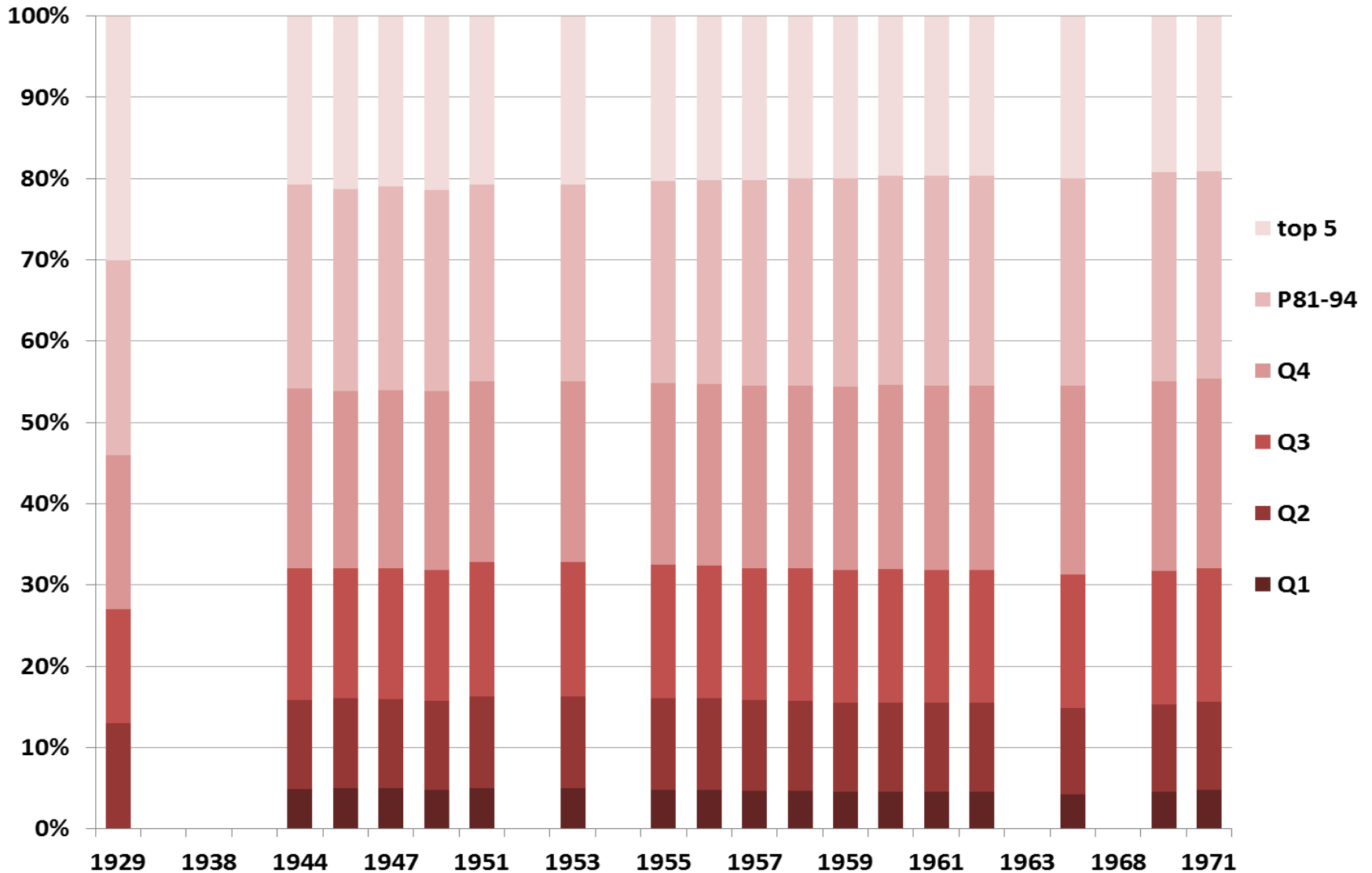
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David Johnson (University of Michigan)*

**Disclaimer:** The results and opinions are those of the authors and do not reflect the position of the Bureau of Economics Analysis or Department of Commerce.

