Developing Statistics on the Distribution of State Personal Income: Methodology and Preliminary Results

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Abstract In recent years, a growing interest in the topic of income inequality has fueled demand for information on the way in which the nation's prosperity and growth are shared across households, as a complement to published data on total income and output. This paper details the methodology and presents preliminary measures of distribution of income at the regional level. These are based on personal income, a primary economic indicator published by the Bureau of Economic Analysis, and measure how personal income is distributed across households in each state and the District of Columbia. The methodology allocates detailed components of state personal income to households based on household data from the Current Population Survey supplemented with other sources. The household-level data are then aggregated to generate state-level bottom-up inequality statistics, including Gini coefficients, medians, and quintile shares of state personal income. The results show that many of the trends in inequality are similar across measures.

Keywords Income distribution, regional analysis, national accounting

JEL codes C81, C82, D31, E01, H75, I3, R1

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1. Introduction

In recent years, a growing interest in the topic of income inequality has fueled demand for information on the way in which the nation's prosperity and growth are shared across households, as a complement to published data on total income and output. In response, the Bureau of Economic Analysis (BEA) has undertaken several research initiatives to provide this information, including developing and publishing prototype measures of the distribution of personal income at the national level (see Fixler at al. 2020). Since the publication of these prototype national statistics in 2020, there has been an ongoing effort to extend these concepts to the state level. The state-level income distribution work aims to supplement the state income aggregates by providing disaggregated data that can be used for policymaking, market research, and economic analysis.

This paper details research at BEA to measure the distribution of personal income by state and compute state-level income inequality statistics. These statistics include median income by state, state Gini coefficients, and state quintile shares of personal income for the 2009-2018 period. The data and methodology used to produce state-level inequality statistics are similar to those used by Gindelsky (2021) to produce national-level income inequality statistics: BEA's state personal income components are allocated to households within each state using data from the Current Population Survey (CPS), supplemented with data from other federal agencies, such as the Internal Revenue Service, Congressional Budget Office, and the Board of Governors of the Federal Reserve System.

After allocating state personal income components to households in the CPS, the method uses the household-level data to generate various inequality measures. The results show that many of the trends in inequality are similar across measures. However, the state-level results are preliminary, and part of the purpose of publishing this paper is to solicit feedback from potential data users regarding the state-level methods and the usefulness of these statistics as a regularly published BEA product.

While state-level income inequality statistics have been published before by others, adherence to the concept of personal income (rather than other definitions of income) sets this work apart. Personal income is a broad measure of income that includes various non-monetary flows such as imputed rental income. As such, it is closer to a well-being measure than would be a narrower income concept such as monetary income. Personal income is also the most prominent statistic BEA publishes to represent household income, and thus serves as an appropriate concept for distributional household income statistics produced by BEA.

When developing methods to produce statistics for state and local geographies, BEA ensures that statistics at the state and local level are consistent with statistics at higher levels of geographic detail. This includes, for example, ensuring that state-level statistics sum up to national totals. With the proposed method for estimating state income distributions, the distribution of each detailed income component of state personal income sums up to the state-level total for that detailed income component. Because state-level components sum up to national totals, this methodology ensures consistency across state inequality measures, state personal income measures, and national personal income measures.

The paper proceeds as follows: section 2 discusses related work, section 3 describes the state personal income concepts and framework, section 4 details the source data and methodology, section 5 shows a sample of results, and section 6 concludes by discussing future work on the distribution of state personal income.

2. Related Work

Income inequality has long been a research area of interest, although income inequality research has intensified in the recent decades (examples include Piketty and Saez, 2003; Piketty et al., 2018; and Auten and Splinter, 2019). In fact, the Office of Business Economics, a predecessor of BEA, previously published estimates of the distribution of personal income in the mid-20th century (Office of Business Economics, 1953). The work by Fixler et al. (2020) is part of an ongoing effort at BEA to re-establish these distributional income statistics as part of the statistics that BEA releases on a regular basis.

While most work to develop income inequality measures focuses on national-level statistics, there are some exceptions. The U.S. Census Bureau publishes estimates of median household income by state, from both the Current Population Survey (CPS) and the American Community Survey (ACS), and Gini coefficients by state from the ACS.[2] The Economic Policy Institute has published state and county inequality data up to 2015, using the concept of taxable income (Sommeiller and Price, 2018).

Outside of the Federal Statistical System and policy organizations, regional inequality statistics have been constructed for specific research purposes. Cunningham (2015) focuses on wage inequality, using Occupational Employment Statistics data. Rinz and Voorheis (2018) and Davern et al. (2019) link survey and administrative data to better capture the distribution of specific income components like earnings or transfers. Gaubert et al. (2021) uses BEA and CPS data to focus on the dispersion across counties in poverty and affluence.

This work is most closely related to Gindelsky (2020 & 2021). Their work allocates the detailed national personal income and disposable personal income components to households using the Census Bureau's Annual Social and Economic Supplement to the Current Population Survey (CPS) microdata combined with data from other federal agencies. While this work uses the same source data and similar methods, the differences between the state and national methods stem from data availability at the state level and sample size concerns. Below are the areas where the two methods differ:

1. The state method pools CPS data over three years because of sample size concerns, while the national method does not pool the CPS.
2. Due to state data constraints, the state method modifies how the national method uses the Internal Revenue Service SOI and the Survey of Consumer Finances data to adjust and allocate certain income components to households in the CPS.

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[2] https://data.census.gov/cedsci/table?q=B19083%3A%20GINI%20INDEX%20OF%20INCOME%20INEQUALITY&g=0100000US%240400000&tid=ACSDT1Y2018.B19083

3. Additional state level data, including data on the cost of Affordable Care Act silver plans by state from the Kaiser Family Foundation, is used to distribute the health premium tax credits to households in the CPS, which is a deviation from the national method.
4. The state method makes specific adjustments to select state personal income components from place-of-work to place-of-residence, an adjustment that is not done at the national level.
5. The state method uses the mean imputed rental income by decile within state from the ACS to generate estimates for households in the CPS. In contrast, the national approach first generates the ratio between imputed rental income and money income for households in the ACS, computes the median of the ratio for each income decile, and then uses the median information to compute estimates for households in the CPS.

Besides the differences listed above, the state method will incorporate additional data and improved methods to align with the national approach in future research and updates.

1. Like the national method, the state method will include an updated machine learning algorithm, which replaces previously used CBO crosswalks, to improve the distribution of Supplemental Security Income (SSI) benefits, Medicaid, and Supplemental Nutrition Assistance Program (SNAP) benefits to households in the CPS.
2. The state method will also use Centers for Medicare and Medicaid Services (CMS) data to improve the allocation of SSI, Medicare, and Medicaid for nursing homes residents because the CPS doesn't survey nursing home residents. These residents make up a significant portion of health care costs.
3. Additionally, the state method will incorporate improvements in how the ACS is used to allocate rental-equivalent income by tying the distribution to household income rather than household type and introduce an enhanced approach for using the Survey of Consumer Finance (SCF) to distribute other financial income types to households in the CPS, similar to Gindelsky (2021).

The work described in this paper complements these related works. It uses a broader and more consistent definition of income and ensures that state-level estimates are consistent with the respective national-level statistics published by BEA.

3. State Personal Income Framework

The inequality measures described in this paper are constructed based on personal income. Personal income is the income received by, or on behalf of, all persons from all sources. It includes income from production activities (wages and salaries), income from owning a home or business, interest and dividend income from the ownership of financial assets, and transfer payments from governments and businesses.[3] It excludes corporate income and capital gains that are not distributed to households. In 2018, personal income accounted for 86 percent of gross domestic income at the national level. Personal income contrasts with the money income concept used for inequality statistics published by the U.S. Census Bureau. Census money income excludes several income components that personal income includes, such as in-kind government transfer programs and many tax credits.

