Finance and Economics Discussion Series

Federal Reserve Board, Washington, D.C.
ISSN 1936-2854 (Print)
ISSN 2767-3898 (Online)

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2025-039

Please cite this paper as:
Troland, Erin, Isabella Agnes, Ellie Dries, Jessica Liu, Zofsha Merchant, Fatimah Shaalan, Michelle Tran, Anna Tranfaglia, and Douglas Webber (2025). "Suitability of a County-Level Income Definition for Analysis of Lower-Income Communities," Finance and Economics Discussion Series 2025-039. Washington: Board of Governors of the Federal Reserve System, https://doi.org/10.17016/FEDS.2025.039.

Suitability of a County-Level Income Definition for Analysis of Lower-Income Communities

Erin Troland, Isabella Agnes, Ellie Dries, Jessica Liu, Zofsha Merchant, Fatimah Shaalan, Michelle Tran, Anna Tranfaglia, and Douglas Webber*

Abstract

This paper examines the costs and benefits of using a straightforward county-level income definition in the classification and study of lower-income communities. A definition based on population-weighted distribution of county-level median household incomes does a good job of identifying the most economically disadvantaged communities across a wide range of indicators. We show robustness to the use of different thresholds, levels of geography, and cost-of-living adjustments.

1. Introduction

Economic conditions vary widely across communities in the United States. For instance, incomes for the median household range from around $46,000 per year in Mississippi to $87,000 per year in Maryland.[1] Housing markets, labor markets, and even the availability of goods and services vary locally. As a result, the economic experiences and opportunities of Americans vary not only family to family, but place to place. Consequently, people living in lower income places face different economic circumstances and opportunities.

However, data availability may limit analyses of economic conditions across geography, with many datasets unavailable at finer geographies or at higher frequencies. Moreover, cost-of-living, which varies substantially across communities, may be difficult to account for at finer geographies. In addition, many income definitions are complex, which may suit their original purpose, but such complexity may not be necessary to examine differences in economic conditions across communities and over time.

In this paper, we demonstrate the usefulness of a simple, county-level income definition using publicly available data for a variety of economic indicators. We show how well the definition captures communities that are struggling more versus less by examining different economic indicators across lower- versus higher-income counties according to the definition. Economic indicators come from the American Community Survey and the NY Fed / Equifax Consumer Credit Panel (CCP). We then analyze how both the choice of county and the use of income versus adjusting for cost-of-living affects the definition's ability to identify disadvantaged communities.

We find that the simple, population weighted, county-level income definition succeeds at capturing communities that are more versus less economically disadvantaged. Lower-income counties have higher unemployment, lower shares of college educated residents, and lower credit

*The findings and conclusions in this paper are those of the authors and do not represent those of the Federal Reserve Board. We thank Curie Chang, Kimberly Kreiss, Jacob Lockwood, Andrew Nguyen, and Joseph Peterson for their contributions to this paper.

[1] https://www.census.gov/library/visualizations/interactive/2019-median-household-income.html

scores than higher income counties. Though using finer geographies generally captures wider differences across communities, broad conclusions are similar regardless of the geographic unit of analysis. Counties are a reasonable "middle ground" between census tracts, which approximate neighborhoods, and commuting zones, which approximate labor markets. One exception to this finding is the homeownership rate, which does not vary systematically by county income level, but does vary widely by census tract. As a result, researchers should exercise caution when using county-level housing data to examine differences by county income.

We then examine whether adjusting for cost-of-living improves the definition's ability to identify communities with more versus less economic disadvantage. Applying a standard price adjustment, the Bureau of Economic Analysis Regional Price Parities (RPP), we find the adjustment did not produce places with substantially more economic challenges compared to results with no income adjustment. In other words, the adjustment does not substantially improve the definition's ability to classify lower-income areas.