# Inequality has increased



# BEA historically produced the distribution of national accounts



- Increasing interest in relationship between distribution of growth, based on national accounts and inequality, based on survey data/tax data
  - GDP is increasing: what share of growth accrues to what part of the distribution?
  - Disconnect between measures constructed from micro data and aggregate national accounts
  - Efforts to bridge “micro-macro” gap (Piketty et al. 2018, Auten and Splinter 2018, OECD EG-DNA)

- PSZ (2018): Compute pre-and-post-tax inequality based on national income
  - NI = GDP - capital depreciation + net income received from abroad
  - Unit of observation: “adult individual”
  - Construct micro files consistent with macro aggregates
  - Start with tax data to capture top (add synthetic obs based on CPS)
- Auten and Splinter (2018): re-estimate top shares due to a different treatment of underreported income (esp. business) on tax data
  - Construct estimate of pre-tax/after-transfer income
  - Correct for tax law changes
  - Find lower income shares than PSZ
- Our paper
  - Construct distribution of household income as major component of personal income
  - Personal income is more intuitive for moving to consumption/PCE
  - Personal Income = National Income -(corp. profits + taxes on production + contributions for gov. soc. Ins. + net interest + bus. Current transfer + current surplus of gov. enterp.) + [personal income receipts on assets + personal current transfer receipts]

- Primary Sources:

- Micro: Public Use CPS ASEC 2008 & 2013 (earnings years 2007 & 2012)
- Macro: NIPA Tables (latest revision)

- Supplementary Sources (include):

- Survey of Consumer Finances (public)
- Centers for Medicare & Medicaid Services (public)
- Consumer Expenditure Survey (public)
- Congressional Budget Office (public)
- 1040 Microdata (internal)

1

- Begin with CPS ASEC households (survey years 2008 and 2013)
- Adjust top incomes with a Pareto imputation