State personal income is composed of 75 detailed income components, see table 1 for an aggregate summary. Examples of these components include wages and salaries, the Earned Income Tax Credit, and imputed rental income from owner-occupied housing. State personal income distributions are constructed based on these detailed components.

While the list of detailed components above is similar to the one used by Gindelsky (2021), a few unique components are needed to construct distributional measures of state personal income. The reasons for this are the way in which certain transfers are accounted for in state-level economic accounts statistics, and different coverage definitions with respect to foreign residents or US citizens living abroad.[4]

[3] See https://www.bea.gov/system/files/methodologies/SPI-Methodology.pdf for more details

[4] See https://www.bea.gov/system/files/methodologies/SPI-Methodology.pdf for more details.

Table 1. Data Sources Used to Distribute Income Components to Households

Aggregate State Personal Income Component	Source Data
Wages and Salaries	Current Population Survey and IRS Statistics of Income
Supplements to Wages and Salaries	
Employer Contributions to Pension Plans	Current Population Survey
Employer contributions to Unemployment Benefit Plans	Current Population Survey
Employer Contributions for Workers' Compensation	Current Population Survey
Employer Contributions for Life insurance	Current Population Survey
Employer Contributions to Health Insurance Plans	Current Population Survey and Medical Expenditure Panel Survey
Proprietors' Income	
Farm Proprietors' Income	Current Population Survey and IRS Statistics of Income
Nonfarm Proprietors' Income	Current Population Survey and IRS Statistics of Income
Dividend Income	Current Population Survey, IRS Statistics of Income, and Survey of Consumer Finance
Interest Income	
Monetary interest	Current Population Survey and IRS Statistics of Income
Imputed Interest from Employee Pension Plans	Survey of Consumer Finances
Imputed Interest from Financial Institutions and Insurance Companies	Survey of Consumer Finances
Rental Income	
Monetary Rental Income	Current Population Survey
Imputed Rental Income (including Owner-Occupied Housing)	Current Population Survey and American Community Survey
Personal Current Transfer Receipts	
Social Security	Current Population Survey
Railroad Retirement and Disability Benefits	Current Population Survey
Workers' Compensation	Current Population Survey
Black Lung Benefits	Current Population Survey
Pension Benefit Guaranty	Current Population Survey
Temporary Disability Benefits	Current Population Survey
Medicare	Current Population Survey and Centers for Medicare and Medicaid Services
Medicaid	Current Population Survey and Congressional Budget Office
Children's Health Insurance Program (CHIP) (non-Medicaid)	Current Population Survey
Military Medical Insurance Benefits (TRICARE)	Current Population Survey
Supplemental Security Income	Current Population Survey and Congressional Budget Office
Earned Income Tax Credit	Current Population Survey
Additional Child Tax Credit	Current Population Survey
Energy Assistance	Current Population Survey
Supplemental Nutrition Assistance Program (SNAP)	Current Population Survey and Congressional Budget Office
Special Supplemental Nutrition for Women, Infants, and Children Benefits (WIC)	Current Population Survey
Unemployment Insurance	Current Population Survey
Veteran's Benefits	Current Population Survey
Education and Training Assistance	Current Population Survey
Health Insurance Premium Assistance Tax Credit	Kaiser Family Foundation
Cost-Sharing Reduction Subsidies	Current Population Survey, Kaiser Family Foundation
Payments to Nonprofits from Federal Government	Current Population Survey
Payments to Nonprofits from State and Local Governments	Current Population Survey
Payments to Nonprofits from Business	Current Population Survey
Other	Current Population Survey and IRS Statistics of Income

Finally, BEA's state personal income tables include an "Adjustment for Residence" line to account for income components estimated using source data that are based on place of work rather than the place of residence (see table 2). Wages and salaries and supplements to wages and salaries are the two main income components estimated on a place-of-work basis, because employers rather than households supply source data for these components. While data report the income earned in a particular state, some recipients may reside in another state, requiring a residency adjustment.

Table 2. Excerpts from 2018 BEA State Personal Income Published Tables

Income Description	District of Columbia	Maryland	New Jersey
Personal income (millions of dollars)	56,573	372,197	597,005
Earnings by place of work	103,149	253,848	396,738
Of which: Wages and salaries	76,564	179,641	275,570
Less: Contributions for government social insurance	10,877	28,065	43,395
Plus: Adjustment for residence	-52,723	24,626	55,144
Equals: Net earnings by place of residence	39,549	250,410	408,487
Plus: Dividends, interest, and rent	10,234	69,275	104,885
Plus: Personal current transfer receipts	6,790	52,513	83,633

When BEA constructs state-level personal income, only a single adjustment for residence is made for personal income in each state. However, for construction of a measure of income distribution, totals by place of residence must be known for each individual component of income. Thus, state-level personal income residency adjustments are allocated proportionally to detailed income components for which data are collected on a place-of-work basis.

4. Source Data and Methodology

Data from the CPS as well as data from several other sources shown in Table 1 inform how different types of income (wages and salaries, dividends, etc.) are distributed across households in each state. In this section, we describe in greater detail the CPS and the other sources used to adjust the CPS. We outline our approach for aggregating the household level-data and generating income inequality statistics. Other sources of data include data from the Internal Revenue Service (IRS), Congressional Budget Office (CBO), and the Board of Governors of the Federal Reserve System.

4.1 Data sources

The CPS is the main source of data for estimating inequality measures of detailed state personal income components. It is also the main data source used by Fixler et al. (2020) to construct distributional measures of personal income at the national level as well as the source used in many other studies of the distribution of income and of inequality in the United States. The CPS is an excellent data source for this purpose because of its broad coverage of multiple income sources, its delineation of individuals and their income sources within households (including those who don't file income taxes), and its calendar-year income definition. Furthermore, the CPS data provide reliable estimates at the state level[5].

The CPS household serves as the unit of observation over which income distributions are computed. However, other data sources must be used to get a complete measure of the distribution of personal income. All data described below that are not from the CPS are used to adjust CPS data or to supplement CPS data at the level of the CPS household.

Two important adjustments to CPS microdata must be made when constructing state income inequality measures. One is to account for the top-coding and underreporting of income by survey respondents. The second is to bring in information on the types of income that are included in personal income, but CPS respondents are not asked about. Table 3 shows the source data that are used to make these adjustments.

[5] https://www.census.gov/programs-surveys/cps/about/faqs.html

Table 3. Supplementary Data Sources to the CPS

	Data Source	Usage
Correction for underreporting	IRS Statistics of Income	Correction for income underreporting at the top
	Congressional Budget Office	Underreporting correction for certain transfer programs
Additional income components	Medical Expenditure Panel Survey	Group health insurance
	American Community Survey	Imputed rental income from owner-occupied housing
	Centers for Medicare & Medicaid Services	Medicare
	Survey of Consumer Finances	Imputed interest
	Kaiser Family Foundation	Health premium tax credit

4.1.1 Correction for underreporting

CPS respondents often report lower earnings than what is reported in administrative records (Meyer et al., 2015; Rothbaum, 2015; Bhandari et al., 2020). The gap between published state personal income totals and the sum of state CPS reported income can be large and varies by income type. For instance, Rothbaum (2015) note that, generally, such gaps for business and property income and transfer payments are larger than the gap for wages. In addition to the gap between CPS totals and NIPA aggregates, there is also a significant problem of underreporting and misreporting by CPS households. Respondents may either understate their total income received from a given source, or else not answer the question (erroneously leaving a value of 0). Finally, high income responses are also top-coded by the Census Bureau to protect respondent privacy.

