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# Adding Insult to Injury: Racial Disparity in an Era of Increasing Income Inequality

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## 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 tax filers in the U.S. for the period 2000 to 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 race and 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, our low-income groups are also highly immobile when looking at 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. In regression analyses using individual-level panel data, we find persistent differences by race and ethnicity in incomes over time. We also examine young tax filers (ages 25-35) and investigate the long-term effects of local economic and racial residential segregation conditions at the start of their careers. We find persistent long-run effects of racial residential segregation at career entry on the incomes of certain groups. The picture that emerges from our analysis is of a rigid income structure, with mainly Whites and Asians confined to the top and Blacks, American Indians, and Hispanics confined to the bottom.

**Keywords:** Income Inequality, Income Mobility, Race, Administrative Data

**JEL Codes:** J15, D31, D63, C81

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# 1 Introduction

Income inequality in the United States has intensified over the last few decades, reaching levels not experienced since the late 1920s (Saez, 2009) and exceeding these peak levels in many geographic areas (Sommeiller et al., 2016). Incomes are increasingly concentrated in the top decile of earners, with the highest concentration occurring in the top tenth of one percent (Piketty and Saez, 2003).<sup>1</sup> These results mark a shift from the compression of wages in the middle of the 20th century, which brought inequality to its lowest levels in U.S. history (Goldin and Margo, 1992). This new reality has inspired intense policy discussions among a variety of stakeholders—from economists, to journalists, to presidential candidates (Scheiber and Cohen, 2015; Cowen, 2015).

Recent research has documented that income mobility has remained constant over the past few decades. Short-term earnings mobility (with earnings averaged over five years) has remained low and relatively stable since the 1960s, with a slight reduction in mobility from the 1970s to the early 2000s (Kopczuk et al., 2010). These results are true for both men and women in the labor force.

Primarily due to data limitations, existing research generally has not focused on income inequality and income mobility by race or ethnic group beyond comparing the largest groups. As a result, understanding racial and ethnic income inequality and mobility continues to be one of the more important unaddressed questions in economics.<sup>2</sup> Anti-poverty policies hinge on concerns regarding the differential resources of race and ethnic groups, yet we do not have a solid picture of these groups' resources relative to majority Whites across time and location. Additionally, when there has been any reporting of inequality across race or ethnic groups, it necessarily focuses on the larger groups. Smaller groups are frequently omitted due to small sample sizes and disclosure concerns. This, unfortunately, masks the experiences of some of the most economically marginalized populations in the U.S., such as American Indians and Pacific Islanders.

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<sup>1</sup>There are a number of studies in the literature that use administrative data to measure income inequality in the U.S., especially the growth of the top percentiles. Recent work by Piketty and Saez (2003) identifies the increasing share of total income that has gone to the top income deciles in the last few decades. Feenberg and Poterba (2000) find an increase in the fraction of income accruing to the top 0.5 percent using U.S. IRS tax data over the period 1960–1995. In the latter analysis, the authors examine Adjusted Gross Income (AGI) measured in three different ways (including and excluding capital gains and statutory gains). All of the recent research confirms an increase in income inequality since the 1970s.

<sup>2</sup>There is a well-developed literature on racial and ethnic wage differences. Juhn et al. (1991, 1993) examine the increase in wage inequality for Black men and attribute this to changes in the demand for skills. Using historical censuses, Darity et al. (1997) examine inferred incomes and find that differences in endowments and unexplained components are responsible for income inequality for Mexicans, African Americans, and American Indians compared to Whites. Welch (2003) finds that the gap in weekly earnings for full time employment for Black males (relative to White males) has diminished over the period 1964–2002. Semyonov and Lewin-Epstein (2009) find similar results for a comparable time period using U.S. Census data for the Black-White differences. However, these analyses have been primarily restricted to the largest racial and ethnic groups, or they use historical data sets that do not suffer from disclosure prohibitions and thus allow for the analysis of smaller race and ethnic groups.

A recent body of inequality research depends on income records provided on U.S. tax forms or Social Security data; however, these data do not contain information on race or Hispanic origin. As a result, a researcher using such data in isolation cannot identify how inequality varies between or within race and ethnic groups. In order to overcome this obstacle, some researchers have used survey data, such as the Survey of Consumer Finance, to examine the long-run trends in income and asset inequality for the U.S. (Keister, 2000). However, because of small sample sizes for certain race and ethnic groups, researchers often only focus on inequality measures for Whites, Blacks, and Hispanics (Bloome and Western, 2011; McKernan et al., 2015), potentially obscuring different patterns of inequality for smaller racial and ethnic groups. Using decennial Census data, Snipp and Cheung (2016) are able to examine all race and ethnic groups, finding that there is a strong persistence of inequality for all races except for Asians and Whites, as well as inequality by gender. They are limited in their analysis, however, in that they do not have linked individual-level data, nor do they have annual information across these different race and ethnic groups.

Additional problems exist with survey data beyond the relatively small sample sizes for ethnic and racial minorities. There are well-known measurement issues with income reported in survey data that can distort measures of inequality. First, survey respondents at the lower end of the income distribution tend to over-report their earnings while those at the higher end tend to under-report (Pedace and Bates, 2000; Meyer and Mittag, 2015). Second, income non-response rates in surveys are both high and not randomly distributed across respondents. For example, annual earnings non-response rates in the Current Population Survey (CPS) and American Community Survey (ACS) are close to 20 percent, and non-response rates are highest for extreme high- and low-earner households (Bollinger et al., 2014). The resulting bias understates earnings inequality (Bollinger et al., 2014, 2015).

Income mobility research is limited by the same data issues as income inequality research: lack of race and ethnicity identifiers in tax data, invisibility of smaller race and ethnic groups due to small sample sizes, and bias resulting from survey income mismeasurement. Moreover, measuring 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 race and ethnic groups using survey or unlinked administrative records. To our knowledge, no studies to date evaluate income mobility using data linked at the individual level for all race and ethnic groups in the U.S. for the current time period.

In our study, we overcome the standard research obstacles in this literature by using Internal Revenue Service (IRS) tax data linked at the person level to U.S. Census Bureau race and Hispanic origin data. Because these data cover more than 90 percent of the universe of working-age tax filers in the U.S. in

each year of our study, we are able to report on income inequality and mobility across previously unreported groups and to measure the differential experience between and within all race and ethnic groups. We are also able to create a panel data set at the individual level for all tax filers over our 15-year period. In looking at our defined race and ethnic groups (White, Black, American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, Other, and Hispanic<sup>3</sup>), we document significant racial and ethnic income inequality in the midst of overall increasing income inequality in the U.S.

Specifically, we have four main findings. First, Blacks, American Indians, and Hispanics are consistently at the low end of the total income distribution compared to Whites, Asians, and those in the Other group. Pacific Islanders tend to fall in between the groups at the lower end and the groups at the higher end of the distribution. Whites tend to have a disproportionate share of income in top quantiles, while all other races accrue a disproportionate share of income at the bottom 10 percent and 1 percent of the overall income distribution. At selected points in each within-group distribution, the income level for most race groups (with the exception of Asians) ranges between 50 percent and 80 percent of the corresponding White income level. This suggests that race differences persist regardless of skill attainment and within-group income distributions, indicating that race and ethnicity “matter” beyond class distinctions.

Second, the rate of income growth at the 90th percentile within all race and ethnic groups exceeds the rate of growth at the 50th percentile, and the growth of income at the 50th percentile generally exceeded the rate of growth at 10th percentile, especially for Whites. These results indicate that the top part of the income distribution is diverging away from the rest of the income quantiles and—to a lesser extent—for many groups the middle part of the income distribution is diverging away from the bottom. This is a general result that persists across most race and ethnic groups; however, it is the most pronounced for Whites.

Third, we find that income mobility decreased for all race and ethnic groups between 2000 and 2014. We observe a decrease in income mobility after the Great Recession and find that there is a convergence in overall immobility for all race 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

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<sup>3</sup>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 define two ethnic groups (Hispanic and non-Hispanic). For our study, we define each race 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.

using rank correlation indicates that Blacks, Hispanics, and American Indians are more immobile than other groups when rank is calculated from the overall distribution. There are noticeable differences across groups in mobility over time. Asians and Whites exhibit higher mobility in a transition matrix analysis compared with Blacks, Hispanics, and American Indians. Together, these results paint a picture of a rigid income structure, where Blacks, Hispanics, and American Indians may move within their own income distributions but still are stuck at the bottom overall.

Finally, a series of fixed-effects regression models confirm these reinforcing effects of income inequality and mobility across groups. After controlling for unobserved individual-level characteristics, the hierarchical ranking across groups observed in the preceding analyses was confirmed. We also examine whether different initial conditions in an individual’s community can explain the resulting differences in observed income over time. We investigate whether income segregation, unemployment levels, or racial residential segregation within the commuting-zone of employment entry has an effect on a young cohort of tax filers’ income over our time period. While we find little to no effect of initial income segregation or unemployment levels on income growth, we do find that the degree of racial residential segregation has a negative effect on the income growth of Whites, Blacks, Hispanics, and American Indians. Contrary to arguments that dismiss the centrality of race in discussions of inequality (i.e., as opposed to class), these results suggest that race continues to play a prominent role in explaining the persistence of inequality.

The paper proceeds as follows: The next section provides information on the data sets used in our analysis and the process of linking these data. In section 3, we provide descriptive evidence documenting the patterns of income inequality across racial and ethnic groups. Section 4 reports estimates of both within-group income mobility and group-specific mobility for the entire income distribution. Section 5 provides our empirical strategy and the results of our fixed-effects regression analysis. Section 6 concludes.