2

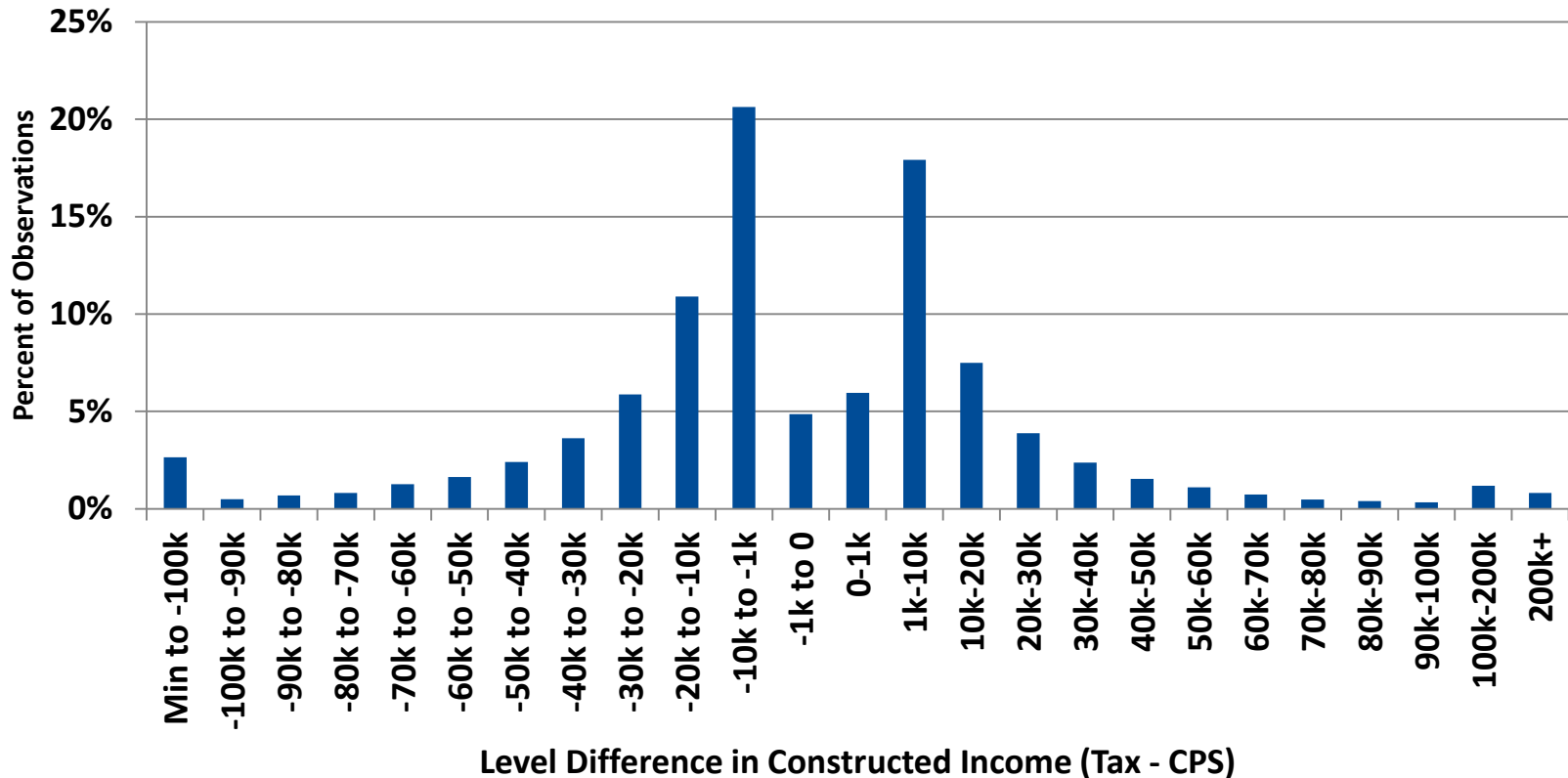
- Distribute NIPA totals for components of household income according to relevant CPS variables
- Use supplemental data sources to provide additional distributional information

3

- Aggregate resulting imputations for each component up to PI
- Construct inequality statistics for equivalized household income for 2007 and 2012

# Tail Adjustment

- CPS underrepresents top incomes due to both topcoding and “missing” observations
- A “matching” strategy for adjusting the tail was explored (see FGJ 2018 – IARIW)
- In matching CPS households to IRS tax units, we found significant differences between the CPS and tax income for the same households, suggesting that simply replacing the survey income for the administrative income data is not satisfactory





- Given distribution of differences between linked 1040 microdata housed at the Census Bureau and CPS data, the following strategy was used
  - Using the 1040 microdata, we fit a Pareto distribution for tax units with money incomes  $\geq \$500k$
  - Using the resulting Pareto coefficient ( $\alpha$ ), imputed a distribution to CPS households with money incomes  $\geq \$500k$

Starting point: A household with \$600,000 of pseudo income

1

- Household has \$60 of dividend income in CPS (unweighted)
- Tail adjustment: household receives a new pseudo income of \$700,000. Correspondingly, dividend income is proportionally adjusted to \$70.

2

- Total dividend income in CPS is summed (with weights) to be \$123b
- NIPA total for dividend income is \$808b
- Household receives an imputed dividend income =  $(\$70/\$123b) * \$808b = \$460$
- Aggregate weighted household dividend income will be \$808b

3

- Other components are scaled as well, such that the household may end up with \$900,000 of household income, consistent with NIPA

- Components of personal income
- Distribution of household income by quintile
- Inequality comparison across income definitions and time
- Extension to States
  - Nominal Income and adjust by Regional Price Parity (RPP)
  - RPP multilateral (spatial) price index produced by BEA's Regional Economics program

