Demography (2019) 56:999–1021
https://doi.org/10.1007/s13524-019-00773-7

Race Matters: Income Shares, Income Inequality, and Income Mobility for All U.S. Races

Randall Akee[1,2,3] · Maggie R. Jones[4] · Sonya R. Porter[4]

Published online: 3 April 2019

Abstract

Using unique linked data, we examine income inequality and mobility across racial and ethnic groups in the United States. Our data encompass the universe of income tax filers in the United States for the period 2000–2014, matched with individual-level race and ethnicity information from multiple censuses and American Community Survey data. We document both income inequality and mobility trends over the period. We find significant stratification in terms of average incomes by racial/ethnic group and distinct differences in within-group income inequality. The groups with the highest incomes—whites and Asians—also have the highest levels of within-group inequality and the lowest levels of within-group mobility. The reverse is true for the lowest-income groups: blacks, American Indians, and Hispanics have lower within-group inequality and immobility. On the other hand, low-income groups are also highly immobile in terms of overall, rather than within-group, mobility. These same groups also have a higher probability of experiencing downward mobility compared with whites and Asians. We also find that within-group income inequality increased for all groups between 2000 and 2014, and the increase was especially large for whites. The picture that emerges from our analysis is of a rigid income structure, with mainly whites and Asians positioned at the top and blacks, American Indians, and Hispanics confined to the bottom.

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s13524-019-00773-7) contains supplementary material, which is available to authorized users.

✉ Randall Akee
rakee@ucla.edu

[1] Economic Studies, Brookings Institution, 1775 Massachusetts Avenue NW, Washington, DC 20036, USA

[2] Department of Public Policy, UCLA, 3250 Public Affairs Building, Los Angeles, CA 90095-1656, USA

[3] National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138, USA

[4] U.S. Census Bureau, Center for Economic Studies, 4600 Silver Hill Road, Suitland, MD 20746, USA

Keywords Income inequality · Income shares · Income mobility · Race · Administrative data

Introduction

Race matters for economic and social outcomes. In the United States, persistent differences exist across racial/ethnic groups in wages, employment, homeownership, arrests, and health outcomes. For example, the black-white male earnings ratio has stagnated at 0.8 after decades of convergence (Lang et al. 2012); life expectancy is approximately four years shorter for blacks than for whites; and infant mortality rates are 140 % higher for blacks relative to whites (Boustan and Margo 2016). Homicide arrests have not dropped below a black-white ratio of 7 (LaFree et al. 2010), and black-white homeownership differed by roughly 23 percentage points as recently as 2007 (Collins and Margo 2011). Even after compositional differences, such as ability, experience, or educational attainment and quality, are controlled for, disparities do not completely disappear across racial/ethnic groups (Altonji and Blank 1999; Bayer and Charles 2016; Black et al. 2006; Bound and Freeman 1992; Carruthers and Wanamaker 2017; Darity and Mason 1998; Fryer 2011; Juhn et al. 1991, 1993; Neal and Johnson 1996; Ramraj et al. 2016; Ritter and Taylor 2011).[1]

Despite mounting evidence that race matters in a series of important economic contexts, one area that has received relatively little attention along racial and ethnic lines is the recent rise in income inequality in the United States. There have been significant efforts in recent years to identify and explain increased income inequality and reduction in income mobility for the general population. However, none of that work has focused on differences by individual race or ethnicity (Chetty et al. 2014; Kopczuk et al. 2010; Piketty and Saez 2003). Administrative records from the Social Security Administration or from income tax filings alone cannot be used to evaluate how inequality varies between or within racial and ethnic groups. As a result, racial and ethnic income inequality and mobility continues to be one of the more important unaddressed topics in economics.[2]

Correctly identifying changes in income inequality and income mobility by race and ethnicity matters for economic policy and analysis. Anti-poverty policies hinge on concerns regarding the differential resources of racial and ethnic groups, yet we do not

[1] In the relatively few cases when differences are explained, the explanatory variables—such as employment opportunities, educational opportunities, or household characteristics—are often highly correlated with race and ethnicity. In these cases, pre-market conditions suggest disparities in access to or quality of educational institutions; these disparities are highly correlated with race and ethnicity and may simply imply an explanation for disparities, predating entry into the labor market, that are still race-/ethnicity-based.

[2] Measures of income inequality are meaningful on their own and may determine other economic outcomes. For example, inequality may drive racial residential segregation (Reardon and Bischoff 2011) and may reduce the incentive to invest in higher education (Kearney and Levine 2016). Some evidence indicates that inequality may reduce the societal support for public assistance programs (Ashok et al. 2015). Violent crimes may also be causally related to high levels of income inequality (Fajnzylber et al. 2002; Kennedy et al. 1998). Income inequality may also affect adult health outcomes with a lag (Subramanian and Kawachi 2004). In tight housing markets, increased income inequality may disproportionately affect the poor, who have to pay more for housing (Matlack and Vigdor 2008). Kawachi et al. (1997) found that increasing income inequality reduces investment in social capital, which then increases adult mortality. Related to this, Hout (2016) found that higher levels of inequality reduce happiness.

have a solid picture of these groups' resources relative to majority whites across time. Data limitations mask the experiences of some of the most economically marginalized populations in the United States, such as American Indians and Pacific Islanders. Additionally, treating large racial and ethnic groups as homogeneous may ignore important changes at the extreme ends of these marginalized populations and hide emerging concerns (or successes). The changes across and within racial/ethnic groups in the United States matter for policy considerations in terms of migration, social welfare programs, housing, health, and education.

To our knowledge, we are the first to conduct an analysis of income inequality and mobility by race and ethnicity using data that include (1) an administrative source of income for the population of U.S. income tax filers (amounting to more than 100 million observations each year); (2) the race and ethnicity of each observation; (3) a long continuous time frame (15 years) over which individual income trajectories can be tracked; and (4) income data that are not top-coded or otherwise censored. Some economists have used survey data, such as the Survey of Consumer Finances, to examine the long-run trends in U.S. income and asset inequality (Keister 2000; Kochhar and Fry 2014), but small sample sizes for certain racial and ethnic groups have often led researchers to focus on inequality measures for only whites, blacks, and Hispanics (Bloome and Western 2011; DeBacker et al. 2013; McKernan et al. 2015). Such research is limited in that it potentially obscures different patterns of inequality for smaller racial and ethnic groups. Sociologists, to some extent, have examined income inequality by race, but such work has been limited to only two or three large groups because of sample size constraints or to cross-sectional analyses using U.S. Census decennial data (Bloome 2014; Bloome and Western 2011; Reardon and Bischoff 2011; Snipp and Cheung 2016). Additional problems exist with survey data beyond the relatively small sample sizes for racial and ethnic minorities. Well-known measurement issues with income reported in survey data can distort measures of inequality. Moreover, because panel data are necessary to study income mobility, few studies have examined mobility pattern differences by race beyond comparisons of whites and blacks (Bloome 2014).