## 2 Data Set Description and Data Linkage

We use restricted-use data in our study. The data come from two separate 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 were given a unique, protected identification key, called a 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.<sup>4</sup> Personal information is then removed from each data set before they may be used for research purposes. Only those observations that received the unique person identifier are used in the analysis.

It is important to note that 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 to 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 race and ethnic groups. While we demonstrate that we cover the vast majority of working-age tax filers in our study in tables that follow, we do caution that our results may be underestimating this population’s inequality and immobility by race and ethnicity for the study period. It is likely that the non-matches between the IRS and the Census race and ethnicity data are among low-income individuals and minorities.

The Census data, referred to here as the “race and ethnicity file,” is a multi-year data set that combines the 2000 and 2010 decennial censuses with ACS data from 2001 to 2014. These data were combined specifically to capture race and Hispanic origin reported by U.S. households. We selected the reported race and Hispanic origin from the most-recent decennial census file when available for each individual. We then selected 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 to 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 that uses tax data and examines the top end of the income distribution, we do not have separate fields for different income sources, and thus lack the ability to partition out market income. This should matter less for looking at the entire distribution of tax filers, however, since for most tax filers, the main source of income is wage earnings. Another way in which we differ from previous research is in our unit of analysis, which is the individual rather than the tax unit. We chose to examine primary and secondary filers separately for several 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 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,

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<sup>4</sup>For more information on the linking process, see Wagner and Layne (2014).

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 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 Citro et al. (1995), which weights income using the adults and children in a household.<sup>5</sup> Additionally, in line with previous research, we have restricted 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 zero.

To assess the representativeness of our data, we separately matched the 2010 Census data for people ages 25 to 65 to the 2010 Form 1040s. This matched data set can be considered a point-in-time assessment of the quality of the match. It should be emphasized that PIK placement on the Form 1040 data is based on SSN, and thus the rate of PIK placement is close to 100 percent. As shown in Table 1, the matched data contain higher proportions of Whites and Asians and lower proportions of the other race and ethnic groups in our study compared with 2010 Census (Column f). Lower match rates for certain groups in our data are due not only 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.<sup>6</sup> Blacks and American Indians, as well as Hispanics and Pacific Islanders, have lower incomes compared to Whites and Asians (Ramakrishnan and Ahmad, 2014) and thus may be less likely to file taxes compared to these groups. Our universe has similar proportions of people ages 25 to 44 and 45 to 65, and we match more women than we do men (indicating that women are more likely than men to be either a primary or secondary filer).

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

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<sup>5</sup>The number of household members are equal to the following:  $(A + 0.7K)^{0.7}$  where  $A$  = number of adults in the household and  $K$  = the number of children (Citro et al., 1995).

<sup>6</sup>See National Center for Education Statistics Table 427, <http://nces.ed.gov/programs/digest/d12/tables/dt12.427.asp>.



Table 1: 2010 Census Race and Ethnicity Data Matched to 1040s, Ages 25–65

	2010 Census Number (a)	Percent (b)	2010 Census PIKs Number (c)	Percent (d)	2010 Census– IRS Match Number (e)	IRS Match out of total 2010 Census Percent (f)
Total	166,305,994	100.0	151,565,180	91.1	123,783,849	74.4
Sex						
Male	82,083,737	49.4	74,069,567	90.2	58,876,049	71.7
Female	84,222,257	50.6	77,495,613	92.0	64,907,800	77.1
Age group						
25-44	82,123,330	49.4	73,362,250	89.3	60,402,428	73.5
45-65	84,182,664	50.6	78,202,930	92.9	63,381,421	75.2
Race						
White	109,396,016	65.8	102,361,646	93.6	86,622,296	79.2
Hispanic	24,631,312	14.8	20,572,899	83.5	15,852,995	64.4
Black	19,832,168	11.9	17,468,337	88.1	12,080,486	61.0
AIAN	1,174,014	0.7	1,024,411	87.3	698,199	59.5
Asian	8,530,347	5.1	7,686,570	90.1	6,667,599	78.1
NHPI	255,324	0.2	216,815	84.9	165,558	64.9
Other	2,486,813	1.5	2,234,502	89.9	1,696,716	68.2

The table shows a single year of demographic data, including race and ethnic origin, derived from Census 2010 and matched to Form 1040 data from the same year. This allows for a point-in-time estimate of filing rates and match quality.  
Source: Census 2010 data linked to 2010 Form 1040 data.

data represent the U.S. resident population.<sup>7</sup> When we further restrict the data to filers with AGI greater than or equal to zero, our capture rates decrease to between 91 and 93 percent (Column f).<sup>8</sup>

Overall, our data provide several improvements and advantages to existing data used to estimate income inequality and immobility by race and ethnicity. Our data are large enough that we are able to identify all of the major race and ethnic categories in the U.S. The panel aspect of the data is also a great improvement in that it allows us to link individuals across time and thus enables the immobility analysis, which would otherwise be impossible. Other benefits of these data are that they do not suffer from income response error or top-coding issues, as is common with survey data.

<sup>7</sup>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 percent compared to 94 and 96 percent.

<sup>8</sup>Comparing 2010 1040s and W-2s 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 to 65 in the 2010 Census compared with W-2s. Each race group has a higher number of people in the 2010 Census-1040 matched universe relative to the 2010 Census-W-2 matched universe. While the 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, while 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.

Table 2: Number and Percent of Tax Filers in Matched 1040 and Census Data, Ages 25 to 65

Year	Total Individuals from SOI (a)	Tax Filers in RE-Form 1040 file (b)	Percent (c)	SOI Tax Filers with AGI $\geq$ 0 (d)	RE-1040 Filers with AGI $\geq$ 0 (e)	Percent (f)
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

Sources: Columns (a) and (d) are authors' calculations based on publicly available aggregate data from the IRS (see <https://www.irs.gov/uac/soi-tax-stats-individual-income-tax-returns-publication-1304-complete-report>). Columns (b) and (c) report matches between the race and ethnicity (RE) file-Form 1040 data, 2000 to 2014. A "-" indicates that IRS aggregate data were not publicly available for the year in question.

### 3 Income Shares and Inequality Measures by Race and Ethnicity

In this section, we describe the distribution of income data by race and ethnic groups for two periods in our time frame: for 2000 and for 2014 (in 2014 dollars). Given the detailed nature of the 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.

#### 3.1 Income Distribution and Income Shares

In Figures 1 and 2, we provide the kernel density estimate of income for our seven race 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 of the other race 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 not to as large a degree as do Whites. The Asian category also 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, for most groups the income distribution patterns 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. There is also a moderate increase of the number of Hispanics in the middle income range between 2000 to 2014.

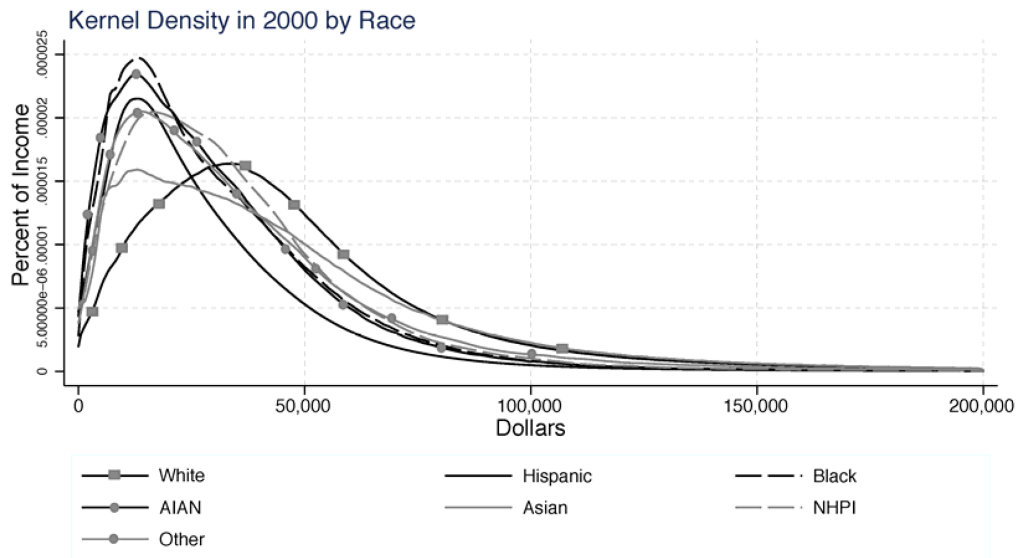
The mean AGI for our entire universe shows similar patterns. Whites had the highest mean AGI at \$61,565 in 2000, followed by Asians at \$58,444. In contrast, the mean AGI for Hispanics, Blacks, and American Indians was in the low \$30,000s. The Other group and Pacific Islanders fall in between these 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 percent, 1 percent, and 0.1 percent of the income distribution, as well as the income shares going to the bottom 10 percent and 1 percent. Piketty and Saez (2003) show that the proportion of income accruing to the top percentiles of the income distribution has been steadily increasing 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.