To correct for top-coding and underreporting among the top income earners in the CPS, the method by Gindelsky (2020) is applied. This method adjusts CPS data using state-level data from the IRS Statistics of Income (SOI) on income that accrues to the households that report large adjusted gross income (AGI) levels. The method, however, requires two initial steps before CPS data are adjusted in this way. First, the SOI data are adjusted for misreporting of income based on the results of an IRS study that found accurate reporting of wages and salaries but a pattern of misreporting in business income, which is relatively larger for lower levels of business income (DeBacker et al., 2020). Second, filing status as reported in the CPS is used to transform individual and household data in the CPS into tax units.[6]

[6] We follow the methodology in Gindelsky (2021), by using an updated version of the TAXSIM program (Feenberg and Coutts 1993) from the National Bureau of Economic Research (NBER) to better determine AGI in order to merge in the SOI data.

After these two initial steps, SOI data are used to adjust CPS wages, interest income, dividend income, and nonfarm proprietors' income but not monetary rental income and farm proprietors' income. For the latter, state-level detail is not available. The steps for adjusting the CPS by income type using the SOI data are as follows: First, SOI tax units are split into two groups, those with incomes above and those with incomes below $200,000. Second, across each income category, the share of income for each of the two tax units in the SOI data and the CPS are computed. Then, CPS tax units are added iteratively to the $200,000 and higher group until the share of CPS tax units in the over $200,000 group is equal to the share of tax units over that threshold in the SOI, such that the distributions are similar.

Finally, for each income category, the gap between totaled CPS state income and state Personal Income is allocated proportionally based on these shares. Gindelsky (2020) used the same general approach with incomes groups above and below $500,000. This difference between the two methods results from different levels of available detail at the state and national level. A similar method determines the distribution of farm proprietors' income and monetary rental income, except using the top share from national-level SOI, rather than state-specific shares due to lack of state-level data.

The method for addressing underreporting of government transfer payments in the CPS uses the approach of the Congressional Budget Office (CBO) to impute recipiency and monetary amounts for Medicaid, Supplemental Nutrition Assistance Program (SNAP) benefits, and Supplemental Security Income (SSI) to CPS households whose other reported income indicates eligibility for these programs (Congressional Budget Office, 2021). The imputed values are then scaled to sum up to the state personal income totals for these income components.[7]

4.1.2 Additional income components

Other adjustments to income of CPS households are required because some of the detailed components of personal income are not part of CPS money income. These components include Medicare benefits, health premium tax credits, imputed rental income from owner-occupied housing, and imputed interest and dividends.

[7] The method described by Fixler et al. (2020) used CBO data in its estimation of inequality statistics. However, when BEA released updated income inequality statistics in December of 2021, a machine-learning method of imputation was substituted for these data (Gindelsky, 2021). Aligning this updated method to produce national inequality measures with the method to estimate measures of inequality for states and the District of Columbia is left for future work.

The method for these adjustments generally follows that of Gindelsky (2020), using data from the Medical Expenditure Panel Survey (MEPS) for employer contributions for health insurance and from the Centers for Medicare & Medicaid Services (CMS) for Medicare benefits. The health premium tax credit is distributed to households within states in part using data on the cost of Affordable Care Act silver plans by state from the Kaiser Family Foundation. For imputed rental income from owner-occupied housing, the distribution to households within states builds off the recent work of Rassier et al. (2021), wherein ACS microdata yield household-level estimates of imputed rental income. From this, households in the CPS who report owning a house are given the average imputed rental income from ACS based on their income decile.

Some data sources such as the Survey of Consumer Finances (SCF), used to distribute imputed interest and dividends, do not contain information on the respondents' state of residence. The method for distributing these components follows Gindelsky (2020), allocating the state totals for these income components to households using data on bank balances or pension holdings by the income bracket in the SCF.

There are also some income components for which survey or administrative microdata are not available at the state level. For these, various assumptions allow distribution of these components to households. These income components include economic stimulus payments, the Alaska permanent fund dividends, and various other targeted tax credits. Survey responses from CPS households are used to determine whether these households qualify for various benefits and to what extent. For these income components, state totals are allocated to households that qualify for these benefits, proportionally to the benefit amount where appropriate.

4.1.3 Pooled samples

After adjusting the CPS microdata as described above, annual CPS samples are pooled across years to mitigate variation in the estimated income distributions associated with a small sample size at the state level, in particular for states with smaller populations. Census guidance advises pooling microdata across three CPS survey years.[8] For example, BEA's 2018 Wisconsin personal income total is allocated by detailed income component to households using a pooled sample of 2017, 2018, and 2019 CPS respondents who live in Wisconsin.[9] The state personal income component totals are not pooled because: 1) sample size is not a concern for these statistics, and 2) using annual controls that are not pooled mitigates some of the drawbacks of using pooled data to compute distributional statistics.

[8] From https://www2.census.gov/programs-surveys/cps/techdocs/cpsmar19.pdf.
[9] We adjust the CPS survey weights accordingly.

4.2 Allocating state personal income to households

CPS contains some income information on individuals and some information on households. The income components for individual respondents, once imputed or adjusted in the various ways described above, are summed to the household level. To demonstrate the method for individual-level personal income components, Social Security benefits serve as an example. For each state, each individual's share of the CPS state total for Social Security benefit receipts is computed by dividing income from Social Security benefit receipts from the CPS by the sum of Social Security benefit receipts for the state also from the CPS. Next, this share is multiplied by the state total for Social Security benefit receipts published in BEA's state personal income accounts. We then sum Social Security benefit receipts over individuals in each CPS household.

For personal income components distributed directly to CPS households, CPS income component shares are computed for households rather than for individuals, and thus there is no need for the step which sums individuals within households. These components of personal income include imputed rental income from owner-occupied housing and transfers such as energy assistance.

4.3 Generating state-level distribution statistics

Allocating each state's personal income components to households results in an adjusted set of CPS household-level microdata that is consistent with BEA's published state personal income. The adjusted microdata are used to generate various inequality measures by state and the District of Columbia— quintile shares, medians, and Gini coefficients. Other metrics that have drawn interest such as top 5 or top 1 percent shares are not computed, because small sample sizes in source data may compromise data quality. Unless otherwise noted, all inequality statistics in the results below are based on equivalized income. Equivalized income is a measure of household income that accounts for differences in household's size and composition and is generated by dividing household income by the square root of household size.[10]

Quintile shares for each state and the District of Columbia are specific to that area. The top quintile share in a particular state is the share of that state's personal income that goes to households that are in the top 20 percent of that state's households in terms of equivalized income. This means that a household used to compute income accruing to the top quintile of one state may not have been used had it been located in a different state, as in that state the household may not have been situated in the top income quintile. This type of quintile share is not the same as the share of income of top 20 percent income earners in the United States that live in that particular state.

[10] This method is also used in BEA's national methodology, explained in Fixler et al. (2020). Numerous other studies such as Auten and Splinter (2019), do so as well. See Coulter et al. (1992) for further discussion.