We overcome the usual data limitations by using Internal Revenue Service (IRS) tax data linked at the person level to U.S. Census Bureau data on race and Hispanic origin. Because these data cover more than 90 % of the universe of working-age tax filers in the United States in each year of our study, we can report on income inequality and mobility across previously unreported groups and measure the differential experience between and within all racial and ethnic groups. We also create a panel data set at the individual level for all tax filers over a 15-year period. In looking at our defined racial and ethnic groups (white, black, American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, Other, and Hispanic),[3] we document significant racial and

[3] The U.S. Census Bureau adheres to the Office of Management and Budget's 1997 race and ethnicity standards, which specify five major race groups—white, black or African American ("black" here), American Indian or Alaska Native ("American Indian" or "AIAN" here), Asian, and Native Hawaiian or Other Pacific Islander ("Pacific Islander" or "NHPI" here)—and two ethnic groups (Hispanic and non-Hispanic). For our study, we define each racial group as that race alone and non-Hispanic, except for Other, which includes non-Hispanic multiple-race respondents as well as people who reported Some Other Race. Hispanic is defined as Hispanic of any race.

ethnic income inequality in the midst of overall increasing income inequality in the United States.

We have three main findings. Whites tend to have a disproportionately large share of income in top quantiles, and all other races accrue a disproportionately large share of income at the bottom 10 % and 1 % of the overall income distribution. Blacks, American Indians, and Hispanics are consistently at the low end of the total income distribution compared with whites, Asians, and those in the Other group. Pacific Islanders tend to fall in between the two extremes. Most racial groups (with the exception of Asians) have incomes that are between 50 % and 80 % of the corresponding white income level consistently across the income distribution.

Our second novel finding is that the rate of income growth at the 90th percentile exceeds that at the 50th percentile for all racial and ethnic groups, suggesting a divergence in income inequality in the top half of the income distribution. At the bottom of the income distribution, we find that the growth of income at the 50th percentile matches the rate of growth at 10th percentile, with little increase in income inequality there over time. One exception is for whites, among whom income inequality increases because of a steady decrease in the level of income at the 10th percentile. These results indicate that the top part of the income distribution is diverging from the rest of the income quantiles, and (to a lesser extent) the middle part of the income distribution for many groups is diverging from the bottom. This general result persists across most racial and ethnic groups; however, it is the most pronounced for whites.

The third finding is that income mobility decreased for all racial and ethnic groups between 2000 and 2014. We observe a decrease in income mobility after the Great Recession and find a convergence in overall immobility for all racial and ethnic groups. Levels of income mobility are low and of a similar magnitude to those found by other researchers using historical data (Kopczuk et al. 2010). Whites and Asians experienced less within-group mobility relative to other groups. On the other hand, an analysis using rank correlation indicates that blacks, Hispanics, and American Indians are more immobile than other groups when rank is calculated from the overall distribution. Differences across groups in mobility over time are evident. Asians and whites exhibit higher mobility in a transition matrix analysis compared with blacks, Hispanics, and American Indians. Blacks, Hispanics, and American Indians have a higher probability of experiencing downward mobility compared with whites and Asians. Together, these results paint a picture of a rigid income structure wherein blacks, Hispanics, and American Indians may move within their own income distributions but still are stuck at the bottom overall. Overall, our study provides detailed evidence for an entrenchment in income across races and ethnicities in the United States for the past two decades. Not only is income disproportionately accruing to the top end of the income distribution, but it is also accruing disproportionately to a few racial groups. Within racial groups, the difference between the top and bottom incomes has been widening with a significant divergence for whites, especially in the past few years. Finally, we document that income immobility is high and fairly consistent for all racial and ethnic groups in the United States. We do not attempt to identify the causal mechanisms for these differences in income shares, inequality, or mobility across racial and ethnic groups in this article. We acknowledge that educational attainment, geographic isolation, and social networks are potentially important determinants, and we leave that possibility for future research.

Data Set Description and Data Linkage

We use restricted-use data in our study, which come from two sources: the U.S. Census Bureau and the IRS. Records are linked at the U.S. Census Bureau using a process whereby individuals in each data set are given a unique, protected identification key (PIK). When a Social Security Number (SSN) is available in a data set, the identifier is assigned based on SSN. For records without an SSN, personally identifiable information, such as name, address, and date of birth, is used in probabilistic matching to assign PIKs.[4] Personal information is then removed from each data set before the data may be used for research purposes. Only those observations that received the unique person identifier are used in the analysis.

The record-linkage approach we use to link the data introduces some bias. Minorities and people with lower socioeconomic status are less likely to receive a record-linkage key compared with whites and people who have higher levels of socioeconomic status (Bond et al. 2014). Given that our analysis focuses on income inequality and immobility, this difference in likelihood would result in downward bias of any estimates of inequality and immobility between racial and ethnic groups. Although we demonstrate that we cover the vast majority of working-age tax filers in our study in tables that follow, we caution that our results may underestimate this population's inequality and immobility by race and ethnicity for the study period. The nonmatches between the IRS and the census race and ethnicity data likely occur among low-income individuals and minorities.[5]

The census data, referred to here as "race and ethnicity" data, are multiyear data that combine the 2000 and 2010 decennial censuses with ACS data from 2001 to 2014. These data are combined specifically to capture race and Hispanic origin reported by U.S. households. We select the reported race and Hispanic origin from the most-recent decennial census file, when available, for each individual. We then select the most recent ACS race and Hispanic origin response for individuals who did not have a race or ethnicity response in one of the decennial censuses.

We link the race and ethnicity file to 2000–2014 Form 1040 data. We use adjusted gross income (AGI) for our analyses, which includes all sources of income for a tax unit and all adjustments to income. Unlike previous inequality research using tax data and examining the top end of the income distribution, we do not have separate fields for different income sources, and thus we lack the ability to partition out market income. This should matter less for looking at the entire distribution of tax filers, however, because the main source of income for most tax filers is wage earnings. Our analysis focuses on all income sources for a household and provides a snapshot of the conditions prior to taxation and any potential governmental transfers. This particular measure is the one used to identify and qualify for many means-tested governmental programs at the state and federal level. Another way in which our study differs from previous research is the unit of analysis, which is the individual rather than the tax unit. We examine primary and secondary filers separately for three reasons. First, because we wish to examine individual income trajectories over time, we want to capture filers who may file as married in some years and unmarried in others. Second, married filers may be of different races or

[4] For more information on the linking process, see Wagner and Layne (2014).

[5] In the online appendix, we examine those with W-2 (wages) data and all working-age men from the decennial censuses to assess how much bias may be induced by examining only tax filers.

ethnicities, and removing spouses from the sample of filers may bias our estimates. This is especially true if married filers of a given race or ethnicity are more likely to be the primary filer. Last, in using every primary and secondary filer, we can examine a weighted measure of AGI that reflects the true resources accruing to each filer.

Specifically, we create a file that lists each primary and secondary (federal income tax) Form 1040 filer separately and then remove any filers who are claimed as dependents on another filer's Form 1040. Using the number of dependents reported on the form and the number of adults reflected in the filing status, we calculate the number of persons in the tax unit for each primary and secondary filer. Then we multiply each filer's AGI by an equivalency scale suggested by the National Research Council (1995), which weights income using the adults and children in a household.[6] Additionally, in line with previous research, we restrict our universe to the working-age population—those aged 25 to 65 in a tax year—and those with AGI greater than or equal to 0. Most of our analysis assumes that these groups are relatively constant over the period studied (2000–2014). We focus on estimating income by year for each race and ethnicity, and this should not be greatly affected (especially at the national level) by compositional changes in the population over this relatively short period of 15 years. We also do not separate our main analysis by gender, which might be a greater cause for concern than changing racial and ethnic composition given the differential changes in labor force participation rates by gender over the same period. We leave such an analysis to future work.