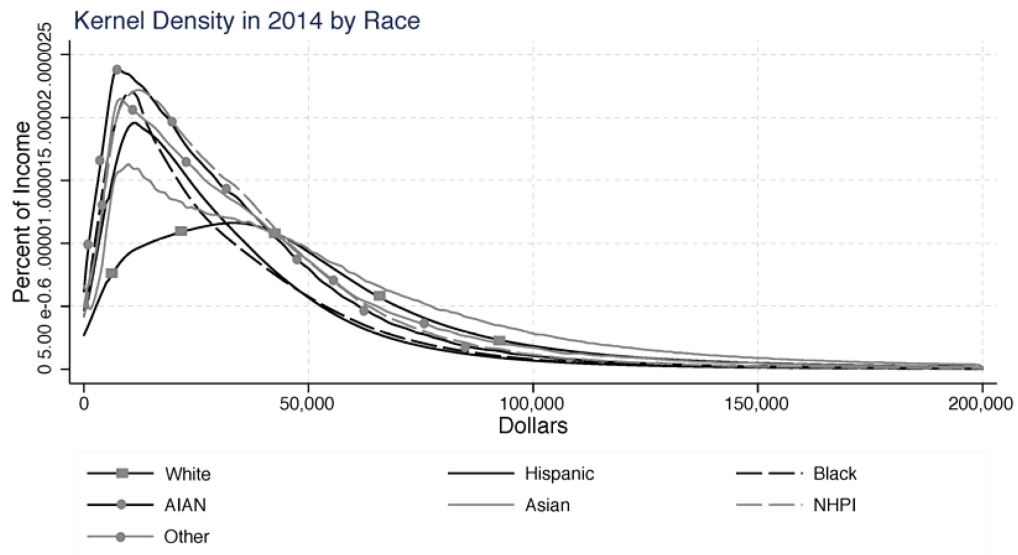
In Table 3, we show the share of income for the different income percentiles for 2000 and 2014.<sup>9</sup> The share of income accruing to the top 10 percent of the population of all tax filers was about 41 percent in 2000 and 40 percent in 2014. Looking across the columns for 2000, about 90 percent of the income that accrued to the top 10 percent of the income distribution of tax filers went to Whites, while about 2.5 percent went to Hispanics, 2.1 percent to Blacks, 0.25 percent to American Indians, and 5.3 percent 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 ages 25 to 65. Comparing the share of the population to the share of income accruing to each group provides an additional measure of inequality. Whites received a strongly disproportionate share of top income, while Asians received slightly more than their proportionate share. Meanwhile Hispanics, Blacks, American Indians, Pacific Islanders, and Others accrued less than their proportionate share of total income

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<sup>9</sup>Appendix Table 3 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 for before, during, and after the Great Recession; future research intends to follow up on these differences.



	White	Hispanic	Black	AIAN	Asian	NHPI	Other
Full sample mean	61,564	31,255	32,929	34,273	58,444	38,967	45,593
AGI<=200,000 mean	46,878	28,663	31,547	31,348	45,029	34,822	36,853



	White	Hispanic	Black	AIAN	Asian	NHPI	Other
Full sample mean	61,445	34,164	32,578	36,369	64,368	37,719	48,025
AGI<=200,000 mean	47,430	31,134	30,859	32,847	49,360	34,707	38,602

Figures 1 and 2: Kernel density estimates of income by race and ethnic group, 2000 and 2014.  
Source: Race and ethnicity file—Form 1040 data, 2000 and 2014.

Table 3: Shares of Income by Race, 2000 and 2014

As a Percent of Row Total									
Panel A: 2000		Overall Total	White	Hispanic	Black	AIAN	Asian	NHPI	Other
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 proportion			75.13%	9.61%	9.72%	0.84%	4.37%	0.17%	0.18%
As a Percent of Row Total									
Panel B: 2014		Overall Total	White	Hispanic	Black	AIAN	Asian	NHPI	Other
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 proportion			69.48%	12.79%	10.67%	0.85%	5.74%	0.22%	0.23%

The table reports the total income share accruing to persons within the portion of the income distribution reported in the row, broken out by race and ethnic group. Population proportions are reported for comparison.

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

in the top 10 percent. Looking at Panel B, there are noticeable changes over time: The share accruing to Whites decreased to about 84 percent and the share for Hispanics increased to 4 percent. However, the proportion of Whites in the population decreased to about 70 percent, while Hispanics increased to about 13 percent. Asians realized an increase to an 8 percent share while Blacks, American Indians, and Pacific Islanders did not realize any noticeable changes at the top 10 percent over this time period.

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

The results for the top 0.1 percent of the income distribution indicate an even larger proportion

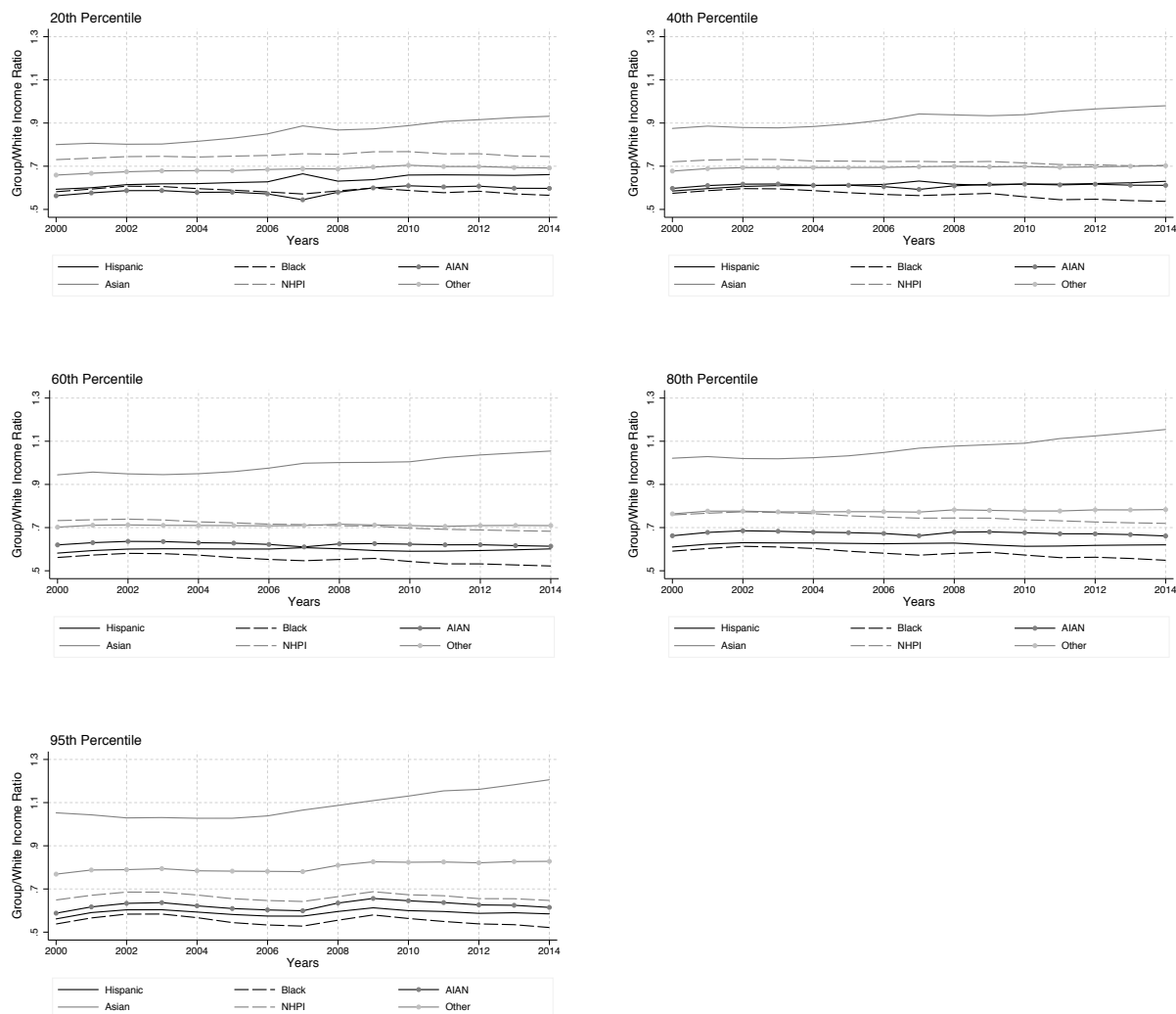
accruing to a much smaller share of the population. Once again, Whites have the largest portion of the income share at this income percentile compared with their share of the population. Patterns are similar to the previous row, and changes over time exhibit the same trade off in income and population shares.

For the bottom 10 percent and bottom 1 percent of the income distribution, only about 1 percent of the total income in the U.S. is accrued in each year. Whereas the top 10 percent received about four times their proportionate share of total income, the bottom 10 percent received about one-tenth of their proportionate share. The proportions of income accruing to the various race and ethnic groups indicates that Whites received less than their proportionate share while 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 tremendous heterogeneity within this group. The next rows provide the income share accruing to the bottom 1 percent. The share accruing to Hispanic and Black 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.

In terms of overall inequality, comparing 2000 to 2014 indicates a slight decrease in income shares at the very top (the top 1 and 0.1 percent). However, this is offset by a decrease in income shares at the bottom of the distribution. For example, for the bottom 10 percent, the income share decreased from 1.20 percent to 1.00 percent; the bottom 1 percent's share decreased from 0.02 to 0.01. This loss of resources at the lowest end of the distribution is consistent with analyses presented in Section 3.4, which indicate a rise in inequality over the time period.

### 3.2 Percentile Parity Results by Race and Year

An alternative method to present differences across race and ethnic groups is to show a comparison of the actual dollar incomes that mark the 20th, 40th, and other percentiles for each race and ethnic group compared to Whites. In the next five figures (Figures 3–7), we plot the annual dollar threshold for selected percentiles 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 the year 2000, the dollar amount associated with the 20th percentile of the White income distribution was \$21,160 while 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 Figures 3–7 for each year and reflected in



Figures 3 through 7: Income ratios for selected points in the within-group income distribution, where the income value at the threshold for each group is compared with the White value. See text for further details. Source: Race and ethnicity file—Form 1040 data, 2000 to 2014.

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.