5. Results and Discussion

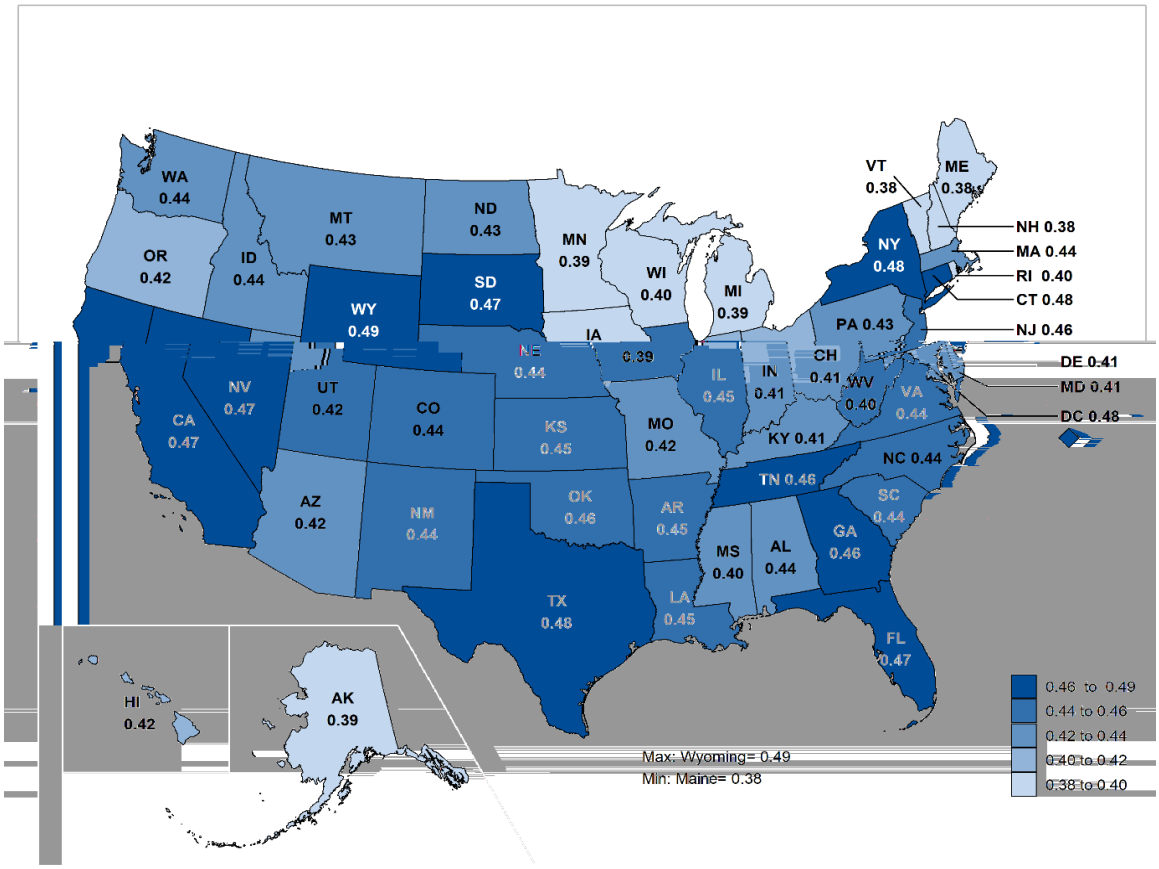
Income distributions are summarized using various metrics. In this section, Gini coefficients, medians, and income shares by quintile are used to summarize inequality in the distribution of personal income. None of these statistics alone summarizes the entire income distribution in any state, but taken together, they can provide valuable insights into how personal income in that state is distributed across households. When comparing these inequality statistics to other income measures such as per capita income, it is important to note the difference in reporting units. These inequality statistics are reported on a household basis, equivalized for household size, rather than on a per capita basis. In this section, nominal inequality measures are presented first, followed by inequality measures that are adjusted for differences in regional prices.

5.1 Nominal state inequality statistics

Figure 1 and table 4 show the Gini coefficients by state and the District of Columbia in 2018. The Gini coefficient is a summary measure of inequality and measures the dispersion of income within a state. In principle, it can range from 0, where all households earn equal income, to 1, where all income is earned by a single household. Thus, a higher Gini coefficient indicates greater inequality, with high-income households receiving much larger percentages of the state total income of the population. In practice, it is rare to see Gini coefficients that lie outside of the 0.2 to 0.7 range. Gini coefficients for personal income by state and the District of Columbia in 2018 ranged from 0.38 (Maine) to 0.49 (Wyoming). This variation across states and the District of Columbia is greater than the variation in the national Gini coefficient over the 2000–2019 time period, 0.43 to 0.45.

By this metric, Maine, Minnesota, Iowa, Michigan, Mississippi, and West Virginia are among states with lower income inequality. In contrast, Wyoming, New York, Connecticut, Texas, California, Nevada, South Dakota, Florida, Georgia, and Tennessee are among states with higher income inequality. Table 4 below reports Gini coefficients for 2018.