Finally, we present an application of the income definition to analyze the effects of the COVID-19 pandemic across lower- versus higher-income counties. Typically, measures of financial distress increase during a recession, and more so for people living in lower-income households (Boushay, Nunn, O'Donnell, & Shambaugh, 2019). Though many experienced financial distress during the pandemic, government assistance programs like stimulus checks and unemployment benefits frequently provided relief from such distress, including for people in lower-income communities. Using this relatively county-level simple definition, we use data from the NY Fed / Equifax Consumer Credit Panel (CCP) and find that people living both lower- and higher-income counties saw improvements in measures of financial distress, but those in lower-income counties saw smaller such improvements. Moreover, despite these improvements, people living in lower-income counties continued to have higher levels of financial distress before and after the COVID recession.

2. Background and Literature

2.1 Use and Variety of Income Definitions

There is no single established way to measure lower-income people and places. Different definitions exist due to differences in purpose and differences in academic thought about how best to define lower income. In this section we summarize other income definitions and compare them to the simple county-level definition explored in this paper. The goal of this paper's income definition is to analyze differences in economic indicators across counties and over time.

Income definitions exist for different purposes and goals with varying levels of complexity. While many exist to identify people in lower-income households, this paper focuses on identifying lower-income places. Other definitions that focus on place include those that target lower-income places for public assistance. For example, Opportunity Zones is a federal tax incentive created by the Tax Cuts and Jobs Act (2017) to increase investment in lower income and undercapitalized communities.[2] Eligible lower income census tracts must satisfy any one of

[2] https://www.irs.gov/credits-deductions/businesses/opportunity-zones

three conditions, including a poverty rate of 20 percent or higher.[3] Yet another set of lower-income definitions exist to enforce federal bank regulations at the neighborhood level. The Community Reinvestment Act (CRA)'s purpose is to determine if banks are meeting the credit needs of their communities, including low- and moderate-income communities. CRA examiners compare lending at the neighborhood-level for mortgages and small-business among banks in the same region over several years. Low-income people are defined as individuals with income less than 50 percent of the area median family income. Low-income places are defined as census tracts where the median family income is less than 50 percent of the area median income. The Federal Housing Finance Agency (FHFA)'s Affordable Housing Goals have a similar focus as CRA: encouraging lending to lower-income people and places. As a result, the FHFA's definition is similar CRA's definition.[4] Both programs use a relative measure of neighborhood (tract) income compared to income at the market level (area median income) to encourage lending activity in communities within a given market (in a way, like a market fixed effect). This relative approach makes sense to account for market-level factors that all lenders within a given area face. In contrast, the more straightforward income definition in this paper uses an absolute definition of lower-income, focusing on all lower-income counties nationwide, independent of their income relative to neighboring counties (see Section 4.2 for a discussion of adjusting for cost-of-living).

Finally, aside from government-based income definitions, researchers often use an alternative definition known as the concentrated poverty rate (Iceland & Hernandez, 2017; Bisha, 2014; Erikson, Reid, Nelson, O'Shaughnessy, & Berube, 2008). The concentrated poverty rate measures the share of low-income residents living in extremely lower-income neighborhoods. Concentrated poverty neighborhoods are defined as census tracts with 40 percent or more of the population living below the federal poverty line. This definition is used mainly in the study of highly segregated poverty. Researchers study these lower income geographies as they represent places with a disproportionate share of people receiving social safety net benefits. Indirectly, concentrated poverty areas are closely tied to federal programs in that they identify communities with high take-up rates.

The simple county-level income definition analyzed in this paper is most like the definitions used in both the Economic Tracker from Opportunity Insights and the Equitable Growth Indicators from the Federal Reserve Bank of New York. Both initiatives provide timely analysis of economic indicators beyond a single national aggregate. Like the income definition in this paper,

[3] The other two conditions are: For tracts in metropolitan areas, a median family income that is 80% or lower than the state-wide or MSA median family income, whichever is higher; for tracts in non-MSA portions of states, a median family income that is 80% or lower than the state-wide median family income.