If a race 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 here, all of the groups with the exception of Asians had substantially lower dollar values at their 20th percentile cutoff than the corresponding dollar value at the 20th percentile for Whites.<sup>10</sup> In this figure, Asians experienced gains relative to Whites over the time

<sup>10</sup>The slight bump that occurs for most groups in 2007 is due to the tax rebates that required individuals to file a tax return in order to receive the rebate. Therefore, the year 2007 witnessed a dramatic increase in 1040 tax filers with low or zero incomes

period. The remaining race and ethnic groups tended to gain somewhat over the period compared to Whites at their respective 20th percentiles; there is some evidence for a decline in the post-Great Recession period for Hispanics, Blacks, and the Other category.

The next figure repeats the analysis at the 40th percentile. The dollar amount associated with the 40th percentile of the Asian income distribution was fairly close to that of the White group at their 40th percentile. The other race and ethnic groups clustered at levels well below parity with Whites for all observed years in our data. Once again, there was a slight downturn for these same groups relative to Whites after the Great Recession.

The third, fourth, and fifth figures provide a similar analysis at the 60th, 80th, and 95th income percentiles, respectively. There continues to be a divergence in the dollar amounts associated with these income percentiles for both Asians and Whites and the rest of the race and ethnic groups in the data. Moreover, Asians began surpassing Whites in the 60th percentile after 2007, and they were above parity with Whites in all years in the 80th and 95th percentiles. All other race 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 income that is, at best, about two-thirds that of Whites and, at worst, about half the income 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. The noticeable difference is the high rate of income growth relative to Whites for Asians over this time period.

### 3.3 Measures of Within-Group Inequality Over Time

Figure 8 tracks the annual Gini coefficient for each race and ethnic group. There are three main findings to be taken from this figure. The first is that within-group inequality varies by race and ethnicity. The most unequal groups (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, tended to be the poorest

(those who would otherwise have not been required to file federal income taxes). The increase in the number of extremely low-income filers necessarily drove down the threshold for the 20th percentile. The results indicate that the filing of tax returns differed by group since the results are all relative to non-Hispanic White. Note that the bump disappears in the subsequent figures after the 40th percentile as the upper income points are less sensitive to changes associated at the bottom of the income distribution.



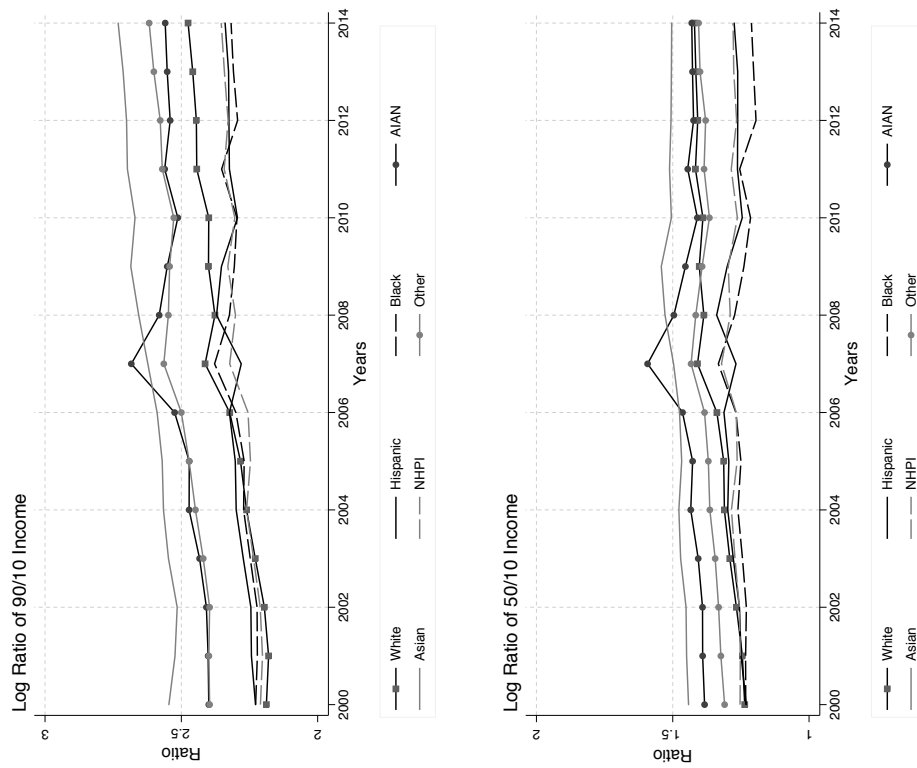
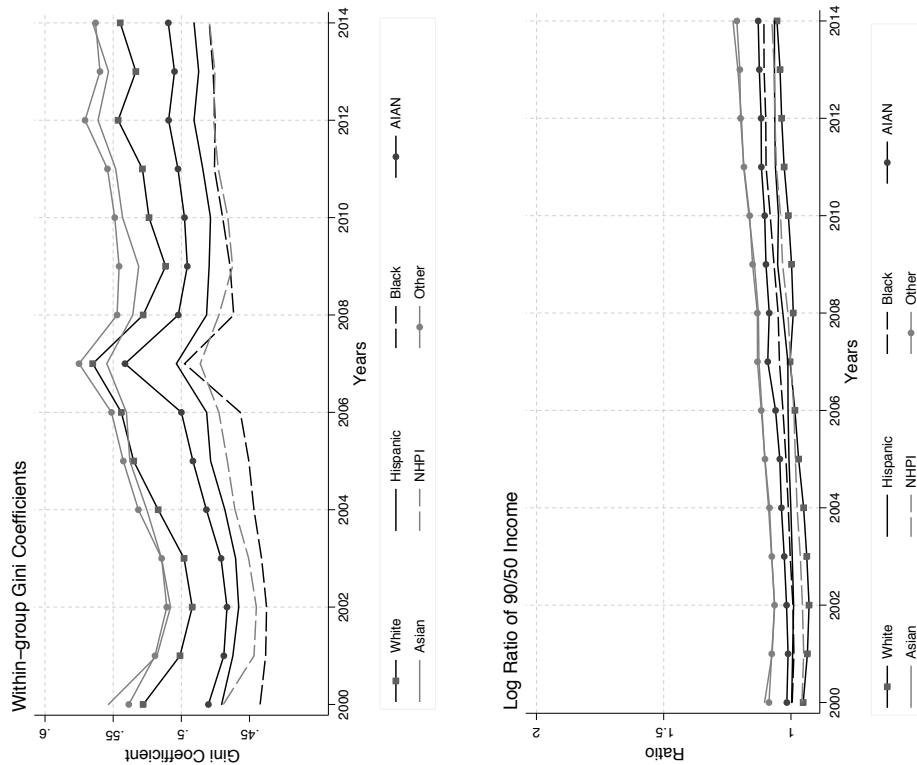
groups as well.

The second finding is that levels of within-group inequality increased from 2000 to 2014 for all race and ethnic groups. However, Black, American Indian, Other, and Hispanic within-group inequality increased more over the time period relative to Asian, White, and Pacific Islander within-group inequality. Our third finding is that 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. We note that 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, 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 zero income filed taxes, which increased the lower bound of incomes for all taxpayers in 2007.

### 3.4 Within-Group Inequality by Income Deciles

The next set of figures display different parts of the within-group income distribution for each race and ethnic group. We plot the logged ratio of the 90th percentile to the 10th percentile for each race or ethnic group by year. This measure indicates whether the top end of the income distribution is moving further away from the bottom end of the income distribution over time. For example, an increase in the ratio indicates that within-group income inequality is increasing for a particular group. The next two measures focus on the top and bottom halves of the income distributions. For the log ratio of the 90th percentile to the 50th percentile, we are able to examine whether inequality in the top half of the income distribution increased or decreased. In a similar fashion, the log ratio of the 50th percentile to the 10th percentile identifies whether there were changes in income inequality at the bottom half of the income distribution.

In Figure 9, we provide the logged ratio of the 90th percentile to the 10th percentile for each race and ethnic group. There was 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. There was approximately a 28 percent increase in within-group income inequality over this time period for Whites, whereas within-group inequality increased for Blacks and Hispanics by only 9 and 11 percent, respectively. There were also different magnitudes of inequality. 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, whereas for the remaining groups the ratio was



Figures 8 through 11: Clockwise from top right: Within-group Gini coefficients; log of 90–10 ratio; log of 50–10 ratio; log of 90–50 ratio. Ratio graphs use a consistent y-axis scale, with Figure 9 shifted up account for the larger ratio values.  
Source: Race and ethnicity file-Form 1040 data, 2000 to 2014.

about 9 at the start of our data series.

Figure 10 examines the corresponding results for the upper part of the income distribution. In this figure, we plot the log of the ratio of the 90th to the 50th percentile for each race and ethnic group by year. The results indicate that there was an increase in income inequality for all groups over the 15-year time span. All groups experienced a 10 to 13 percent increase in the 90–50 ratio during this period except for Hispanics (7 percent). These results indicate that the rich are becoming richer within each race and ethnic group.

Figure 11 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 percent and 10 percent, respectively. All other groups experienced a slight increase in within-group income inequality over time, except for Blacks who experienced a slight decrease in inequality during the time period. These results suggest that the Black middle class was worse off in 2014 relative to 2000. For Whites, the increase in income inequality at bottom of their own income distribution was larger (18 percent) than the increase at the top of the income distribution (10 percent). This indicates that, especially for Whites, the rich were getting richer (Figures 9 and 10), but inequality also increased between the middle class and the poor, where the middle class largely pulled away from the poor (Figure 11). 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 only looking at the top.