Figure 1. Gini Coefficients, 2018



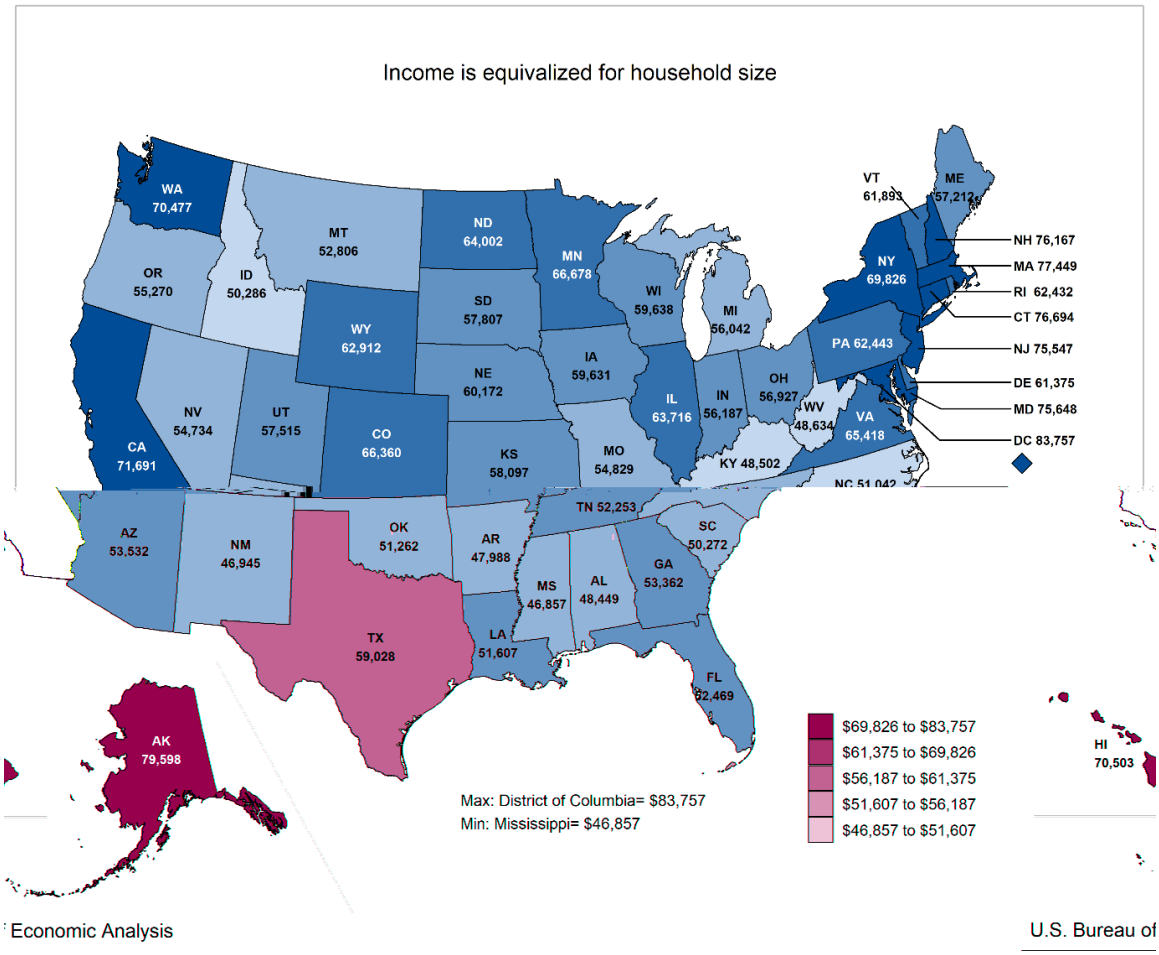
U.S. Bureau of Economic Analysis

Table 4. Gini Coefficients, 2018

State	Gini	State	Gini	State	Gini
Alabama	0.44	Kentucky	0.41	North Dakota	0.43
Alaska	0.39	Louisiana	0.45	Ohio	0.41
Arizona	0.42	Maine	0.38	Oklahoma	0.46
Arkansas	0.45	Maryland	0.41	Oregon	0.42
California	0.47	Massachusetts	0.44	Pennsylvania	0.43
Colorado	0.44	Michigan	0.39	Rhode Island	0.4
Connecticut	0.48	Minnesota	0.39	South Carolina	0.44
Delaware	0.41	Mississippi	0.4	South Dakota	0.47
District of Columbia	0.48	Missouri	0.42	Tennessee	0.46
Florida	0.47	Montana	0.43	Texas	0.48
Georgia	0.46	Nebraska	0.44	Utah	0.42
Hawaii	0.42	Nevada	0.47	Vermont	0.38
Idaho	0.44	New Hampshire	0.38	Virginia	0.44
Illinois	0.45	New Jersey	0.46	Washington	0.44
Indiana	0.41	New Mexico	0.44	West Virginia	0.4
Iowa	0.39	New York	0.48	Wisconsin	0.4
Kansas	0.45	North Carolina	0.44	Wyoming	0.49

Figure 2 and table 5 below show median equivalized state personal income for 2018. Median income represents the income level which is greater than the income earned by exactly half of households and less than the income earned by the other half of households.

Figure 2. Median Equivalized State Personal Income, 2018



For symmetric distributions, median income will equal average income, but when there are households with very large or very small income levels, these tend to pull the average income above or below the median income, respectively. Median household personal income was highest in the District of Columbia, Alaska, Connecticut, Massachusetts, and New Hampshire and was lowest in Mississippi, New Mexico, Arkansas, Alabama, and Kentucky. Table 5 below reports the median and mean equivalized state personal income for 2018.

Figures 3 and 4 and table 6 below show the 80th and 20th percentiles of equivalized state personal income for 2018. The 80th percentile is the income level where exactly 80 percent of households earn less and, conversely, 20 percent earn more, on an equivalized basis. Similarly, the 20th percentile is the income where exactly 20 percent of households earn less and, conversely, 80 percent earn more. There is significant variation across the country in these numbers. For example, the 80th percentile of equivalized personal income in the District of Columbia is more than double that of Mississippi.