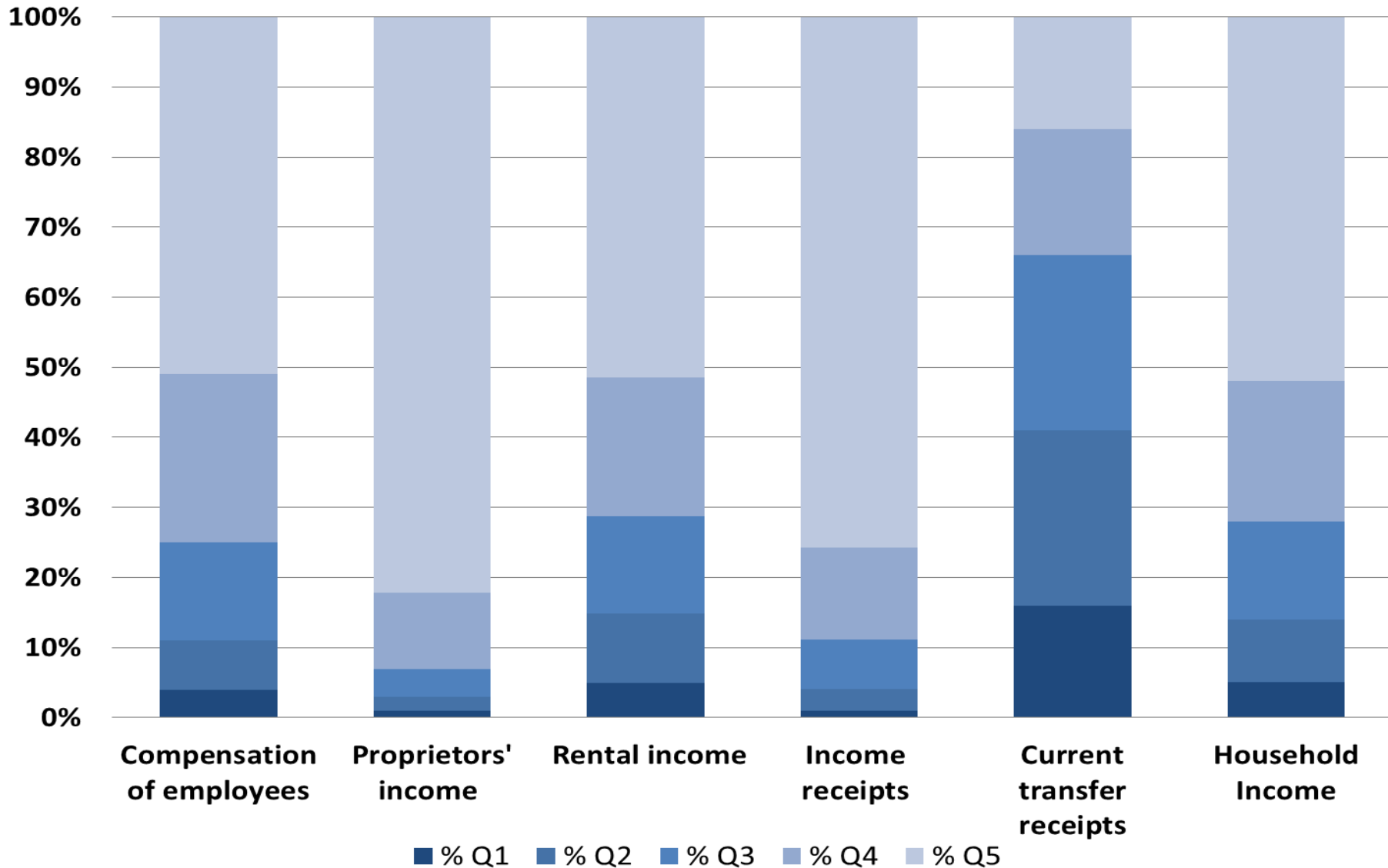
# Components of Personal Income

<b>2012</b>	<b>Household average</b>	<b>Totals (billions)</b>
<b>Pseudo Income</b>	\$87,636	\$10,732
<b>Plus</b>		
<b>Financial</b>	\$14,998	\$1,837
<b>Health</b>	\$16,062	\$1,967
<b>Net Transfers</b>	-\$4,359	-\$534
<b>Equals</b>		
<b>Household Income</b>	<b>\$114,336</b>	<b>\$14,001.6</b>
<b>+NPISH</b>	\$70	\$8.6
<b>Personal Income</b>	<b>\$114,406</b>	<b>\$14,010</b>