## 4 Immobility Measures

Inequality is not the only component that matters in measures of economic equity. The level of income mobility across race and ethnic groups matters as well. There has been a sharp increase in the volume of recent research examining income mobility through the use of administrative data. Kopczuk et al. (2010) investigates long-run earnings inequality and mobility using Social Security Administration data from 1937–2004. They find that income inequality is U-shaped for the U.S. over the 20th century, with a low point occurring in the 1950s. Additionally, using several measures of mobility, they show that mobility has been stable for much of the previous 25 years. Their analysis focuses on the distribution of wage earners between ages 25–60 who have positive earnings above a minimum threshold of \$2,575 in 2004 dollars for all years. Mitnik et al. (2016) finds that the increase in income inequality is associated with a decline in mobility; moreover, this association is concentrated in professional and managerial occupation categories.

An implication of their finding is that high-income and -class categories are more likely to reproduce themselves in the next generation, which ensures a permanent distance across groups.

In this section we analyze three different measures of income mobility: the first measures within-group mobility, and the other two capture mobility for all race and ethnic groups across the full income distribution.

## 4.1 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 where there is 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:

$$\text{Long-term income inequality} = \text{Short-term income inequality} * (1 - \text{Mobility}) \quad (1)$$

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 different Gini coefficients calculated for each year independently. The following equation defines that relationship:<sup>11</sup>

$$G(\bar{Z}) \leq \frac{\sum_{t=1}^K G(Z_t)}{K} \times (1 - \text{Mobility}) \quad (2)$$

The Shorrocks Index is the term in parentheses on the right had side of the equal sign. The variable  $\bar{Z}$  is the three-year aggregate of income while  $K$  = the number of time periods, equal to three in our example. The equation tells us that for a given level of short-run inequality, higher levels of mobility (where  $\text{Mobility} \in \{0, 1\}$ ) translate into a lower upper bound for long-run income inequality. In other words, more income mobility means that we should expect 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 Figure 12. The index is equal to  $1 - \text{Mobility}$ ; therefore, a value closer to 1 indicates very low levels of mobility. The index

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<sup>11</sup>The inequality symbol is due to the convexity of the Gini function and the fact that the function is also homogeneous of degree 0.

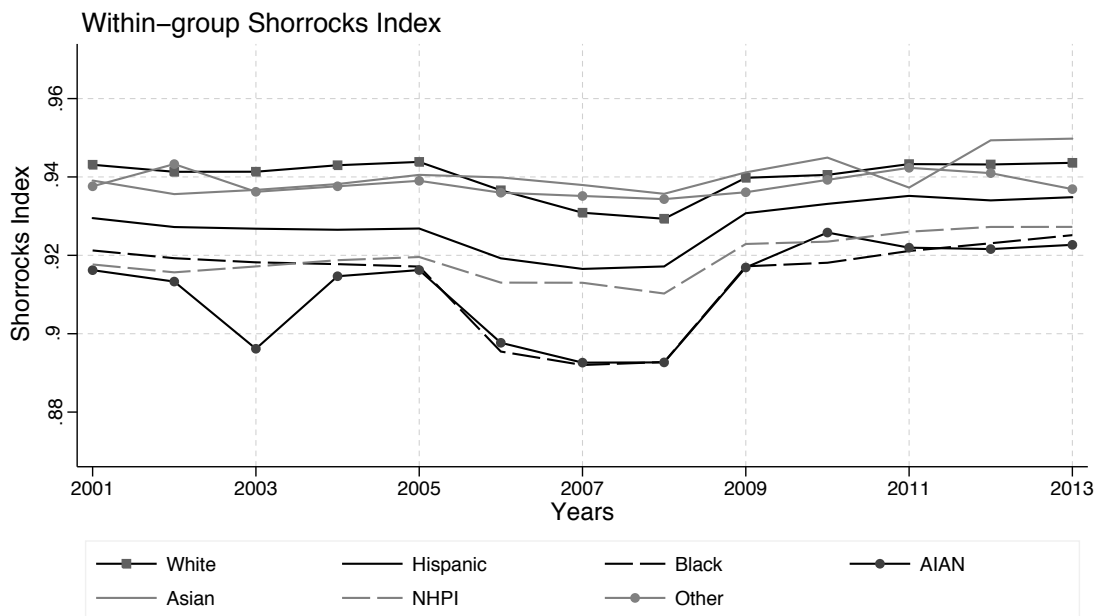


Figure 12: Shorrocks’s index measuring within-group income mobility.  
Source: Race and ethnicity file-Form 1040 data, 2000–2014.

is a relative ranking measure of mobility—in other words, it reflects group-specific mobility, where an individual’s income is compared only to income from individuals in the same race or ethnic group. Our findings suggest that, on average, there are very low levels of mobility for all race 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 at all years in our data. The Black and American Indian groups in particular experienced higher levels of mobility in the years 2006–2008 than did other groups in our data (potentially due to the effect of the contemporaneous tax rebates), but they quickly return to the same levels as Pacific Islanders by 2009.

## 4.2 Two-Year Rank Correlations

While the Shorrocks Index measures within-group mobility, 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

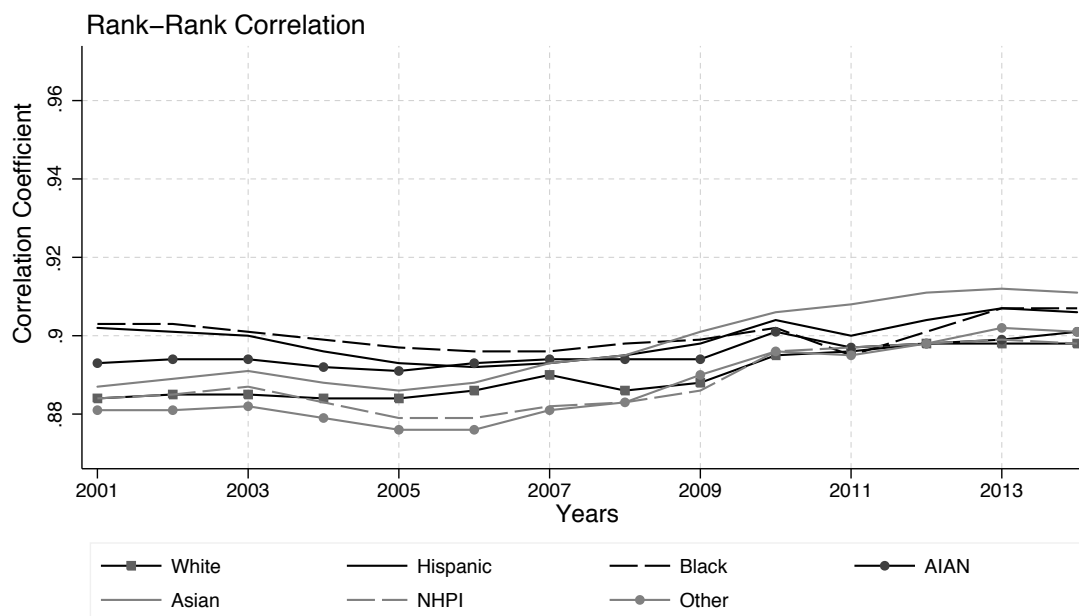


Figure 13: Rank-rank correlation measuring overall income mobility.  
Source: Race and ethnicity file-Form 1040 data, 2000–2014.

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 zero. Finally, we take the average correlation over all individuals by race or ethnic group. We limit the sample to individuals who appear in the tax data for two consecutive years.

In Figure 13 we provide the correlation coefficients by race and ethnic group by year. There are two points worth noting in this figure. First, there are high levels of immobility in income by race and ethnic group. In fact, it appears that all groups increased in their immobility from 2008 onward. Second, for some groups, immobility varied more when comparing individuals to the entire income distribution than it did when limiting 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 until approximately 2010, they experienced the highest rank correlation of any group. Asians experienced the sharpest increase in income immobility over our time period, with Whites, those in the Other group, and Pacific Islanders following closely behind.

### 4.3 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 of our data and at the final year of our data (years 2000 and 2014). We identify the income quintiles (a total of five bins) in 2000 for all individuals in our selected sample. Then we identify the same person’s location in the income quintile in 2014. We then 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 Figures 14–20. The first 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 Figure 14 is 45.6, which means that about 46 percent of Whites that started out in the first (lowest) income quintile in 2000 remained in the lowest income quintile in 2014. Along the diagonal, we observe that there is a high probability of remaining in the same income quintile over time. Individuals that start out in the highest income quintile are the most likely to remain there: we find that 57 percent of Whites remained in that same position in the income distribution. These results suggest strong immobility for upper-income Whites. There is a very small likelihood of low-income Whites moving up to the highest income quintiles by 2014 (only 5 percent). 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. However, the levels vary across race and ethnic groups. Asians exhibit the highest level of immobility at the highest quintile, where 65 percent were in the fifth quintile in both 2000 and 2014. The level of immobility at the lowest quintile for Asians is similar to Whites. However, Asians experience the greatest mobility in quintiles two through four relative to other groups. For these quintiles, while many Asians are sliding backwards, a greater proportion of Asians moved up in comparison with other groups.