[4] FHFA defines lower-income areas as census tracts or blocks in which the median family income does not exceed 80 percent of area median income (AMI). "Low-income" families have income no greater than 80 percent of AMI and "very low-income" families have income no greater than 50 percent of AMI. Unique to the housing goals, the definition of families in lower-income areas also includes (a) families with income not greater than 100 percent of AMI who reside in minority census tracts (tracts with 30% or greater minority residents AND a median income below 100% of AMI), and (b) families with income not greater than 100 percent of AMI who reside in designated disaster areas.

the Economic Tracker and the Equitable Growth Indicators define lower income geographies as the bottom quartile of median household income at either county or zip-code level.[5]

2.2 Adjustments for Cost-of-Living in Place-Based Income Definitions

An active academic debate exists about whether cost-of-living adjustments should be included in government income definitions such as poverty measures. Cost-of-living adjustments typically define a fixed "bundle" of goods and services, then adjust based on how much that bundle costs across different areas. Incomes for people and/or places are then adjusted such that a cost-of-living-adjusted dollar buys the same amount of goods and services regardless of location. Adjustments for cost-of-living typically lower the income of people living in higher-cost areas and raise income for people living in lower-cost areas.

Some argue against using cost-of-living adjustments because they are an incomplete measure of overall well-being differences across geographies. Some of these differences in costs, including housing costs, may reflect higher demand for a certain area. For example, some areas may have better amenities such as more employment opportunities or better environmental quality (Roback, 1982). Therefore, some argue that the goal of cost-of-living adjustments should be to equalize well-being across place (the standard Rosen-Roback model) and that available data make such a calculation difficult. It can be hard to define the same bundle of goods and services when amenities vary across place, particularly when it comes to housing. For example, a family living in a one-bedroom apartment in an area relatively free of pollution may be paying more than a family living in an identical apartment in a polluted area. However, despite a higher cost-of-living, the family in less polluted area may be better off due to a higher "amenity value." Overall, it is difficult to measure such amenity values in a systematic way. With an adjustment for cost-of-living, locations with "high amenity value," which includes environmental quality, may be categorized as lower-income, even if people living in these areas have higher well-being than more affordable areas. Furthermore, recent research suggests that using such price adjustments for identifying households living in poverty may select a less disadvantaged group than not adjusting for price (Meyer, Wu, & Curran, 2021).

On the other hand, others argue for a cost-of-living adjustment because the results in the standard Rosen-Roback model may not hold as much for lower-income households. Arguments against price adjustment rest on the assumption that people are mobile, and people living in lower-income households are less able to move. Other recent research suggests that the standard model of cost-of-living across space is less applicable for households with lower levels of education, which tend to be lower-income. Households with lower levels of education lose more purchasing power when moving to a high-cost area than households with higher levels of education (Diamond & Moretti, 2021).

[5] The place-based lower-income definition for Opportunity Insights is population weighted, similar to the income definition in this paper. The place-based definition for the Equitable Growth Indicators defines lower-income counties as those with median household incomes below the 25th percentile of national household income. For Opportunity Insights, lower income is consistently defined as the bottom quartile. However, the 'lower-income' label used by Opportunity Insights identifies households, individuals, workers, or different geographies depending on the data source.

3. **Construction and Validation of the County-Level Income Definition**

3.1 Construction of the Income Definition

We allow the composition of county income groups to change annually to capture economic conditions in lower versus higher income counties in a given year. To rank counties by income in each year, we take annual county-level median household incomes from two sources: Small Area Income and Poverty Estimates (SAIPE) for 2000 to 2008, and American Community Survey (ACS) 5-year estimates for 2009 to the present.[6] For years that do not yet have ACS 5-year estimates available, we use the most recent available ACS 5-year data. Income groups are relatively stable year-to-year, but their composition changes more over longer time spans. Around 93 percent of counties (containing 94 percent of population) are in the same income group one year prior compared to around 85 percent of counties (88 percent of population) that are in the same income group five years prior.