To assess the representativeness of our data, we separately match the 2010 Census data for people ages 25–65 to the 2010 Form 1040s. This matched data set can be considered a point-in-time assessment of the quality of the match. Note that PIK assignment on the Form 1040 data is based on SSN, and thus the rate of PIK assignment is close to 100 %. As shown in table 1, the matched data contain higher proportions of whites and Asians and lower proportions of the other racial and ethnic groups in our study compared with 2010 census (column 6). Finally, in column 7, we provide the distribution for the final matched data set. Lower match rates for certain groups in our data are not only due to the slightly lower likelihood of receiving a PIK compared with whites and Asians but also due to lower participation in the labor force and in income tax filing for these groups (see Snyder and Dillow 2013: table 427). Blacks and American Indians, as well as Hispanics and Pacific Islanders, have lower incomes compared with whites and Asians (Ramakrishnan and Ahmad 2014) and thus may be less likely to file taxes compared with these groups. Our universe has similar proportions of people ages 25–44 and 45–65, and we match more women than men, indicating that women are more likely than men to be either a primary or secondary filer and that women are more likely to receive a PIK.

Because race and ethnicity information is not available on Form 1040, it is impossible to know how well we match certain lower-income groups *contingent on filing a Form 1040*. However, we can compare our final number of matched tax filers with publicly available data to assess how much of the tax-filing population we capture. These data are available from 2010 forward from the Statistics of Income (SOI) division of the IRS. Table 2 indicates that we cover roughly 94 % to 96 % of the

[6] The number of household members are equal to $(A + 0.7K)^{0.7}$, where A = number of adults in the household, and K = the number of children (National Research Council 1995). We examine how our results change when we use a different equivalency scale as suggested by the National Research Council, and we find that the results are qualitatively very similar. Those results are available upon request.

Table 1 2010 census race and ethnicity data matched to Form 1040, ages 25–65

	2010 Census Count	%	2010 Census PIK Number	%	2010 Census–IRS Match Amount	IRS Match 2010 Census %	Final Data Set
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Number of Observations	166,305,994	100.0	151,565,180	91.1	123,783,849	74.4	100.0
Sex							
Male	82,083,737	49.4	74,069,567	90.2	58,876,049	71.7	47.6
Female	84,222,257	50.6	77,495,613	92.0	64,907,800	77.1	52.4
Age Group							
25-44	82,123,330	49.4	73,362,250	89.3	60,402,428	73.6	48.8
45-64	84,182,664	50.6	78,202,930	92.9	63,381,421	75.3	51.2
Race							
White	109,396,016	65.8	102,361,646	93.6	86,622,296	79.2	70.0
Hispanic	24,631,312	14.8	20,572,899	83.5	15,852,995	64.4	12.8
Black	19,832,168	11.9	17,468,337	88.1	12,080,486	60.9	9.8
AIAN[a]	1,174,014	0.7	1,024,411	87.3	698,199	59.5	0.6
Asian	8,530,347	5.1	7,686,570	90.1	6,667,599	78.2	5.4
NHPI[b]	255,324	0.2	216,815	84.9	165,558	64.8	0.1
Other	2,486,813	1.5	2,234,502	89.9	1,696,716	68.2	1.4

Notes: The table shows a single year of demographic data, including race and ethnicity, derived from Census 2010 and matched to Form 1040 data from the same year. This table provides a point-in-time estimate of filing rates and match quality.

Source: Census 2010 data linked to 2010 Form 1040 data.

[a] AIAN = American Indian or Alaska Native.

[b] NHPI = Native Hawaiian or Other Pacific Islander.

tax-filing population (column 3). One explanation for why the numbers of observations in our linked data are lower each year than the SOI estimates is that the SOI estimates include U.S. citizens working abroad, but our linked data represent the U.S. resident population.[7] When we further restrict the data to filers with AGI greater than or equal to 0, our capture rates decrease to between 91 % and 93 % (column 6).[8]

[7] Estimates of Americans living and working abroad range from 2.2 to 6.8 million people (Costanzo and von Koppenfels 2013). When we subtract 2.2 and 6.8 million people from the SOI estimates, our universe coverage rates of the SOI estimates increase to between 95 % and 100 %, compared with 94 % and 96 %.

[8] Comparing 1040s and W-2s from 2010 matched to the 2010 census also helps us assess the representativeness of our universe. W-2s cover the distribution of wage earners with the exception of the self-employed. We find that 1040s cover more people ages 25–65 in the 2010 census compared with W-2s. Each racial group has a higher number of people in the 2010 census–1040 matched universe relative to the 2010 census–W-2 matched universe. Although race distributions are generally similar between both universes, the proportion of blacks in the matched 2010 census–1040 universe is lower relative to W-2s, and the proportion of Asians and Hispanics is slightly higher in the 2010 census–1040 universe. This further supports the suitability of our data for this analysis. Our universe contains a higher proportion of women relative to men, whereas the W-2 universe covers slightly more men. This higher coverage of females in our universe is likely in part because we are capturing women who are out of the labor force but married to a spouse who is earning income and filing income tax. Our W-2 analysis is available upon request. In the online appendix, we perform an analysis in which we add W-2 nonfilers to our analytic data from 2005 to 2014.

Table 2 Number and percentage of tax filers aged 25—65 in matched Form 1040 and census data

Year	Total Individuals From SOI (1)	Tax Filers in Race/Ethnicity–Form 1040 File (2)	% (3)	SOI Tax Filers With AGI ≥ 0 (4)	Race/Ethnicity File–1040 Filers With AGI ≥ 0 (5)	% (6)
2000	—	128,921,786	—		123,578,069	—
2001	—	129,793,940	—		125,279,453	—
2002	—	130,569,116	—		125,814,539	—
2003	—	131,177,615	—		126,299,847	—
2004	—	132,172,267	—		127,191,375	—
2005	—	133,293,435	—		128,207,203	—
2006	—	135,162,521	—		129,831,114	—
2007	—	143,344,007	—		133,852,450	—
2008	—	138,719,168	—		132,885,452	—
2009	—	138,215,191	—		132,408,142	—
2010	145,626,457	139,360,334	96	143,699,907	133,329,141	93
2011	146,153,957	139,869,823	96	144,166,079	133,569,107	93
2012	145,264,554	138,526,757	95	143,537,485	132,390,872	92
2013	146,085,542	137,918,301	94	144,433,822	131,764,470	91
2014	146,599,415	137,532,145	94	144,969,444	131,384,380	91

Note: Dashes indicate that IRS aggregate data were not publicly available for the year in question.

Sources: Columns 1 and 4 are authors' calculations based on publicly available aggregate data from the IRS (2016). Columns 2 and 3 report matches between the race and ethnicity file—Form 1040 data for 2000 to 2014.

Overall, our data provide several improvements and advantages over previous data used to estimate income inequality and immobility by race and ethnicity. Our data set is large enough that we are able to identify all the major racial/ethnic categories in the United States. Additional problems exist with survey data beyond the relatively small sample sizes for ethnic and racial minorities. Well-known measurement issues with income reported in survey data can distort measures of inequality. First, survey respondents at the lower end of the income distribution tend to overreport their earnings, and those at the higher end tend to underreport (Meyer and Mittag 2015; Pedace and Bates 2000). Second, income nonresponse rates in surveys are high and are not randomly distributed across respondents. For example, annual earnings nonresponse rates in the Current Population Survey (CPS) and American Community Survey (ACS) are close to 20 %, and nonresponse rates are highest for extreme high- and low-earner households (Bollinger et al. 2018). The resulting bias understates earnings inequality (Bollinger et al. 2015, 2018).