Figure 3. 80th Percentile Equivalized State Personal Income, 2018

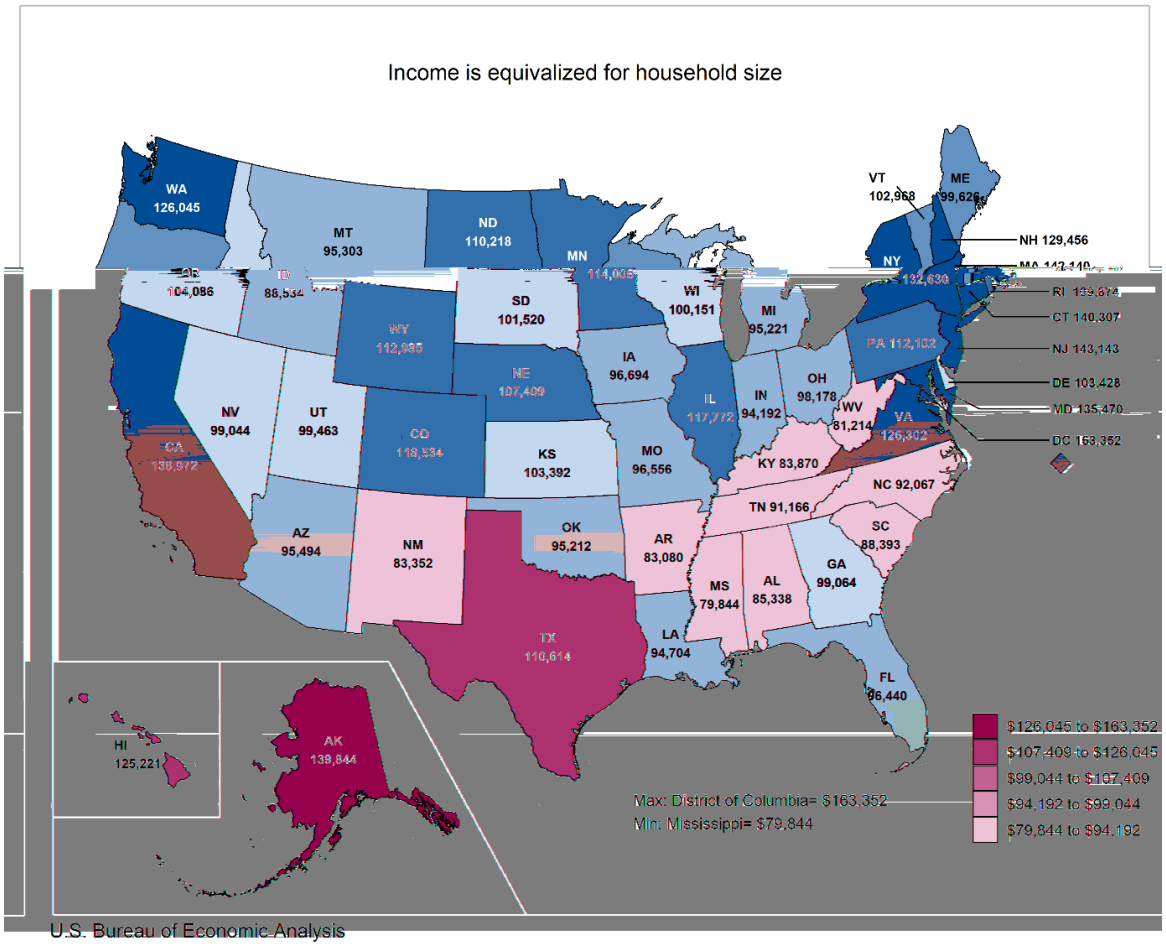


Figure 4. 20th Percentile Equivalized State Personal Income, 2018

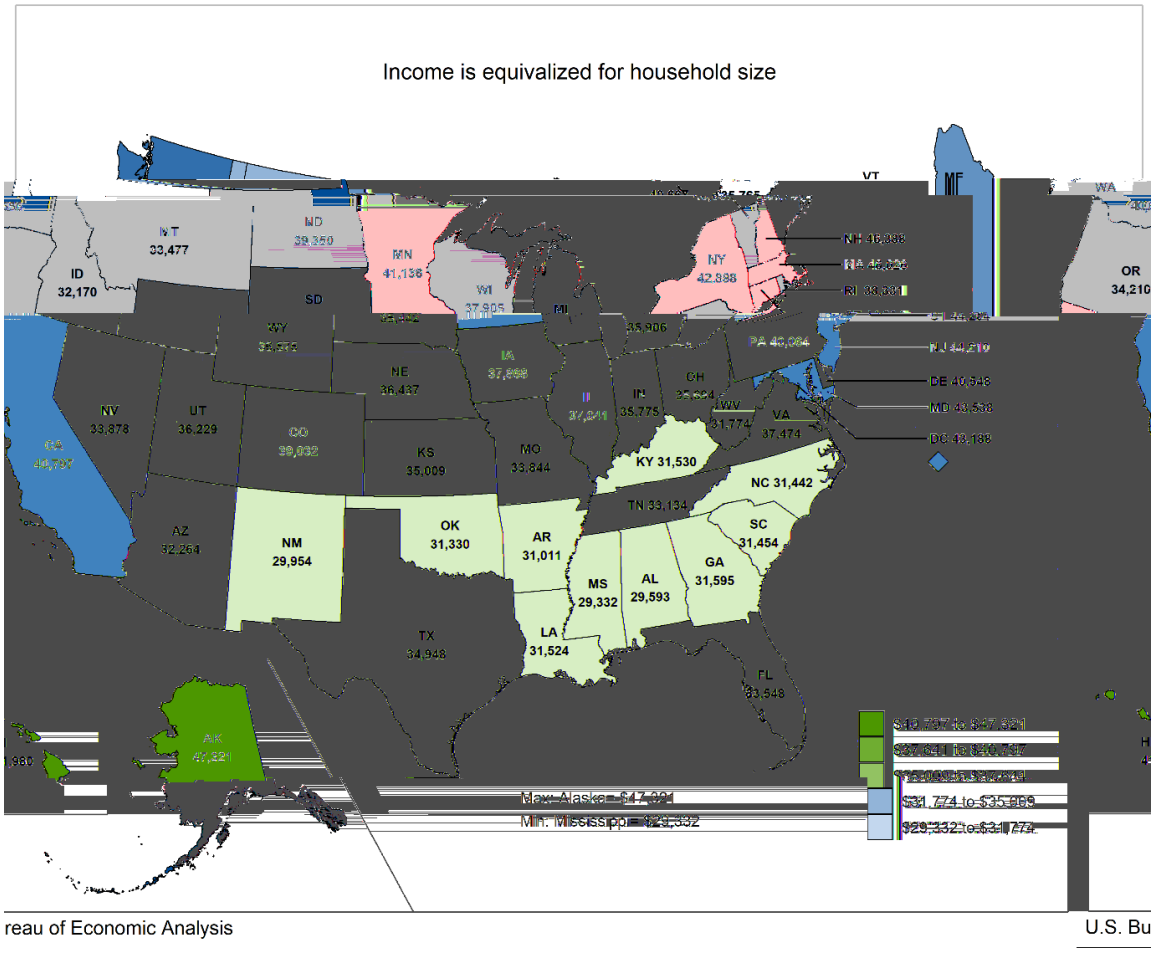


Table 6 shows percentiles of the state personal income distributions, defined analogously to the 20th and 80th percentiles. Note that the mean equivalized personal income lies between the 60th and 80th percentiles in each state and the District of Columbia, which indicates that the income distribution is skewed to the right. This means that there are more very large incomes than very small incomes in each state.

Based on the nominal-dollar personal income quintiles shown in table 6, table 7 below shows how personal income is shared across quintiles of the income distribution for each state and the District of Columbia in 2018. The second column is BEA's published state personal income. The next five columns show the shares of personal income earned in that state and the District of Columbia by households within each quintile. The states with the largest top quintile shares are Connecticut, New York, Florida, and Wyoming—all of which are among the states with the largest Gini coefficients (indicating higher income inequality).

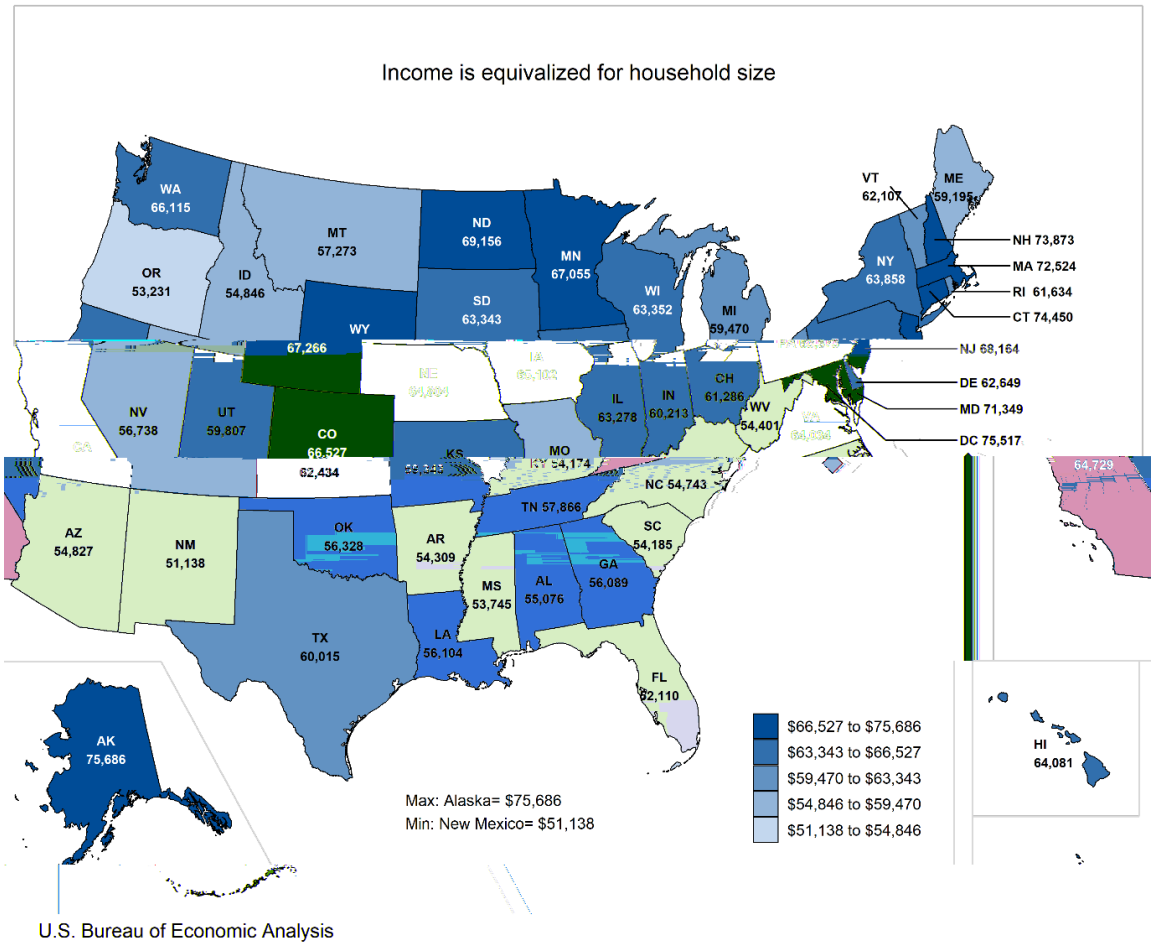
5.2 Price-adjusted state inequality statistics

Real (i.e., price-adjusted) state personal income can be expressed as nominal state personal income deflated by a regional price parity (RPP). RPPs represent the relative price levels in each state at a given point in time,[11] and are expressed relative to average U.S. prices. RPP-adjusted personal income distributions are computed by dividing equivalized nominal household personal income by the RPP of the state in which the household resides, meaning that all households within a state receive the same RPP adjustment. Thus, using the RPPs to deflate personal income distribution estimates shifts the entire distribution of income down in high-RPP states such as Hawaii and California, and shifts the entire distribution of income up in low-RPP states such as Mississippi and Arkansas. As a result, certain statistics such as Gini coefficients or quintile shares are not affected by this adjustment. Median incomes and income thresholds are, however, different when computed from the RPP-adjusted personal income data than they are when computed from the unadjusted nominal data. Tables 5 and 6 below show RPP adjusted personal income distribution statistics alongside the nominal dollar personal income distribution statistics.