Pseudo Income = money income – retirement – other comingled factors  
 It is defined as in Fixler et al. (2017)

PI = Household Income – transfers from NPISH + NPISH income – transfers from households

# Distribution of Household Income by Quintile, 2012



# Distribution of Household Income by Quintile

2012, NIPA Table 2.9

Household income	Total (\$B)	% Q1	% Q2	% Q3	% Q4	% Q5
Compensation of employees	8567	4%	7%	14%	24%	51%
Proprietors' income with inventory valuation and capital consumption adj.	1347	1%	2%	4%	11%	83%
Rental income of households with capital consumption adj.	509	5%	10%	14%	20%	52%
Household income receipts	2119	1%	3%	7%	13%	75%
Household interest income	1311	2%	4%	9%	17%	67%
Household dividend income	808	0%	1%	3%	7%	89%
Household current transfer receipts	2410	16%	25%	25%	18%	16%
Government social benefits	2300	16%	26%	26%	17%	14%
From business (net)	24	1%	4%	11%	24%	60%
From nonprofit institutions	86	5%	8%	14%	26%	47%
Less: Contrib. for government social insurance, domestic	950	4%	10%	17%	26%	43%
<b>Household Income</b>	<b>14002</b>	<b>5%</b>	<b>9%</b>	<b>14%</b>	<b>20%</b>	<b>52%</b>

# Inequality Comparison

	Mean	Gini	90/50	90/10	Top 5% Share	Top 1% share
<b>2012</b>						
<b>Eq. HH Money Income</b>	\$46,587	0.456	2.64	9.54	22.2%	8.8%
<b>Eq. HH Pseudo Income (with tail adj.)</b>	\$57,204	0.524	3.04	10.91	29.7%	14.3%
<b>Eq. HH Income</b>	\$74,452	0.463	2.72	6.33	27.1%	13.3%
<b>2007 (in 2012 dollars)</b>						
<b>Eq. HH Money Income</b>	\$48,279	0.441	2.59	9.05	21.6%	7.4%
<b>Eq. HH Pseudo Income (with tail adj.)</b>	\$46,848	0.502	2.86	9.91	28.2%	12.9%
<b>Eq. HH Income</b>	\$73,022	0.453	2.65	6.25	26.5%	12.5%

Eq. HH Income = HH Income/sqrt(# in hh)

# Inequality Comparison

Definition	2007	2012	Source
	<b>Top 1% Share</b>		
<b>Eq. HH income</b>	<b>12.5%</b>	<b>13.3%</b>	<b>FGJ 2018</b>
Pre-tax/Post-transfer	13.1%	13.3%	Auten & Splinter 2018
Pre-tax National Inc. (equal split indiv)	19.9%	20.8%	PSZ 2018
HH inc. Pre-tax/Post-transfer w/o CapG	13.8%	14.6%	CBO
	<b>Gini</b>		
<b>Eq. HH income</b>	<b>0.453</b>	<b>0.463</b>	<b>FGJ 2018</b>
HH inc. Pre-tax/Post-transfer	0.491	0.487	CBO
Eq. HH Money Income	0.444	0.463	Census Bureau