Blacks have the highest level of immobility in the bottom quintile compared to all other groups: strikingly, 63 percent of Blacks who started in the lowest income quintile in 2000 remained in the lowest quintile in 2014. This is also true for the second quintile, where 40 percent of Blacks who were in the second quintile in 2000 remained in that quintile in 2014. Conversely, Blacks had the lowest percentage of people relative to other race and ethnic groups that remained in the highest quintile from 2000 to 2014: 45

2000	2014					
	White	1	2	3	4	5
	1	45.66	26.14	14.24	8.77	5.19
	2	22.21	32.20	23.50	14.46	7.63
	3	13.06	21.15	31.52	23.25	11.03
	4	7.37	12.21	23.54	35.41	21.48
	5	4.08	5.65	10.40	22.48	57.39

2000	2014					
	Hispanic	1	2	3	4	5
	1	55.54	28.36	9.97	4.31	1.82
	2	27.64	37.83	21.36	9.41	3.76
	3	16.79	25.54	31.26	19.06	7.36
	4	9.50	14.84	24.50	33.29	17.87
	5	5.29	6.96	11.80	24.00	51.95

2000	2014					
	Black	1	2	3	4	5
	1	62.71	25.43	7.45	3.26	1.14
	2	28.31	39.57	19.98	8.96	3.17
	3	16.50	25.33	31.87	19.19	7.11
	4	10.37	16.02	25.61	32.59	15.42
	5	5.69	8.16	14.24	27.20	44.70

2000	2014					
	AIAN	1	2	3	4	5
	1	56.16	26.57	10.40	4.90	1.97
	2	28.29	35.47	21.56	10.67	4.01
	3	17.40	23.94	31.03	20.15	7.48
	4	10.34	14.78	24.86	33.10	16.92
	5	5.93	7.75	12.76	25.33	48.23

2000	2014					
	Asian	1	2	3	4	5
	1	44.19	23.36	12.72	9.58	10.15
	2	23.57	28.20	21.00	14.74	12.50
	3	13.70	18.83	25.72	22.76	18.99
	4	7.97	10.49	18.91	31.52	31.11
	5	4.40	4.65	7.92	18.41	64.60

2000	2014					
	NHPI	1	2	3	4	5
	1	46.92	28.95	13.59	7.61	2.93
	2	23.38	33.02	24.08	13.95	5.57
	3	14.67	22.06	30.38	23.55	9.35
	4	8.73	13.42	24.05	35.22	18.59
	5	4.91	7.06	12.48	26.09	49.47

2000	2014					
	Other	1	2	3	4	5
	1	51.24	26.17	11.65	6.55	4.39
	2	27.22	32.76	21.22	11.83	6.96
	3	16.67	22.34	27.69	21.20	12.10
	4	10.08	13.03	21.83	31.12	23.94
	5	6.03	6.16	9.52	20.38	57.91

Figure 14 through 20: Transition matrices showing probability of arriving in quantile in 2014 from quantile in 2000.

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



percent. Blacks were also more likely to slide back to lower quintiles compared to Whites and Asians. Twenty-eight percent of Blacks who started out in the second quintile in 2000 slid to the first quintile in 2014. Moreover, 43 percent of Blacks who started out in the third quintile in 2000 fell to the first and second quintiles by 2014. In other words, 74 percent of Blacks who started in the third quintile in 2000 were either immobile (32 percent) or downwardly mobile (43 percent).

Generally, all other race 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, while 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.

## 5 Regression Specification and Analysis for Panel Data

In this final section of analysis, we take advantage of the longitudinal nature of the data to analyze the differences across races in log incomes. The regression analysis provides a simple comparison of the “effect” of being in a particular race or ethnic group by year on log incomes. Given that we observe the same individual at multiple points in our data, we are able to include individual fixed-effects in the specifications, which account for unobserved, time-invariant characteristics.

Due to the use of individual fixed effects, we limit the sample to individuals who appear in at least two years of tax data. We also limit our analysis to individuals who were 25-35 in 2000 to take advantage of baseline conditions at the beginning of individuals’ careers. Our interest is to identify whether there are causal effects of different types of inequality (measured at career initiation) on incomes that vary across race and ethnicity. Our explicit assumption is that the location of where an individual lives during the first few years of labor force experience are taken as given; to some extent this may be more true for younger workers than for older workers who have more experience or skills and have a larger set of available options for employment and location. To run the analysis, we take a 10 percent random sample of the data for computing purposes. The further sample restrictions and random sampling leave us approximately 4.3 million observations in the fixed-effects models, with each group represented by at least 9,000 individuals.

## 5.1 Individual Fixed-Effects Regression and Race by Year Effects

Our regression takes the following form:

$$\begin{aligned}
Y_{igt} = & \alpha + \theta_i + \delta_g + \epsilon_{igt} + \gamma_{1,1} \times White_g \times Year1_t + \dots + \gamma_{1,14} \times White_g \times Year14_t \\
& + \gamma_{2,1} \times Hispanic_g \times Year1_t + \dots + \gamma_{2,14} \times Hispanic_g \times Year14_t \\
& + \gamma_{3,1} \times Black_g \times Year1_t + \dots + \gamma_{3,14} \times Black_g \times Year14_t \\
& + \gamma_{4,1} \times AIAN_g \times Year1_t + \dots + \gamma_{4,14} \times AIAN_g \times Year14_t \\
& + \gamma_{5,1} \times Asian_g \times Year1_t + \dots + \gamma_{5,14} \times Asian_g \times Year14_t \\
& + \gamma_{6,1} \times NHPI_g \times Year1_t + \dots + \gamma_{6,14} \times NHPI_g \times Year14_t \\
& + \gamma_{7,1} \times Other_g \times Year1_t + \dots + \gamma_{7,14} \times Other_g \times Year14_t
\end{aligned} \tag{3}$$

where  $i$  indexes each individual in our data,  $g$  indexes each different ethnic/racial group in our data, and  $t$  indexes each year in the data. The outcome variable,  $Y$ , is individual AGI income per year for an individual, weighted by the equivalence scale. The term  $\alpha$  is the common intercept term for all observations. The next term,  $\theta_i$ , is the individual fixed effect, which controls for all of the unobserved time-invariant characteristics at the individual level. The next term,  $\delta_g$ , is the ethnic/racial group fixed effect; it is actually subsumed under the individual fixed effect  $\theta_i$  but is included here for completeness. To account for overall time effects, we express AGI in year 2014 dollars (logged). The final term is an error term,  $\epsilon_{igt}$ .

The coefficients of interest are the  $\gamma$  terms. The terms are indexed by a number that refers to the ethnic/racial group (1–7 for White, Black, Hispanic, American Indian, Asian, Pacific Islander, and Other, respectively). The second index number for the terms indicates the data wave (year) and takes values of 1–14. We will therefore be able to estimate  $7 \times 13$  ethnic/racial coefficients. These coefficients indicate the “effect” that being White, Black, Hispanic, American Indian, Asian, Pacific Islander, or Other has on AGI over the years in our data.

The next figures plot the estimated coefficients from the fixed-effects regression model described above. In Figure 21, we provide the coefficients on the interaction variables for race-times-year at the mean of the dependent variable in year 1 for each race or ethnic group. Including the mean makes it easier to see the size of the effects of race and ethnicity on income over time and also accounts for level differences

between groups. The coefficients in this case indicate the effect that race has on the log of income for each year, holding other time-invariant characteristics constant. Generally, the results show the same income hierarchy by race that has been observed throughout this paper: Asians, Whites, and the Other category on top; Blacks, American Indians, and Hispanics on the bottom; and Pacific Islanders in the middle. These results confirm that race and ethnicity continue to play a critical role in income inequality, even after controlling for unobservable individual characteristics such as education and occupation. The results also confirm that the Asian group had a positive upward trend in income over time that is larger than for any other group. Whites, Hispanics, and those in the Other category appear to have a fairly stable relationship with income over our time period. There was a slight upturn for Pacific Islanders, and a downturn for Blacks and American Indians over time.<sup>12</sup> The conclusion from this figure is that, upon controlling for time-invariant characteristics across individuals over time, there was a persistent level difference in income across races and ethnicities. Additionally, there was a remarkable increase over time in income for Asians that was especially dramatic after 2004. On the other hand, there is a noticeable decrease in incomes for Blacks and American Indians over this time period.

## 5.2 Individual Fixed-Effects Regression and Race-by-Year-by-Unemployment Effects

In this section, we investigate further the difference in log income across race and ethnic groups. Following Chetty et al. (2014), we look at whether there are differences in the geographic location where different race and ethnic groups reside that have long-run effects on average group income. There is an existing literature that investigates the effect of starting one’s career during recessions (see, for example, Oreopoulos et al. (2012)). Our analysis follows that literature except that we investigate whether starting one’s employment career in high-unemployment areas, high-income-inequality areas, or areas that have a high proportion of people who are racially or ethnically segregated helps explain the observed differences in group incomes. We create a measure of the unemployment level in the year 2000 based on the commuting zone where each individual resides and interact this variable with the race-by-year interaction terms. The results of interest are the triple-interaction coefficients (race-times-year-times-unemployment effects), which are presented in the graph. Secondary interactions are available upon request.

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<sup>12</sup>These results may be related to the literature examining the effect of the Great Recession on race and ethnic groups in the U.S. Hoynes et al. (2012), using CPS data from 1979–2011, find that Hispanic and low-skill workers tend to fare worst during recessions. Bitler and Hoynes (2015) use CPS data to identify the effect of recessions on the unemployment rate for households across the income distribution. They find that the poorest households are the most likely to experience an increase in inequality relative to households in the upper portion of the income distribution.

In Figure 22, we provide just the regression coefficients for each of the race and ethnic groups by year and initial unemployment level in their local area (commuting zones) in the year 2000. The coefficients indicate that there was an increase in income for all race and ethnic groups between the base year (2000) and 2001/2002. In other words, individuals who lived in areas with high levels of unemployment at career start tend to experience a comparative increase in their incomes in the short-run (1 to 2 years), holding their race or ethnic group constant. This is potentially just a phenomenon of reversion to the mean. Any larger national or even regional trend in unemployment is already controlled for in the time and individual fixed effects. After 2002, it does not appear that there are large differences in the experiences across the groups with respect to their incomes, indicating that initial unemployment levels do not appear to affect race and ethnic groups differentially with regard to income over time.