Figure 5 shows equivalized median RPP-adjusted personal income for states and the District of Columbia. Alaska has the highest adjusted median RPP-adjusted personal income, while New Mexico has the lowest. In contrast, in unadjusted median personal income estimates, Mississippi has the lowest median income. In comparison to the unadjusted medians shown in figure 2, higher median incomes are more concentrated in the Upper Midwest and Plains states.

[11] For more on the RPP program, see https://www.bea.gov/data/prices-inflation/regional-price-parities-state-and-metro-area.

Figure 5. Median Equivalized Real State Personal Income, 2018



The mean and median equivalized state personal income, in real or price-adjusted dollars, for each state and the District of Columbia vary less than the nominal (not price-adjusted) means and medians (table 5). Similar to what was seen in the state medians and means in table 5, the various real (price-adjusted) percentiles of personal income for each state and the District of Columbia vary less than the nominal (not price-adjusted) percentiles (table 6).

Table 5. Personal Income, Median and Mean Equivalized State Personal Income, 2018

State	Nominal dollars			Real dollars		
	Personal income ($ Millions)	Median Equivalized	Mean Equivalized	Personal income ($ Millions)	Median Equivalized	Mean Equivalized
Alabama	207,054	48,449	69,162	217,765	55,076	78,622
Alaska	44,103	79,598	105,594	38,798	75,686	100,404
Arizona	315,732	53,532	74,218	299,176	54,827	76,014
Arkansas	130,865	47,988	72,234	137,024	54,309	81,750
California	2,431,822	71,691	109,650	2,031,413	64,729	99,002
Colorado	331,955	66,360	95,393	307,894	66,527	95,633
Connecticut	264,263	76,694	120,918	237,340	74,450	117,380
Delaware	51,310	61,375	86,704	48,457	62,649	88,503
District of Columbia	56,573	83,757	126,569	47,191	75,517	114,117
Florida	1,087,189	52,469	83,473	998,979	52,110	82,903
Georgia	493,175	53,362	80,598	479,603	56,089	84,718
Hawaii	76,184	70,503	97,912	64,064	64,081	88,993
Idaho	76,681	50,286	73,739	77,378	54,846	80,427
Illinois	728,366	63,716	94,618	669,246	63,278	93,968
Indiana	316,782	56,187	77,627	314,077	60,213	83,188
Iowa	156,072	59,631	79,541	157,644	65,102	86,839
Kansas	148,956	58,097	85,274	148,099	62,434	91,640
Kentucky	188,362	48,502	68,735	194,649	54,174	76,773
Louisiana	215,112	51,607	76,137	216,359	56,104	82,771
Maine	65,122	57,212	75,392	62,338	59,195	78,006
Maryland	372,197	75,648	103,026	324,782	71,349	97,171
Massachusetts	486,204	77,449	112,726	421,222	72,524	105,558
Michigan	476,477	56,042	75,577	467,791	59,470	80,200
Minnesota	319,619	66,678	89,956	297,382	67,055	90,466
Mississippi	112,818	46,857	63,101	119,720	53,745	72,376
Missouri	289,454	54,829	76,573	289,844	59,343	82,876
Montana	50,989	52,806	77,211	51,165	57,273	83,742
Nebraska	101,204	60,172	88,415	100,840	64,804	95,222
Nevada	149,789	54,734	84,658	143,657	56,738	87,757
New Hampshire	83,161	76,167	100,477	74,622	73,873	97,451
New Jersey	597,005	75,547	113,953	498,357	68,164	102,816
New Mexico	86,532	46,945	70,542	87,209	51,138	76,844
New York	1,316,440	69,826	111,454	1,113,849	63,858	101,928
North Carolina	475,483	51,042	74,064	471,807	54,743	79,434
North Dakota	42,822	64,002	91,339	42,808	69,156	98,694
Ohio	569,766	56,927	79,907	567,513	61,286	86,027
Oklahoma	182,574	51,262	78,142	185,609	56,328	85,865
Oregon	211,415	55,270	80,226	188,381	53,231	77,266
Pennsylvania	716,337	62,443	91,229	675,804	63,673	93,026
Rhode Island	57,372	62,432	86,388	52,400	61,634	85,283
South Carolina	222,565	50,272	72,863	221,940	54,185	78,534
South Dakota	46,032	57,807	89,211	46,667	63,343	97,755
Tennessee	319,949	52,253	79,238	327,810	57,866	87,750
Texas	1,483,122	59,028	92,755	1,395,094	60,015	94,305
Utah	146,326	57,515	82,173	140,774	59,807	85,448
Vermont	33,437	61,893	83,568	31,043	62,107	83,857
Virginia	484,937	65,418	95,130	439,161	64,034	93,117
Washington	454,257	70,477	100,544	394,263	66,115	94,321
West Virginia	74,778	48,634	65,814	77,387	54,401	73,617
Wisconsin	297,730	59,638	80,886	292,608	63,352	85,923
Wyoming	34,691	62,912	98,619	34,317	67,266	105,444

Table 6. Quintile Thresholds Equivalized State Personal Income, 2018

State	Nominal dollars				Real dollars			
	20th Percentile	40th Percentile	60th Percentile	80th Percentile	20th Percentile	40th Percentile	60th Percentile	80th Percentile
Alabama	29,593	42,136	55,923	85,338	33,640	47,899	63,572	97,010
Alaska	47,321	68,101	93,420	139,844	44,995	64,754	88,828	132,970
Arizona	32,264	45,285	62,975	95,494	33,045	46,380	64,498	97,804
Arkansas	31,011	42,155	55,671	83,080	35,096	47,708	63,005	94,025
California	40,797	59,625	86,801	138,972	36,836	53,835	78,372	125,477
Colorado	39,032	56,751	78,484	118,534	39,130	56,893	78,681	118,832
Connecticut	44,204	63,865	93,371	140,307	42,911	61,996	90,639	136,202
Delaware	40,548	54,128	71,349	103,428	41,389	55,252	72,830	105,575
District of Columbia	43,188	66,253	103,286	163,352	38,939	59,734	93,124	147,280
Florida	33,548	45,800	61,991	96,440	33,319	45,487	61,567	95,781
Georgia	31,595	45,604	64,472	99,064	33,210	47,935	67,767	104,127
Hawaii	41,980	59,564	85,443	125,221	38,156	54,138	77,660	113,814
Idaho	32,170	43,850	58,502	88,534	35,087	47,827	63,808	96,564
Illinois	37,641	54,253	76,128	117,772	37,382	53,880	75,605	116,963
Indiana	35,775	48,688	65,506	94,192	38,338	52,176	70,199	100,940
Iowa	37,868	52,045	69,441	96,694	41,342	56,820	75,813	105,566
Kansas	35,009	48,580	68,958	103,392	37,622	52,206	74,105	111,110
Kentucky	31,530	42,284	55,877	83,870	35,218	47,229	62,412	93,679
Louisiana	31,524	44,613	60,726	94,704	34,271	48,500	66,017	102,956
Maine	35,765	48,200	66,979	99,626	37,005	49,871	69,300	103,079
Maryland	43,538	64,035	90,849	135,470	41,064	60,396	85,687	127,772
Massachusetts	46,026	65,084	93,830	142,140	43,099	60,945	87,863	133,101
Michigan	35,906	49,155	64,974	95,221	38,103	52,161	68,948	101,045
Minnesota	41,138	57,056	78,847	114,006	41,371	57,379	79,293	114,652
Mississippi	29,332	40,972	53,869	79,844	33,643	46,995	61,787	91,580
Missouri	33,844	46,504	64,647	96,556	36,630	50,332	69,969	104,505
Montana	33,477	45,408	61,977	95,303	36,308	49,249	67,220	103,364
Nebraska	36,437	50,913	72,827	107,409	39,242	54,832	78,433	115,677
Nevada	33,878	47,329	65,317	99,044	35,119	49,062	67,709	102,670
New Hampshire	46,388	64,481	89,049	129,456	44,991	62,540	86,367	125,557
New Jersey	44,210	62,557	92,476	143,143	39,890	56,443	83,438	129,153
New Mexico	29,954	40,648	55,425	83,352	32,630	44,279	60,376	90,798
New York	42,898	59,031	83,935	132,630	39,232	53,986	76,761	121,294
North Carolina	31,442	43,960	59,432	92,067	33,721	47,147	63,741	98,741
North Dakota	39,350	55,295	76,625	110,218	42,519	59,747	82,795	119,093
Ohio	35,694	49,336	66,040	98,178	38,428	53,115	71,098	105,697
Oklahoma	31,330	44,377	60,843	95,212	34,426	48,763	66,856	104,622
Oregon	34,210	47,815	67,896	104,086	32,948	46,051	65,391	100,246
Pennsylvania	40,064	54,169	73,627	112,102	40,853	55,236	75,078	114,311
Rhode Island	38,331	53,680	72,927	109,874	37,841	52,993	71,994	108,468
South Carolina	31,454	43,802	59,042	88,393	33,902	47,211	63,637	95,272
South Dakota	35,442	49,411	68,521	101,520	38,837	54,144	75,083	111,242
Tennessee	33,134	45,377	61,143	91,166	36,694	50,252	67,711	100,959
Texas	34,948	50,015	71,048	110,614	35,532	50,851	72,235	112,462
Utah	36,229	49,854	69,116	99,463	37,673	51,841	71,871	103,427
Vermont	40,667	53,769	71,360	102,968	40,807	53,954	71,607	103,323
Virginia	37,474	54,218	79,376	126,302	36,681	53,071	77,697	123,629
Washington	40,656	59,066	84,968	126,045	38,140	55,410	79,709	118,244
West Virginia	31,774	42,663	56,043	81,214	35,541	47,721	62,688	90,843
Wisconsin	37,905	51,636	69,702	100,151	40,265	54,852	74,042	106,388
Wyoming	36,575	52,178	74,777	112,985	39,106	55,789	79,953	120,805