A distinct advantage with our data is that they allow us to create a panel data set at the individual level to evaluate income mobility by race and ethnicity. Assessing income mobility requires having measures of income for the same individual at multiple points in time, making it even more difficult to study income mobility for all racial and ethnic

groups using survey or unlinked administrative records. To our knowledge, no studies to date have evaluated income mobility using data linked at the individual level for all racial and ethnic groups in the United States for the current period.

Income Shares and Inequality Measures by Race and Ethnicity

In this section, we describe the distribution of income data by racial and ethnic groups for two years in our time frame: 2000 and 2014 (in 2014 dollars). Previous research has shown that incomes are increasingly concentrated in the top decile of earners, with the highest concentration occurring in the top one-tenth of 1 % (Piketty and Saez 2003).[9] These results mark a shift from the compression of wages in the middle of the twentieth century, which brought inequality to its lowest levels in U.S. history (Goldin and Margo 1992). Given the detailed nature of our data, we can provide several measures that outline the evolution of income inequality and the concentration of income to different parts of the distribution. We measure income at the individual level as discussed previously, using income equivalency weights to account for household composition.

Income Distribution and Income Shares

In Figs. A1 and A2 of the online appendix, we provide the kernel density estimate of income for our seven racial and ethnic groups for 2000 and 2014 (in 2014 dollars). In order to show the main part of the distribution on a single graph, we present income by group for those reporting between $0 and $200,000 in AGI. The white group is the most right-skewed of the densities in the figures, and the mass for this distribution is significantly to the right of all the other racial and ethnic groups, which indicates that they had the highest average (and median and mode) incomes. The Asian category also has a rightward skew, but it is not as large as that for whites. And the Asian category has clustering at the far left of the distribution, suggesting greater inequality within the Asian category relative to whites.

The remaining five groups (Hispanic, black, American Indian, Pacific Islander, and Other) all tend to be clustered at the far left of the income distribution. The masses of those distributions are centered below approximately $25,000. Generally, the income distribution patterns for most groups are similar in 2000 and 2014. Notably, however, we find an increase in the number of Asians in the upper end of the income distribution between 2000 and 2014. We also find a moderate increase in the number of Hispanics in the middle income range between 2000 and 2014.

The mean AGI for our entire universe shows similar patterns. In 2000, whites had the highest mean AGI at $61,565, followed by Asians at $58,444. In contrast, the mean AGI for Hispanics, blacks, and American Indians was in the low $30,000s. The Other

[9] A number of studies have used administrative data to measure income inequality in the United States, especially the growth of the top percentiles. Piketty and Saez (2003) identified the increasing share of total income that has gone to the top income deciles in the last few decades. Feenberg and Poterba (2000) found an increase in the fraction of income accruing to the top 0.5 % using IRS tax data over the period 1960–1995. In the latter analysis, the authors examined adjusted gross income (AGI) measured in three ways (including and excluding capital gains and statutory gains). All recent research confirms an increase in income inequality since the 1970s.

group and Pacific Islanders fell in between these high-income and low-income groups. Generally, the mean AGI across groups remained stable from 2000 to 2014, with the exception of the mean AGI for Asians, which increased to $64,369 in 2014, surpassing the mean AGI for whites.

We next decompose the total share of income accruing to the top 10 %, 1 %, and 0.1 % of the income distribution, as well as the income shares going to the bottom 10 % and 1 %. Piketty and Saez (2003) showed that the proportion of income accruing to the top percentiles of the income distribution has been increasing steadily over the past few decades. Our analysis in this section identifies whether those at the top and bottom segments of the income distribution were proportionate to their group's share in the total population.

In Table 3, we show the share of income for the different income percentiles for 2000 and 2014.[10] The share of income accruing to the top 10 % of the population of all tax filers was about 41 % in 2000 and 40 % in 2014. Looking across the columns for 2000, about 90 % of the income that accrued to the top 10 % of the income distribution of tax filers went to whites, whereas about 2.5 % went to Hispanics, 2.1 % went to blacks, 0.25 % went to American Indians, and 5.3 % went to Asians. At the bottom of the panel, we report the proportion of the population of each of these groups for our restricted sample of tax filers aged 25–65. Comparing the share of the population with the share of income accruing to each group provides an additional measure of inequality. Whites received a strongly disproportionate share of top income, whereas Asians received slightly more than their proportionate share. Hispanics, blacks, American Indians, Pacific Islanders, and Others accrued less than their proportionate share of total income in the top 10 %. Panel b of Table 3 shows noticeable changes over time: the share accruing to whites decreased to about 84 %, and the share for Hispanics increased to 4 %. However, the proportion of whites in the population decreased to about 70 %, whereas the proportion of Hispanics increased to about 13 %. Asians realized an increase to an 8 % share, but blacks, American Indians, and Pacific Islanders did not realize any noticeable changes at the top 10 % over this period.

The next row of Table 3 provides a similar analysis for the top 1 % of the income distribution of tax filers. Compared with the preceding row, inequality is even more pronounced at this percentile of the distribution. Examining the portion accruing to the various racial and ethnic groups indicates that the share that went to Hispanics, blacks, American Indians, and Pacific Islanders is smaller in percentage terms than for the top 10 %. In other words, even more inequality is found across racial and ethnic groups at the uppermost ends of the income distribution. Changes over time indicate a pattern similar to that for the top 10 %: groups besides whites and Pacific Islanders improved their share while also increasing their representation in the population.

The results for the top 0.1 % of the income distribution indicate an even larger proportion accruing to a much smaller share of the population. Once again, whites have the largest portion of the income share at this income percentile compared with their

[10] Table A1 in the online appendix shows the population distribution and top and bottom shares for every year of our data. Patterns of change roughly hold true when looking at every year rather than the first and last year, but interesting patterns can be observed before, during, and after the Great Recession. We intend to follow up on these differences in future research.

share of the population. Patterns are similar to the previous row in Table 3, and changes over time exhibit the same trade-off in income and population shares.

For the bottom 10 % and bottom 1 % of the income distribution, only about 1 % of the total income in the United States is accrued in each year. Whereas the top 10 % received about four times their proportionate share of total income, the bottom 10 % received roughly one-tenth of their proportionate share. The proportions of income accruing to the various racial and ethnic groups indicate that whites received less than their proportionate share, whereas Hispanics, blacks, American Indians, Pacific Islanders, and Others received more than their proportionate shares. Asians also received more than their proportionate share of income at the bottom of the overall distribution than their share of population would suggest. This group received more than its proportionate share at both the top and bottom income percentiles, suggesting strong heterogeneity within this group. The next rows of Table 3 provide the income share accruing to the bottom 1 %. The share accruing to Hispanics and blacks was lower than in the previous panel, and the share going to whites was somewhat larger but still less than proportionate to their population share.

Table 3 Shares of income by race, 2000 and 2014

		As a Percentage of Row Total						
	Overall Total (%)	White	Hispanic	Black	AIAN[a]	Asian	NHPI[b]	Other
A. 2000								
Top								
10 %	40.79	89.73	2.46	2.11	0.25	5.26	0.07	0.13
1 %	17.87	92.10	1.88	0.97	0.19	4.67	0.06	0.13
0.1 %	8.85	92.53	1.65	0.95	0.16	4.54	0.06	0.12
Bottom								
10 %	1.20	54.88	19.57	18.18	1.56	5.32	0.23	0.27
1 %	0.02	59.51	13.13	19.66	2.00	5.18	0.25	0.26
Population percentage		75.13	9.61	9.72	0.84	4.37	0.17	0.18
B. 2014								
Top								
10 %	40.31	84.13	4.10	2.76	0.33	8.40	0.08	0.20
1 %	16.01	87.83	3.13	1.39	0.25	7.16	0.05	0.19
0.1 %	7.35	89.10	2.75	1.37	0.21	6.35	0.04	0.18
Bottom								
10 %	1.00	50.68	20.35	21.42	1.39	5.53	0.30	0.32
1 %	0.01	66.18	12.03	14.34	1.57	5.32	0.25	0.30
Population percentage		69.48	12.79	10.67	0.85	5.74	0.22	0.23

Notes: The table reports the total income share accruing to persons within the percentage of the income distribution reported in the row, broken out by race and ethnicity. Population percentages are reported for comparison.