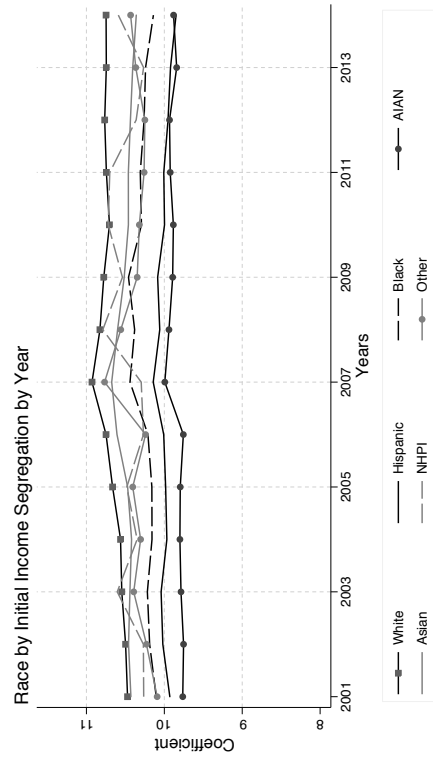
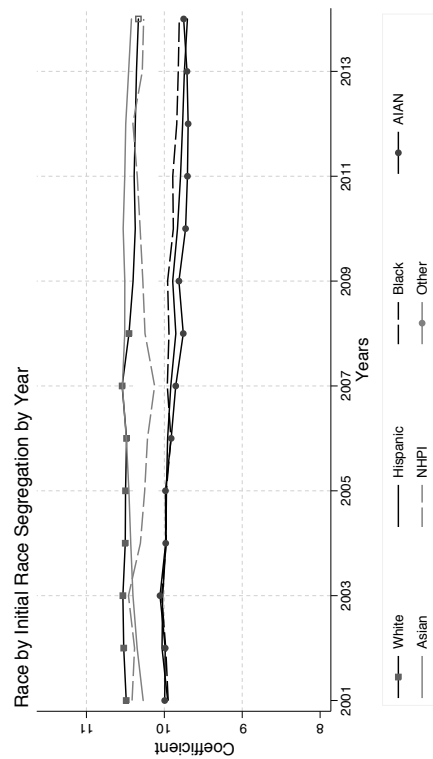
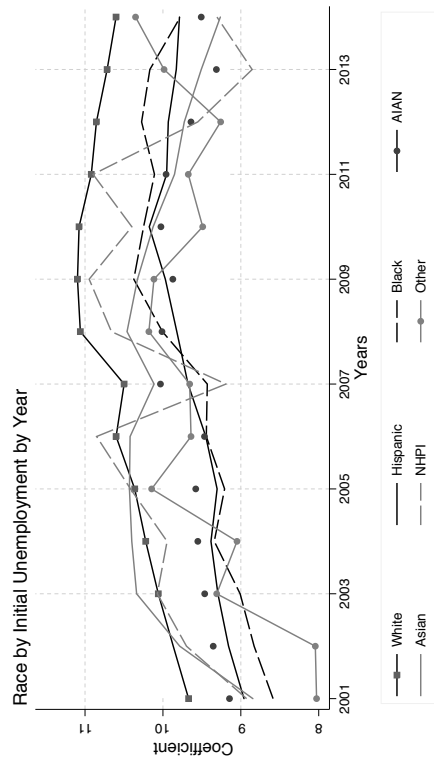
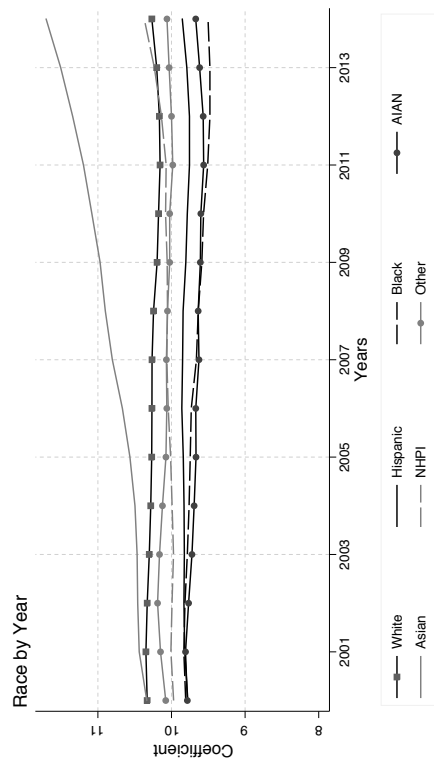
### **5.3 Individual Fixed-Effects Regression and Race-by-Year-by-Income Segregation**

Figure 23 provides the results when we interact the individual's own race with year and the level of income inequality in their commuting zone in year 2000. In this case, we investigate whether members of certain races or ethnicities who start out their employment careers in relatively high-income-inequality areas are more or less likely to earn higher incomes over time. We use a standard measure of income segregation, the Rank Order Information Theory Index (Reardon and Bischoff, 2011) which identifies the degree to which a census tract differs in its income distribution from that of the larger commuting zone.

The results show that income growth was again relatively stable across the different race and ethnic groups, suggesting that people who started their careers in areas with initially higher income segregation had about the same income trajectory as individuals who started their careers in areas with lower income segregation.

### **5.4 Individual Fixed-Effects Regression and Race-by-Year-by-Racial Residential Segregation**

In Figure 24, we show the regression coefficients when we interact race by year by initial racial residential segregation at the commuting zone. We use a standard measure of racial residential segregation—entropy (see also Iceland (2004) and Reardon and Bischoff (2011))—at the commuting-zone level. The regression coefficients indicate that Hispanics, Blacks, and American Indians who started their employment careers in



Figures 21 through 24: Reported coefficients from individual fixed-effects regressions. Clockwise from top left: interactions of group times year; triple interaction of initial unemployment rate times group times year; triple interaction of initial racial residential segregation times group times time; triple interaction of initial income segregation times group times time. Source: Race and ethnicity file-Form 1040 data, 2000 to 2014.

highly racially segregated communities saw their incomes decline over the time period compared with other groups, holding other things constant. We find a similar result, to some extent, for Whites, although this is likely a reversion to the mean since Whites start off at the highest mean income. For Asians, those in the Other group, and Pacific Islanders, the results are relatively flat over this time period.

The effect of starting one's employment career in a racially segregated area is particularly detrimental for the incomes of Hispanics, Blacks, and American Indians. Over time, incomes for these groups decreased on average by about twenty percent. Income also decreased for Whites after the Great Recession as well.

Overall, the results from our various regression models are in line with the more descriptive results outlined in preceding sections. Asians saw dramatic income growth over the time period, while other groups saw fairly stable growth from year to year while retaining group position in the income hierarchy. Furthermore, the level of racial residential segregation existing where one starts working appears to negatively impact the long-term income growth of Blacks, Hispanics, and American Indians. This perhaps indicates that the types of jobs available, or the local resources where a person first enters works, plays a part in income trajectories.

## 6 Conclusion

Our analysis examines incomes for the universe of tax filers for the U.S. over the period 2000 to 2014 by race and ethnic group. To our knowledge, we are the first to be able to provide in-depth analysis of relatively smaller race and ethnic groups, overcoming the limitations of survey data or administrative records used separately. Through the use of confidential IRS tax data and U.S. Census race and ethnicity data, we have 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, that there are large differences in income shares across race and ethnic groups over this time 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 towards the end of our time period. Blacks, Hispanics, and American Indians tend to be clustered at the low end of the income distribution across all years, while the 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. While there were some differences across race and ethnic groups in intensity, this pattern held for each group. Additionally, we find that for most groups, the log 90th/50th ratio increased over time, and to a lesser extent for many groups the log 50th/10th ratio also increased. This was especially pronounced for Whites. This suggests that the upper half of the income distribution for all race and ethnic groups is becoming less equal, as is the lower half, but to a lesser extent for many non-White groups.

Using several different measures, we calculate income mobility across race and ethnic groups in the U.S. Our findings indicate that there is 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 indicates that there is 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 race and ethnic groups with generally high levels of income also tend to have the highest measures of inequality and within-group immobility. While our analysis does not allow us to determine if there is a causal relationship, individual fixed-effects analysis show that these results hold up even when controlling over time for unobserved individual characteristics. The basic facts that high-income groups are less mobile and more unequal will be useful in thinking about how to alleviate persistent poverty in certain race 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, there has been a marked increase in the log 90th/50th income ratio and little change in the log 50th/10th income ratio. The overall Gini increases seen for each group reflect heterogeneous changes when considering the upper and lower part of each within-group income distribution.

Our results tell the following story about income inequality and mobility by race 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 when looking at within-group measures. Third, while within-group measures for lower-income groups, such as Black, Hispanic, American Indian, and Pacific Islander, indicate lower within-group inequality, this is more due to individuals being clustered at the low end of the overall

income distribution. Finally, when looking at this overall distribution, low-income groups start the period with high levels of immobility; higher-income groups, however, eventually catch up in this measure. 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. These results suggest that race and ethnicity continue to play a central role in explaining the persistence of inequality and income immobility.