# Extension to States

## Summary Statistics, 2012

	Household Income					Household Income			
	Median		Mean			Median		Mean	
	Nominal	RPP Adj.	Nominal	RPP Adj.		Nominal	RPP Adj.	Nominal	RPP Adj.
Alabama	42893	48687	62321	70739	Missouri	47983	53732	78642	88064
Alaska	60384	57291	83773	79481	Montana	43818	46864	64465	68947
Arizona	44065	45381	67833	69859	Nebraska	53988	59590	73454	81076
Arkansas	39479	44964	54540	62118	Nevada	43232	43802	65111	65969
California	53821	47671	89482	79257	New Hampshire	63291	59935	85677	81134
Colorado	54790	54194	80486	79610	New Jersey	58948	51528	85630	74851
Connecticut	62090	56859	96992	88820	New Mexico	41819	44020	81211	85486
Delaware	49027	48446	69910	69081	New York	49429	42870	73306	63579
District of Columbia	66643	56621	113773	96664	North Carolina	42312	46142	60324	65784
Florida	46312	46733	66919	67527	North Dakota	53666	58974	85242	93672
Georgia	45423	49265	64955	70450	Ohio	44208	49450	61560	68860
Hawaii	50018	42460	72068	61179	Oklahoma	46417	51631	65276	72609
Idaho	45066	48250	64181	68716	Oregon	49163	49811	68880	69788
Illinois	50001	49653	79657	79103	Pennsylvania	50864	51691	70901	72053
Indiana	46387	50752	62179	68030	Rhode Island	53991	54647	82758	83764
Iowa	52630	58348	71822	79625	South Carolina	43416	47815	58684	64630
Kansas	49078	54170	68561	75675	South Dakota	50459	56759	69943	78676
Kentucky	43181	48627	56093	63168	Tennessee	44567	49082	63643	70091
Louisiana	44137	48289	58758	64287	Texas	48451	50364	74106	77033
Maine	52292	53142	73140	74329	Utah	47748	49174	70366	72468
Maryland	63310	57502	104432	94852	Vermont	56737	56287	81264	80619
Massachusetts	59813	56110	94786	88918	Virginia	56464	54820	84495	82034
Michigan	49341	52213	71279	75427	Washington	56460	54550	81812	79045
Minnesota	60443	61930	83414	85465	West Virginia	41941	47338	58248	65743
Mississippi	40030	46278	64944	75080	Wisconsin	51378	54949	79046	84541
					Wyoming	51240	53487	73929	77170

High  
Middle  
Low

\*Equivalized Income

Note: It is important to note that the sample design and methods of weighting CPS data are geared towards producing national estimates (Current Population Survey, 2013 ASEC Technical Documentation). Accordingly, caution should be exercised when interpreting state-level estimates.

## State Decompositions

<b>District of Columbia, 2012 (Shares of State Totals)</b>					
	Q1	Q2	Q3	Q4	Q5
<b>Household Income</b>	2.9%	4.4%	5.8%	10.5%	76.5%
<b>Compensation of Employees</b>	1.5%	2.9%	4.9%	12.1%	78.6%
<b>Proprietors' income with inventory valuation and capital consumption adjustments</b>	0.2%	0.6%	1.8%	4.3%	93.2%
<b>Rental income of households with capital consumption adjustment</b>	2.0%	2.4%	3.9%	11.0%	80.7%
<b>Household income receipts on assets</b>	0.8%	1.0%	1.8%	4.9%	91.6%
<b>Household current transfer receipts</b>	17.3%	22.2%	21.7%	17.9%	20.9%
<b>Less: Contributions for government social insurance, domestic</b>	2.8%	4.5%	6.2%	15.6%	70.8%

\*Equivalent income and categories

# Extension to States

## Michigan, 2012 (Shares of State Totals)

	Q1	Q2	Q3	Q4	Q5
Household Income	5.1%	9.6%	15.9%	20.9%	48.6%
Compensation of Employees	3.4%	7.3%	14.2%	26.2%	48.9%
Proprietors' income with inventory valuation and capital consumption adjustments	0.3%	1.8%	3.5%	6.7%	87.8%
Rental income of households with capital consumption adjustment	5.9%	12.7%	18.0%	23.2%	40.3%
Household income receipts on assets	1.3%	2.5%	6.8%	15.8%	73.6%
Household current transfer receipts	13.5%	23.3%	31.7%	17.1%	14.4%
Less: Contributions for government social insurance, domestic	4.6%	10.1%	19.1%	27.2%	39.1%