Source: Race and ethnicity file–Form 1040 data, 2000 and 2014.

[a] AIAN = American Indian or Alaska Native.

[b] NHPI = Native Hawaiian or Other Pacific Islander.

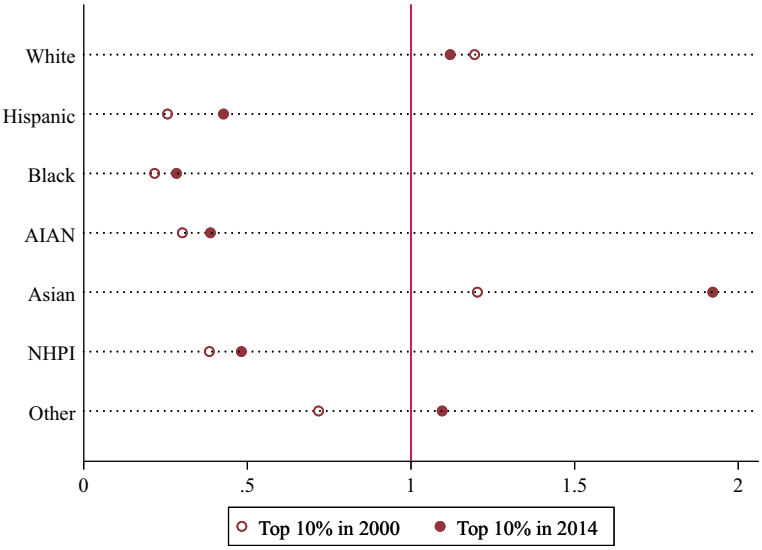

Fig. 1 Ratio of top 10 % income share to population share, 2000 and 2014. AIAN = American Indian or Alaska Native. NHPI = Native Hawaiian or Other Pacific Islander. *Source:* U.S. Census Race and ethnicity file, Form 1040 data, 2000 and 2014.

In terms of overall inequality, comparing 2000 with 2014 indicates a slight decrease in income shares at the very top (the top 1 % and 0.1 %). However, this decrease is offset by a decrease in income shares at the bottom of the distribution. For example, the income share for the bottom 10 % decreased from 1.20 % to 1.00 %; the income share for the bottom 1 % decreased from 0.02 % to 0.01 %. This loss of resources at the lowest end of the distribution is consistent with analyses presented later that indicate a rise in inequality over the period. Figures 1 and 2 provide a graphical depiction of these same results for 2000 and 2014.

Percentile Parity Results by Race and Year

An alternative method to present differences across racial and ethnic groups is to show a comparison of the actual dollar incomes that mark the 20th, 40th, and other percentiles for each racial and ethnic group compared with whites. In Figs. 3 and 4, we plot the annual dollar threshold for the 20th and 80th percentiles, respectively, in the within-group income distributions for all groups, where the value is expressed as a ratio of the group-specific dollar threshold divided by the white threshold. For example, in 2000, the dollar amount associated with the 20th percentile of the white income distribution was $21,160, and the dollar amount associated with the 20th percentile of the Asian distribution in 2000 was just $16,935. This is an Asian-white ratio of approximately 0.8, which is plotted in Figs. 3 and 4 for each year and reflected in the line labeled "Asian." To continue the example, at the low end of the income distribution—in this case, the 20th percentile—the American Indian income level was only $11,917, which is just 56 % of the white value. In Figs. A3–A5 in the

Fig. 2 Ratio of bottom 10 % income share to population share, 2000 and 2014. AIAN = American Indian or Alaska Native. NHPI = Native Hawaiian or Other Pacific Islander. *Source:* U.S. Census Race and ethnicity file, Form 1040 data, 2000 and 2014.

online appendix, we provide the same analysis for the 40th, 60th, and 95th percentiles, respectively.

If a racial group were at exact parity with whites in all years, we would see a horizontal line for that race group at the value of 1. As shown in Fig. 3, all groups except Asians had substantially lower dollar values at their 20th percentile cutoff than the corresponding dollar value at the 20th percentile for whites.[11] Asians experienced gains relative to whites over the period. The remaining racial and ethnic groups tended to gain somewhat over the period compared with whites at their respective 20th percentiles; some evidence suggests a decline in the post–Great Recession period for Hispanics, blacks, and the Other category.

Figure 4 provides the same analysis for the 80th income percentile, showing a continued divergence in the dollar amounts for both Asians and whites and the rest of the racial and ethnic groups in the data. Moreover, Asians began surpassing whites in all years in the 80th and higher percentiles. All other racial and ethnic groups continued to be clustered at lower levels below parity with whites for all observed years in our data.

A striking result across most of the percentiles is that blacks, American Indians, and Hispanics had incomes that were, at best, about two-thirds that of whites and, at worst, about one-half that of whites. The results appear to be constant whether we are examining the low, middle, or high ends of the income distribution. This result suggests that these differences are related to more than just class-based explanations or occupation- and industry-specific effects. The differences appear to persist across these various income percentiles by race. Another noticeable difference is the high rate of income growth relative to whites for Asians over this period.

[11] The results indicate that the filing of tax returns differed by group because the results are all relative to non-Hispanic white. The bump disappears in the subsequent figures after the 40th percentile as the upper-income points are less sensitive to changes associated with the bottom of the income distribution.

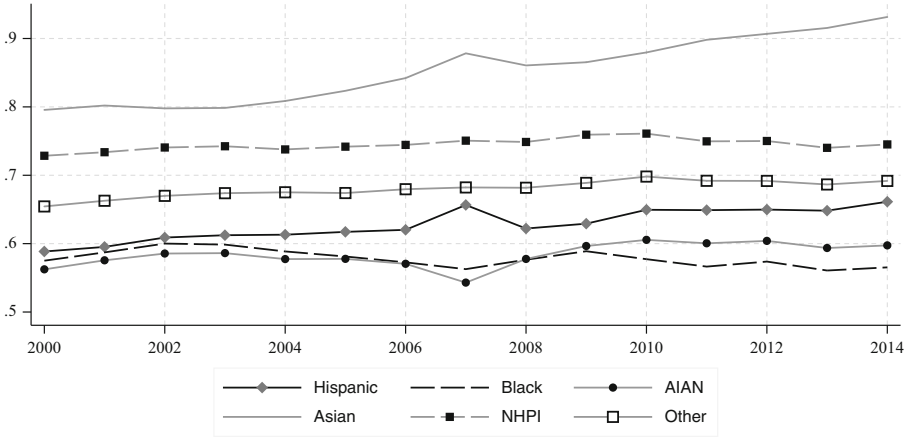

Fig. 3 Income ratio at the 20th percentile, by race/ethnicity relative to white. AIAN = American Indian or Alaska Native. NHPI = Native Hawaiian or Other Pacific Islander. *Source:* U.S. Census Race and ethnicity file, Form 1040 data, 2000–2014.