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## A Appendix

Table A1: Income shares by race and ethnic group, 2000 to 2014

<b>Panel A: Population share of race or ethnic group</b>							
Year	White	Hispanic	Black	AIAN	Asian	NHPI	Other
2000	75.13%	9.61%	9.72%	0.84%	4.37%	0.17%	0.18%
2001	74.70%	9.91%	9.73%	0.84%	4.47%	0.17%	0.18%
2002	74.26%	10.21%	9.73%	0.84%	4.59%	0.17%	0.18%
2003	73.85%	10.46%	9.76%	0.84%	4.72%	0.18%	0.19%
2004	73.41%	10.69%	9.84%	0.84%	4.84%	0.18%	0.19%
2005	73.18%	10.73%	9.90%	0.87%	4.94%	0.19%	0.19%
2006	72.72%	11.03%	9.94%	0.90%	5.03%	0.19%	0.20%
2007	72.33%	11.95%	9.47%	1.29%	4.59%	0.21%	0.16%
2008	71.63%	11.53%	10.20%	0.92%	5.31%	0.20%	0.20%
2009	71.18%	11.76%	10.25%	0.90%	5.49%	0.21%	0.21%
2010	70.66%	12.02%	10.45%	0.90%	5.55%	0.21%	0.22%
2011	70.40%	12.19%	10.52%	0.91%	5.55%	0.21%	0.22%
2012	70.32%	12.27%	10.47%	0.89%	5.62%	0.22%	0.22%
2013	69.94%	12.47%	10.59%	0.87%	5.68%	0.22%	0.23%
2014	69.48%	12.79%	10.67%	0.85%	5.74%	0.22%	0.23%

<b>Panel B: Income Share for Top 10 Percent</b>								
Year	Overall Total	As a Percent of Row Total						
		White	Hispanic	Black	AIAN	Asian	NHPI	Other
2000	40.79%	89.73%	2.46%	2.11%	0.25%	5.26%	0.07%	0.13%
2001	37.46%	88.94%	2.79%	2.49%	0.27%	5.30%	0.06%	0.14%
2002	36.22%	88.43%	2.98%	2.79%	0.29%	5.29%	0.07%	0.14%
2003	36.70%	88.24%	3.03%	2.81%	0.30%	5.41%	0.07%	0.14%
2004	38.62%	88.39%	3.06%	2.62%	0.29%	5.42%	0.07%	0.15%
2005	40.55%	88.34%	3.20%	2.39%	0.30%	5.55%	0.07%	0.15%
2006	41.30%	88.21%	3.20%	2.34%	0.30%	5.73%	0.07%	0.15%
2007	42.14%	87.71%	3.23%	2.39%	0.30%	6.13%	0.07%	0.16%
2008	39.00%	86.42%	3.55%	2.78%	0.34%	6.65%	0.08%	0.17%
2009	36.90%	84.97%	3.85%	3.26%	0.35%	7.30%	0.08%	0.19%
2010	38.22%	84.96%	3.79%	3.15%	0.34%	7.49%	0.08%	0.19%
2011	38.52%	84.70%	3.87%	3.04%	0.34%	7.78%	0.08%	0.19%
2012	40.61%	85.02%	3.84%	2.77%	0.33%	7.76%	0.08%	0.20%
2013	39.05%	84.20%	4.06%	2.91%	0.33%	8.21%	0.08%	0.20%
2014	40.31%	84.13%	4.10%	2.76%	0.33%	8.40%	0.08%	0.20%

Table A1

**Panel C: Income Share for Top 1 Percent**

Year	Overall Total	As a Percent of Row Total						
		White	Hispanic	Black	AIAN	Asian	NHPI	Other
Year	Overall Total	White	Hispanic	Black	AIAN	Asian	NHPI	Other
2000	17.87%	92.10%	1.88%	0.97%	0.19%	4.67%	0.06%	0.13%
2001	14.53%	92.09%	2.15%	1.19%	0.20%	4.19%	0.05%	0.14%
2002	13.31%	91.88%	2.27%	1.31%	0.21%	4.15%	0.05%	0.14%
2003	13.76%	91.80%	2.22%	1.25%	0.21%	4.34%	0.05%	0.14%
2004	15.65%	91.95%	2.22%	1.16%	0.21%	4.25%	0.05%	0.15%
2005	17.45%	91.72%	2.45%	1.05%	0.22%	4.36%	0.05%	0.14%
2006	18.04%	91.78%	2.41%	1.04%	0.22%	4.33%	0.06%	0.15%
2007	18.45%	91.30%	2.40%	1.06%	0.22%	4.81%	0.05%	0.16%
2008	15.61%	90.32%	2.68%	1.26%	0.27%	5.23%	0.07%	0.17%
2009	13.28%	88.67%	2.99%	1.64%	0.28%	6.15%	0.06%	0.21%
2010	14.60%	88.69%	2.85%	1.58%	0.26%	6.37%	0.05%	0.19%
2011	14.57%	88.47%	2.95%	1.44%	0.25%	6.64%	0.06%	0.20%
2012	16.80%	88.78%	2.92%	1.31%	0.25%	6.48%	0.05%	0.20%
2013	14.79%	87.94%	3.11%	1.48%	0.25%	6.96%	0.05%	0.20%
2014	16.01%	87.83%	3.13%	1.39%	0.25%	7.16%	0.05%	0.19%

**Panel B: Income Share for Top 0.1 Percent**

Year	Overall Total	As a Percent of Row Total						
		White	Hispanic	Black	AIAN	Asian	NHPI	Other
2000	8.85%	92.53%	1.65%	0.95%	0.16%	4.54%	0.06%	0.12%
2001	6.62%	92.78%	1.93%	1.28%	0.15%	3.68%	0.04%	0.14%
2002	5.83%	92.79%	2.01%	1.40%	0.16%	3.45%	0.05%	0.14%
2003	6.15%	92.88%	1.84%	1.31%	0.15%	3.63%	0.05%	0.13%
2004	7.34%	93.02%	1.91%	1.14%	0.16%	3.55%	0.06%	0.16%
2005	8.43%	92.61%	2.21%	0.98%	0.18%	3.83%	0.05%	0.14%
2006	8.73%	92.83%	2.10%	1.01%	0.17%	3.67%	0.06%	0.15%
2007	8.98%	92.32%	2.07%	0.99%	0.17%	4.23%	0.05%	0.18%
2008	7.32%	91.48%	2.34%	1.21%	0.24%	4.45%	0.07%	0.19%
2009	5.82%	89.67%	2.72%	1.78%	0.26%	5.25%	0.05%	0.27%
2010	6.73%	89.85%	2.52%	1.68%	0.23%	5.45%	0.05%	0.22%
2011	6.59%	89.66%	2.61%	1.40%	0.22%	5.83%	0.05%	0.22%
2012	8.01%	89.76%	2.61%	1.28%	0.23%	5.85%	0.04%	0.23%
2013	6.60%	89.14%	2.77%	1.48%	0.22%	6.13%	0.04%	0.22%
2014	7.35%	89.10%	2.75%	1.37%	0.21%	6.35%	0.04%	0.18%

**Panel D: Income Share for Bottom 10 Percent**

Year	Overall Total	As a Percent of Row Total						
		White	Hispanic	Black	AIAN	Asian	NHPI	Other
2000	1.18%	54.85%	19.57%	18.20%	1.56%	5.32%	0.23%	0.27%
2001	1.24%	55.04%	19.63%	17.85%	1.54%	5.43%	0.24%	0.27%
2002	1.24%	55.47%	19.41%	17.48%	1.50%	5.62%	0.24%	0.28%
2003	1.20%	55.46%	19.35%	17.38%	1.48%	5.81%	0.25%	0.28%
2004	1.14%	55.07%	19.36%	17.69%	1.49%	5.86%	0.25%	0.28%

Table A1

2005	1.09%	54.46%	19.49%	18.09%	1.48%	5.93%	0.25%	0.29%
2006	1.04%	53.99%	19.62%	18.37%	1.47%	6.00%	0.26%	0.29%
2007	0.61%	54.77%	19.00%	18.20%	1.56%	5.91%	0.26%	0.30%
2008	1.02%	53.73%	19.83%	18.25%	1.43%	6.19%	0.27%	0.30%
2009	1.07%	53.53%	20.38%	17.84%	1.40%	6.27%	0.27%	0.31%
2010	1.08%	52.69%	20.26%	18.92%	1.39%	6.15%	0.28%	0.31%
2011	1.02%	52.49%	20.12%	19.42%	1.39%	5.98%	0.29%	0.31%
2012	1.01%	51.94%	20.22%	20.00%	1.38%	5.86%	0.29%	0.32%
2013	1.02%	51.26%	20.29%	20.76%	1.38%	5.68%	0.30%	0.32%
2014	0.98%	50.69%	20.34%	21.43%	1.39%	5.53%	0.30%	0.32%

**Panel B: Income Share for Bottom 1 Percent**

Year	Overall Total	As a Percent of Row Total						
		White	Hispanic	Black	AIAN	Asian	NHPI	Other
2000	0.02%	59.97%	12.87%	19.44%	2.00%	5.20%	0.24%	0.27%
2001	0.02%	61.43%	12.58%	18.52%	1.88%	5.06%	0.24%	0.26%
2002	0.01%	63.81%	11.86%	16.91%	1.85%	5.08%	0.23%	0.26%
2003	0.01%	64.90%	11.65%	15.85%	1.82%	5.30%	0.25%	0.27%
2004	0.01%	65.36%	11.54%	15.39%	1.83%	5.40%	0.23%	0.27%
2005	0.01%	65.28%	11.76%	15.27%	1.86%	5.29%	0.25%	0.29%
2006	0.01%	67.19%	11.46%	13.82%	1.76%	5.32%	0.24%	0.29%
2007								
2008	0.00%	68.10%	11.23%	12.93%	1.55%	5.55%	0.24%	0.28%
2009	0.00%	68.87%	10.91%	12.37%	1.53%	5.88%	0.24%	0.27%
2010	0.01%	68.77%	10.47%	12.93%	1.56%	5.64%	0.24%	0.28%
2011	0.00%	68.37%	10.77%	13.38%	1.38%	5.64%	0.23%	0.30%
2012	0.01%	67.81%	11.19%	13.35%	1.54%	5.53%	0.24%	0.27%
2013	0.01%	66.93%	11.65%	13.92%	1.59%	5.35%	0.24%	0.30%
2014	0.00%	66.60%	11.87%	13.99%	1.50%	5.44%	0.24%	0.30%

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