## Arkansas, 2012 (Shares of State Totals)

	Q1	Q2	Q3	Q4	Q5
Household Income	10.2%	15.6%	17.6%	21.0%	35.6%
Compensation of Employees	6.9%	10.6%	17.7%	25.8%	39.0%
Proprietors' income with inventory valuation and capital consumption adjustments	0.6%	4.7%	6.0%	23.1%	65.6%
Rental income of households with capital consumption adjustment	10.8%	18.7%	21.4%	21.8%	27.2%
Household income receipts on assets	3.5%	5.4%	11.1%	14.0%	66.0%
Household current transfer receipts	22.8%	33.8%	22.8%	14.0%	6.5%
Less: Contributions for government social insurance, domestic	8.5%	15.4%	18.7%	25.3%	32.1%

\*Equivalent income and categories

<b>Household Income, 2012</b>						
	Gini	90/10			Gini	90/10
<b>Northeast</b>				<b>Midwest</b>		
Connecticut	0.48	6.67		Illinois	0.48	6.21
Maine	0.40	4.46		Indiana	0.40	5.35
Massachusetts	0.48	6.26		Iowa	0.41	5.35
New Hampshire	0.42	5.65		Kansas	0.42	5.72
New Jersey	0.45	7.09		Michigan	0.44	5.66
New York	0.45	6.09		Minnesota	0.44	5.69
Pennsylvania	0.42	5.33		Missouri	0.51	5.16
Rhode Island	0.47	7.43		Nebraska	0.43	5.57
Vermont	0.42	5.31		North Dakota	0.49	5.97
				Ohio	0.41	5.77
				South Dakota	0.43	5.44
				Wisconsin	0.47	5.56

\*Equivalent Income

Household Income, 2012						
	Gini	90/10			Gini	90/10
<b>West</b>				<b>South</b>		
Alaska	0.42	5.39		Alabama	0.44	5.61
Arizona	0.47	7.00		Arkansas	0.42	5.90
California	0.51	7.53		Delaware	0.42	4.85
Colorado	0.46	7.30		District of Columbia	0.54	11.59
Hawaii	0.44	7.09		Florida	0.44	6.02
Idaho	0.42	5.96		Georgia	0.44	6.71
Montana	0.44	5.14		Kentucky	0.38	5.12
Nevada	0.46	6.40		Louisiana	0.40	6.00
New Mexico	0.55	7.64		Maryland	0.53	5.95
Oregon	0.42	6.21		Mississippi	0.49	4.94
Utah	0.44	5.71		North Carolina	0.43	5.33
Washington	0.44	6.62		Oklahoma	0.43	5.78
Wyoming	0.43	6.15		South Carolina	0.40	5.49
				Tennessee	0.43	5.45
				Texas	0.48	6.89
				Virginia	0.48	7.04
				West Virginia	0.41	5.43

\*Equivalent Income

- Construct a distribution of personal income using mainly public use data
- Impute a Pareto distribution for top incomes in the CPS → expected increase in inequality
- Top shares for household income align well with Auten & Splinter and CBO for pre-tax/post-transfer income
- Income definitions are highly significant
  - Mean eq. household (Census) money income decreased from 2007-2012 while eq. household (NIPA) income (and therefore personal income) increased
  - Gini shows little change from 2007-2012, but 90/10 ratio shows significant decline moving from money income to personal income
  - Non-money income allocated to lower income groups is important for distributional results
- Next steps
  - Develop a time series of estimates
  - Develop distributional measures for PCE (following OECD working group)
  - Evaluate savings, APC and fiscal multiplier