Measures of Within-Group Inequality Over Time

Figure A6 in the online appendix tracks the annual Gini coefficient for each racial and ethnic group. Three main findings can be taken from this figure. First, within-group inequality varies by race and ethnicity. The most unequal groups (those with the highest Gini coefficients) are whites, Asians, and the Other group. The Hispanic, black, American Indian, and Pacific Islander groups tended to have lower levels of within-group inequality for all years compared with the other three groups. These groups, on average, also tended to be the poorest groups.

Second, levels of within-group inequality increased from 2000 to 2014 for all racial and ethnic groups. However, black, American Indian, Other, and Hispanic within-group inequality increased more over the period relative to Asian, white, and Pacific Islander within-group inequality.

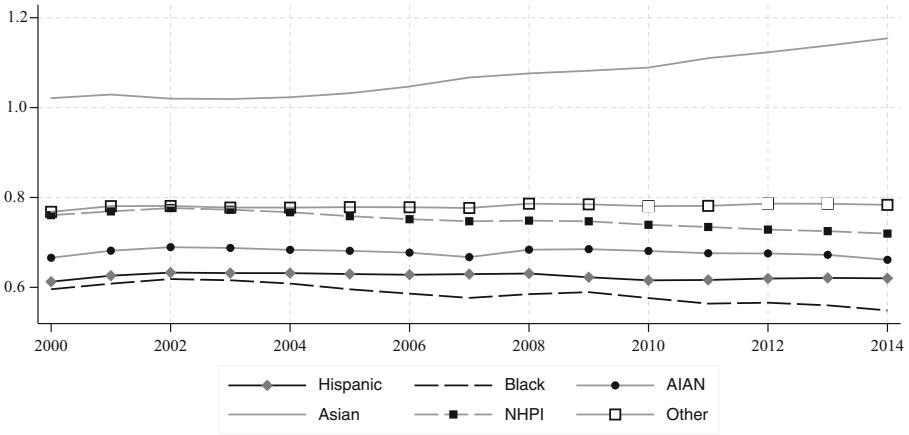

Fig. 4 Income ratio at the 80th percentile, by race/ethnicity relative to white. AIAN = American Indian or Alaska Native. NHPI = Native Hawaiian or Other Pacific Islander. *Source:* Race and ethnicity file, Form 1040 data, 2000–2014.

Third, within-group income inequality decreased for most groups during the recessionary periods. Whites and Asians experienced the largest decrease in within-group inequality during the recessionary periods relative to other groups. The sharp increase in income inequality in 2007 is primarily due to the increase in tax filers for the tax rebates for that year; everyone eligible for the rebate had to file to receive it, even if they were not legally required to file because their income was below the filing threshold. Therefore, a large number of individuals with very low or 0 income filed income tax returns, which increased the lower bound of incomes for all taxpayers in 2007.

Within-Group Inequality by Income Deciles

The next set of figures displays different parts of the within-group income distribution for each racial and ethnic group. In Fig. A7 in the online appendix, we plot the logged ratio of the 90th percentile to the 10th percentile for each racial or ethnic group by year. The figure shows an upward trend for all groups over this 15-year period. Inequality within groups appears to have increased at a relatively constant rate for whites, Asians, and Others. Within-group income inequality increased by approximately 28 % over this period for whites but by only 9 % and 11 %, respectively, for blacks and Hispanics. Different magnitudes of inequality are also evident. For example, Asians started out with the highest level of within-group inequality at a value of 2.55, which indicates that the 90th percentile income value is about 13 times larger than that of the 10th percentile for Asians. For the Other group and American Indians, the ratio between the 90th and 10th percentiles was about 11; for the remaining groups, the ratio was about 9 at the start of our data series.

Figure 5 plots the log ratio of the 50th and 10th percentiles for all years in our data. First, whites and those in the Other category experienced increases in income inequality in the bottom of their own income distributions—18 % and 10 %, respectively. Almost all other groups experienced a slight increase in within-group income inequality over time; the exception was for blacks, who experienced a slight decrease in inequality during the period. These results suggest that the black middle class was worse off in

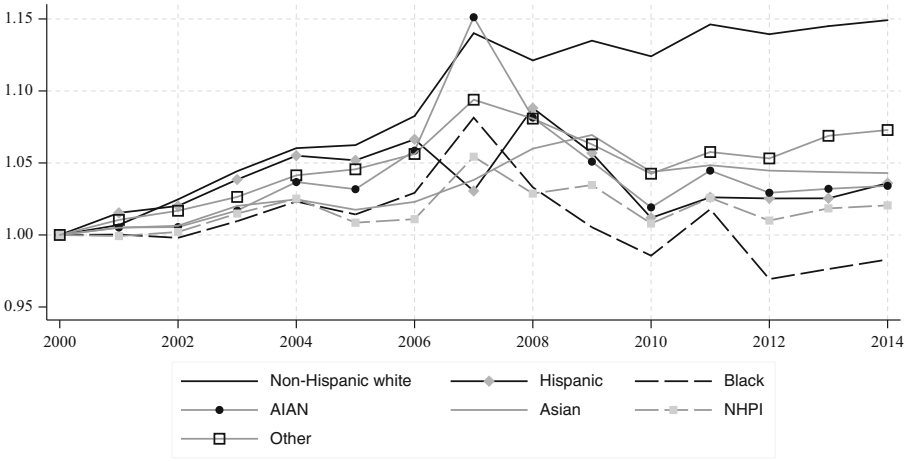

Fig. 5 Log ratio of the 50th and 10th income percentiles for each year. AIAN = American Indian or Alaska Native. NHPI = Native Hawaiian or Other Pacific Islander. *Source:* Race and ethnicity file, Form 1040 data, 2000–2014.

2014 relative to 2000. For whites, the increase in income inequality at the bottom of their own income distribution was larger (18 %) than the increase at the top of the income distribution (10 %). This shift indicates that especially for whites, the rich were getting richer, but inequality also increased between the middle class and the poor, where the middle class largely pulled away from the poor. To a lesser extent, this result applies to all other groups except for blacks. These results highlight the importance of studying patterns across the full income distribution rather than looking only at the top.

Figure 6 shows the log ratio of the 90th percentile to the 50th percentile and provides information on inequality in the top half of the income distribution across time. The results indicate an increase in income inequality for all groups over the 15-year time span. Almost all groups experienced a 10 % to 13 % increase in the ratio of the 90th to 50th percentile during this period; the exception is for Hispanics, for whom the increase was 7 %. These results indicate that the rich are becoming richer within each racial and ethnic group.

Income Immobility

Inequality is not the only component that matters in measures of economic equity: levels of income mobility across racial and ethnic groups matter as well. High levels of income immobility, coupled with the increase in income inequality, would tend to further entrench class differences across races. Previous research has shown that in general, mobility has been stable for much of the previous 25 years (Kopczuk et al. 2010). Mitnik et al. (2016) found that the increase in income inequality seen in previous decades is associated with a decline in mobility. In this section, we present measures of income mobility (or rather immobility) by race and ethnicity. Specifically, we analyze three measures of income mobility: the first measures within-group mobility, and the other two capture mobility for all racial and ethnic groups across the full income distribution.