Table 7. Quintile Equivalized Share of State Personal Income, 2018

State	Personal Income ($ Millions)	0-20th Percentile	20-40th Percentile	40-60th Percentile	60-80th Percentile	80-100th Percentile
Alabama	207,054	5.3	10.0	13.7	20.1	50.9
Alaska	44,103	5.9	11.4	16.2	21.5	44.9
Arizona	315,732	5.7	10.4	14.4	21.0	48.5
Arkansas	130,865	5.5	9.8	13.1	18.8	52.7
California	2,431,822	4.9	9.1	13.9	20.5	51.7
Colorado	331,955	5.5	9.8	14.2	20.4	50.2
Connecticut	264,263	4.6	8.6	13.0	19.1	54.6
Delaware	51,310	6.1	10.3	13.6	20.6	49.4
District of Columbia	56,573	4.2	8.6	13.2	20.5	53.5
Florida	1,087,189	5.2	9.1	12.6	18.8	54.3
Georgia	493,175	5.1	9.5	13.5	20.3	51.7
Hawaii	76,184	5.4	10.0	15.4	21.9	47.3
Idaho	76,681	5.8	10.2	13.4	19.7	50.9
Illinois	728,366	5.1	9.2	13.7	20.5	51.5
Indiana	316,782	6.3	10.2	14.6	20.7	48.3
Iowa	156,072	6.3	10.7	15.1	21.2	46.7
Kansas	148,956	5.2	9.2	13.9	20.4	51.3
Kentucky	188,362	6.1	10.2	14.0	20.3	49.3
Louisiana	215,112	5.4	9.6	13.3	19.9	51.9
Maine	65,122	6.0	10.3	15.1	22.3	46.2
Maryland	372,197	5.5	10.4	14.9	22.0	47.1
Massachusetts	486,204	5.0	9.1	14.1	20.9	51.0
Michigan	476,477	6.1	10.4	14.4	20.8	48.2
Minnesota	319,619	5.9	10.4	15.0	21.1	47.6
Mississippi	112,818	6.0	10.8	14.6	20.5	48.1
Missouri	289,454	5.5	9.8	14.3	20.8	49.6
Montana	50,989	5.8	9.7	13.7	20.7	50.1
Nebraska	101,204	5.4	9.6	14.1	20.8	50.1
Nevada	149,789	5.3	9.5	13.5	19.6	52.1
New Hampshire	83,161	6.2	10.6	15.3	22.1	45.8
New Jersey	597,005	4.8	8.8	13.7	20.6	52.1
New Mexico	86,532	5.9	9.8	13.8	19.8	50.6
New York	1,316,440	5.0	8.8	12.8	19.1	54.3
North Carolina	475,483	5.5	9.6	13.6	20.4	50.8
North Dakota	42,822	5.6	10.1	14.6	21.0	48.6
Ohio	569,766	5.9	10.1	14.3	20.9	48.8
Oklahoma	182,574	5.5	9.4	13.5	20.2	51.3
Oregon	211,415	5.8	10.0	14.3	21.1	48.8
Pennsylvania	716,337	5.6	9.9	14.0	20.8	49.7
Rhode Island	57,372	5.9	10.2	14.5	20.6	48.8
South Carolina	222,565	5.6	10.0	13.7	20.0	50.7
South Dakota	46,032	5.3	9.2	13.4	19.6	52.5
Tennessee	319,949	5.6	9.6	13.4	19.6	51.8
Texas	1,483,122	5.0	9.1	13.1	19.7	53.1
Utah	146,326	5.7	10.4	14.0	19.7	50.2
Vermont	33,437	6.4	10.8	14.6	21.3	46.9
Virginia	484,937	5.1	9.2	14.1	21.5	50.1
Washington	454,257	5.2	9.7	14.5	20.6	49.9
West Virginia	74,778	6.1	10.4	14.9	20.8	47.9
Wisconsin	297,730	6.1	10.2	14.8	20.8	48.1
Wyoming	34,691	4.7	8.7	13.4	19.2	54.0

6. Conclusion

This paper discusses source data and methodology used to construct state personal income inequality measures. These estimates fill the need for measures of inequality within states and the District of Columbia based on a broad income concept, in this case, personal income. The method to produce these statistics is based on CPS households, and has combined a variety of income sources to adjust CPS data for underreporting of income, and for personal income components that are outside the scope of the CPS. Statistics constructed using this method are correlated with other measures of inequality for states and the District of Columbia, but show unique patterns that are consistent with the broader income concept.

The preliminary statistics show that Gini coefficients for personal income by state and the District of Columbia in 2018 ranged from 0.38 in Maine to 0.49 in Wyoming. By this metric, apart from Maine, Minnesota, Iowa, and Michigan are among the states with lower income inequality. In contrast, apart from Wyoming, New York, Connecticut, and Texas are among the states with higher income inequality.

These estimates are part of an effort at BEA to produce measures of the distribution of income and of income inequality, based on national accounting concepts, which includes the earlier work by Fixler et al. (2020). Part of the purpose of publishing this paper is to solicit feedback from potential data users, regarding both concepts and methods as well as the value of these statistics as a potential regularly published estimate.

These estimates could be expanded in a variety of ways: Production of time series of inequality statistics, development of measures of inequality in disposable personal income for states and the District of Columbia, or publication of distributional measures by detailed income components. These extensions are left for future work.

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