The Shorrocks Index

A frequently used relative measure of mobility is the Shorrocks index. This measure allows for a comparison between short- and long-run income inequality. In a society with no mobility, long-run income inequality will simply equal short-run inequality. However, with some amount of mobility in society, short-run income inequality will be equal to long-run societal inequality by a factor equal to the mobility measure. Similar to Kopczuk et al. (2010), we use the following equation to describe this relationship:

$$\textit{Long-term income inequality} = \textit{Short-term income inequality} \times (1 - \textit{Mobility}). \quad (1)$$

We use the Gini coefficient calculated over several years of income data as our long-term measure of income inequality. In our analysis, we select three years given our 15 years of data available. We define short-term income inequality as the average of three Gini coefficients calculated for each year independently. The following equation defines that relationship:[12]

[12] The inequality symbol is due to the convexity of the Gini function and the fact that the function is also homogeneous of degree 0.

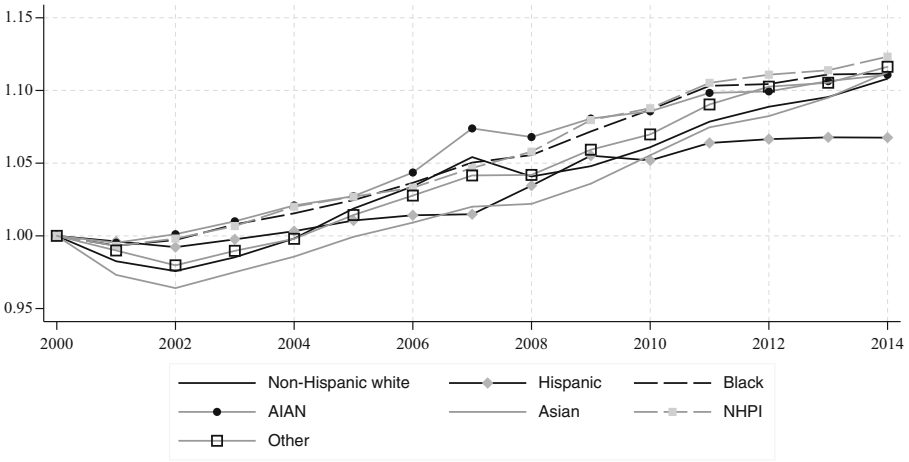

Fig. 6 Log ratio of the 90th and 50th income percentiles for each year. AIAN = American Indian or Alaska Native. NHPI = Native Hawaiian or Other Pacific Islander. *Source:* Race and ethnicity file, Form 1040 data, 2000–2014.

$$G\left(\overline{Z}\right) \leq \frac{\sum_{t=1}^{K} G(Z_t)}{K} \times (1 - Mobility). \tag{2}$$

The Shorrocks index is the term in parentheses on the right side of the equation. The variable $\overline{Z}$ is the three-year aggregate of income; K = the number of periods, which is equal to 3 in our example. The equation tells us that for a given level of short-run inequality, higher levels of mobility (where $Mobility \in \{0, 1\}$) translate into a lower upper bound for long-run income inequality. In other words, more income mobility means less income inequality in the long run if short-run inequality remains relatively stable. Income mobility is generally seen as an important characteristic in measuring and predicting income inequality.

We calculate the Shorrocks index for each group separately and plot the results in the online appendix, Fig. A8. The index is equal to 1 – *Mobility*; therefore, a value close to 1 indicates very low levels of mobility. The index is a relative ranking measure of mobility: it reflects group-specific mobility, wherein an individual's income is compared only with income from individuals in the same racial or ethnic group. Our findings suggest that levels of mobility are, on average, very low for all racial and ethnic groups in our data. The groups with the lowest levels of within-group mobility tend to be white, Asians, and Other. Hispanics, blacks, American Indians, and Pacific Islanders display relatively higher levels of within-group income mobility in all years in our data. In particular, blacks and American Indians experienced higher levels of mobility in 2006–2008 than did other groups in our data (potentially because of the effect of the contemporaneous tax rebates), but their mobility quickly returned to the same levels as that of Pacific Islanders by 2009.

Two-Year Rank Correlations

We also present an absolute mobility measure using the overall income distribution. We sort individuals, regardless of group membership, by their income in year t and then

assign each person a rank in the income distribution according to their location. We then correlate that rank number for an individual with their rank for $t + 1$. If a person does not move very much in the income distribution between the first and second year, then the associated correlation coefficient will approach 1. Alternatively, if the person is mobile in the income distribution (moving either up or down), then this correlation will approach 0. Finally, we take the average correlation over all individuals by racial or ethnic group. We limit the sample to individuals who appear in the tax data for two consecutive years.

In Fig. 7, we provide the correlation coefficients by racial and ethnic group by year. Two features of the figure are noteworthy. First, the figure shows high levels of immobility in income by racial and ethnic group. In fact, immobility appears to have increased among all groups from 2008 onward. Second, for some groups, immobility varied more when we compare individuals with the entire income distribution than when we limit the comparison to individuals from the same group. For example, blacks were relatively more mobile within their own income distribution when compared with other groups, but they experienced the highest rank correlation of any group until approximately 2010. Asians experienced the sharpest increase in income immobility over the period of study, with whites, those in the Other group, and Pacific Islanders following closely behind.

Transition Matrices

An additional method to examine income mobility is the use of transition matrices for individuals at two points in time (Bloome 2014). We restrict our sample to individuals who are present in the first year and the final year of our data (2000 and 2014).[13] We identify the income quintiles (a total of five bins) in 2000 for all individuals in our selected sample, and then we identify the same person's location in the income quintile in 2014. We calculate the probability, by group, that a person will be in a given quintile at the end of the period based on the starting quintile. These probabilities are shown in transition matrices in Figs. A9–A13 (online appendix). The first panel of each figure presents the results for whites. The income quintiles for 2000 are given across the five rows, and the income quintiles for 2014 are given across the columns. We arrange the quintiles in order from lowest to highest along a 1–5 ordering. The darkness of the shaded squares indicates a higher probability of being in a particular cell. The results are calculated based on row probabilities. For example, the first cell in Fig. A9 (online appendix) is 44.15, which means that roughly 44 % of whites who started out in the first (lowest) income quintile in 2000 remained in the lowest income quintile in 2014. Along the diagonal, we observe a high probability of remaining in the same income quintile over time. Individuals who started out in the highest-income quintile were the most likely to remain there: 55 % of whites remained in that same position in the income distribution. These results suggest strong immobility for upper-income whites. Low-income whites had a very small likelihood of moving up to the highest-income

[13] We restrict our analysis in Figs. A1–A7 (online appendix) to the years 2005–2014 and add individuals who had W2 earnings but did not file a 1040 form. This robustness check allows us to evaluate whether a significant difference is obtained when these individuals are included in the analysis. We find no strong qualitative (or quantitative) differences across the transition matrices with and without the additional individuals who were identified from using the W2 forms.

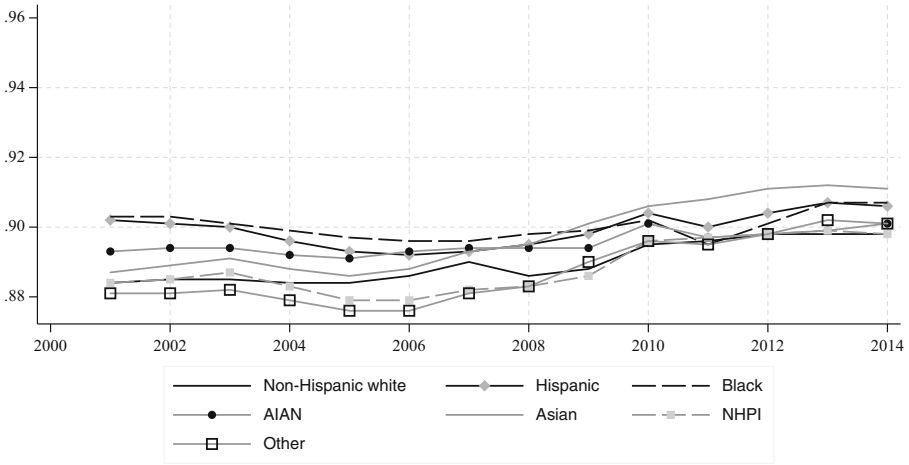

Fig. 7 Rank-rank correlation measuring overall income mobility. AIAN = American Indian or Alaska Native. NHPI = Native Hawaiian or Other Pacific Islander. *Source:* Race and ethnicity file, Form 1040 data, 2000–2014.

quintiles by 2014 (less than 5 %). We also observe evidence of people sliding back, moving to lower quintiles from 2000 to 2014.

All race groups follow this general pattern, with high probabilities of immobility across quintiles, very high immobility in the lowest- and highest-income quintiles, and people sliding back to lower quintiles.[14] However, the levels vary across racial and ethnic groups. Asians exhibit the highest level of immobility at the highest quintile, with 61.5 % in the fifth quintile in both 2000 and 2014. Asians experienced the greatest mobility in quintiles 2–4 relative to other groups. For these quintiles, although many Asians slid backward, a greater proportion of Asians moved up in comparison with other groups.

Blacks have the highest level of immobility in the bottom quintile compared with all other groups: strikingly, 60 % of blacks who started in the lowest-income quintile in 2000 remained in the lowest quintile in 2014. About 33 % of blacks who started in the second quintile in 2000 remained in that quintile in 2014; only Hispanics had a higher level of immobility in the second quintile at 35 %. Conversely, blacks had the lowest percentage of people relative to other racial and ethnic groups that remained in the highest quintile from 2000 to 2014, at 45 %. Blacks and Hispanics were also more likely to slide back to lower quintiles compared with whites and Asians. Among blacks and Hispanics, 29 % of those who started out in the second quintile in 2000 slid to the first quintile in 2014. Moreover, 41 % of blacks who started out in the third quintile in 2000 fell to the first or second

[14] In Figs. A10 and A11 (online appendix), we provide additional analysis where we separate the transition matrices by race and ethnicity into two broad educational categories. As expected, education has a mitigating effect on mobility, where low-education individuals are more likely to remain entrenched or to experience downward mobility (especially for blacks and Hispanics), while high-education individuals are more likely to transition upward in the distribution. In Figs. A12 and A13 (online appendix), we separate the observations into two broad categories compared with the full sample. People at the start of their careers in our data (aged 25–34) appear to have slightly more downward mobility than those later in life, which may indicate an increasing return in the labor market as experience is gained, or it may reflect the impact of the erosion of the value of wages over time.

quintiles by 2014. In other words, 69 % of blacks who started in the third quintile in 2000 were either immobile (28 %) or downwardly mobile (41 %).

Generally, all other racial and ethnic groups fall in between whites and Asians on one hand and blacks on the other. Immobility and downward mobility patterns for Hispanics and American Indians more closely resemble those of blacks and the Other group, whereas the pattern for Pacific Islanders more closely resembles those of whites and Asians. To our knowledge, the stark differences in mobility patterns seen when comparing groups to one another is a new finding in the literature.

Conclusion

Our analysis examines incomes for the universe of income tax filers for the United States over the period 2000–2014 by racial and ethnic group. To our knowledge, we are the first to be able to provide in-depth analysis of relatively smaller racial and ethnic groups, overcoming the limitations of survey data or administrative records used separately. Through the use of restricted IRS tax data and U.S. Census race and ethnicity data, we created a novel data set that allows for an examination of annual incomes, income inequality, income shares, and income mobility by race and Hispanic origin.

We find, as expected, large differences in income shares across racial and ethnic groups over this period. What is more startling is the persistence of disadvantage of certain minority groups relative to whites at every point in the income distribution. Whites and Asians tend to accrue higher income shares at all points in time, especially toward the end of our period. Blacks, Hispanics, and American Indians tend to be clustered at the low end of the income distribution across all years, while Pacific Islanders and our Other group are slightly higher than these groups but still never at parity with whites and Asians. Within-group inequality analysis shows that for almost all races, individuals at the 90th percentile gained income at a pace that far surpassed that of the 50th percentile. Despite some differences across racial and ethnic groups in intensity, this pattern held for each group. Additionally, we find that that for most groups, the log ratio of the 90th to 50th percentiles increased over time; to a lesser extent for many groups, the log ratio of the 50th to 10th percentiles also increased. This pattern was especially pronounced for whites, suggesting that the upper half of the income distribution for all racial and ethnic groups is becoming less equal, as is the lower half, but to a lesser extent for many nonwhite groups.

Using several different measures, we calculate income mobility across racial/ethnic groups in the United States. Our findings indicate a high level of immobility for all groups in general. We find differences in mobility for different groups: blacks, Hispanics, and American Indians have lower levels of overall mobility compared with Asians. However, these same groups have the highest levels of mobility within their own groups. This trend indicates movement within each of the relatively poorer groups in our data, but such movement is confined to the lower end of the overall income distribution.

By our measures, the racial and ethnic groups with generally high levels of income also tend to have the highest measures of inequality and within-group immobility. The evidence that high-income groups are less mobile and more unequal will be useful when thinking about how to alleviate persistent poverty among certain racial and ethnic

groups. Mobility by itself is not the solution when it results in movement only within the lowest parts of the respective income distribution. Additionally, income inequality can mask changes in different parts of the income distribution. Blacks have witnessed a slight increase in income inequality as measured by a standard Gini coefficient; however, the log ratio of the 90th to 50th income percentiles increased markedly, and the log ratio of the 50th to 10th income percentiles changed little. The overall Gini increases seen for each group reflect heterogeneous changes when the upper and lower part of each within-group income distribution are considered.

Our results tell the following story about income inequality and mobility by racial and ethnic groups. First, whites and Asians simply have more income than other groups at every point in the income distribution. Second, whites, Asians, and those in the Other group experience both higher income inequality and income immobility as assessed using within-group measures. Third, although within-group measures for lower-income groups (such as black, Hispanic, American Indian, and Pacific Islander) indicate lower within-group inequality, this result is due more to individuals being clustered at the low end of the overall income distribution rather than to a true equitable distribution of incomes. Finally, in terms of this overall distribution, low-income groups start the period with high levels of immobility; higher-income groups, however, eventually realize a decrease in mobility as well over this period. This picture that emerges is of a rigid distribution of income, with whites, Asians, and (to a lesser extent) those in the Other group protected at the top, and all other groups confined to the bottom.

Acknowledgments This article is released to inform interested parties of research and to encourage discussion. The views expressed are those of the authors and not necessarily those of the U.S. Census Bureau. We would like to thank participants at the UCLA Center for Population Research seminar and seminars at Dartmouth University and the University of Kentucky, as well as Moshe Buchinsky, David Card, Raj Chetty, Sandy Darity, Rajeev Dehejia, Nicole Fortin, John Friedman, Tim Halliday, Darrick Hamilton, Nathan Hendren, Chinhui Juhn, Adriana Kugler, Adriana Lleras-Muney, Paul Ong, Sarah Reber, Mark Rosenzweig, Matthias Schuendeln, Steven Stillman, and Till von Wachter for helpful comments and feedback; any errors are ours alone.

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