Next, we set the size of our income groups with population weights to account for the vast differences in population across counties. Unlike census tracts, which contain roughly the same number of people, county populations vary widely.[7] In each year from 2000 to the present, we define our county income groups such that 25 percent of the population lives in "Bottom Income Quartile", 25 percent live in "Second Income Quartile", and the remaining 50 percent live in the "Top Half." We split the bottom half of the population into two income groups to better analyze conditions within lower-income communities. We use county-level population estimates from the intercensal population estimates program for 2000 to 2008, and we use ACS 5-year population estimates for 2009 onward.

To carry out this population weighting, we rank the county-level median household incomes from smallest to largest in each year. Then, starting from the lowest income county, we add counties to the lower-income group up to 25 percent of the population and classify them as the Bottom Income Quartile. We repeat this procedure for the Second Income Quartile, then the remaining counties are in the Top Half. This results in an income group classification for each county in each year.

Figure 1 shows that using the income definition in 2019 shows that 25 percent is a reasonable population threshold for Bottom Income counties. The figure shows how the unemployment rate of the Bottom Income Group would vary across different population thresholds, including our preferred threshold of 25 percent. Each x-axis bin represents a population-weighted county income threshold split into vigintile bins. The bars show the 2019 unemployment rate for counties within each bin, and the line shows the cumulative unemployment rate for all counties

[6] Though SAIPE continues to provide county-level median household income estimates after 2008, we switch to ACS 5-year estimates when they first become available in 2009 because they offer both county-level and census tract-level estimates of median household income. Though cost of living varies substantially across the country, we do not adjust for cost of living as it makes little difference in our economic indicators across the county groups. See Section 4(ii) (b) for more details.

[7] Counties range from less than a hundred people to over ten million people (a difference of five orders of magnitude), while census tracts contain population of the same order of magnitude in the thousands (1,200 to 8,000 people) https://www.census.gov/library/stories/2017/10/big-and-small-counties.html.

at or below a given income bin. Both series show an inflection point around 25 percent. This result suggests that raising the threshold beyond 25 percent would not lead to much additional separation between the Bottom and Second groups, representing a reasonable balance between size and ability to capture meaningful economic differences across counties.[8]

Figure 2 and Table 1 shows the county group income thresholds that result from the income definition applied to data from the 2019 5-Year American Community Survey. For that year, Bottom Income Quartile counties are those with median household incomes around $53,000 or less, Second Income Quartile counties are above Bottom Income Quartile and up to around $62,000, and Top Half counties are above the Second Income Quartile. Because they contain the tails of the distribution, the Bottom Quartile and Top Half groups have a wider range of county incomes than the Second Quartile group, as shown in Figure 1 and Table 1.

3.2 Income Data Sources

We combine county-level median income estimates from two data sources to define annual income groups: Small Area Income and Poverty Estimates (SAIPE) for 2000 to 2008, and the 5-year American Community Survey (ACS) for 2009 onward. Before 2009, SAIPE is the only source that provides annual median income estimates for all U.S. counties. However, we switch to the 5-year ACS after data become available for the year 2009 onward because it also offers annual tract-level median income estimates. This allows us to construct annual tract income groups for robustness checks from 2009 to the present in addition to our annual county income groups.

Since the SAIPE provide single-year estimates while the 5-year ACS includes data collected over rolling five-year periods, our income groups are mechanically more stable year-to-year after switching to the 5-year ACS in 2009. This is because for any adjacent pair of 5-year ACS releases, such as the 2015–2019 5-year ACS and the 2016–2020 5-year ACS, four of the five years included in each release overlap. However, when comparing five years apart to avoid overlapping data (such as the 2011–2015 5-year ACS and the 2016–2020 5-year ACS), income groups are no more stable when defined using the 5-year ACS than they are when defined using SAIPE. In addition, around 90 percent of people in a given year are assigned to the same income group regardless of whether we use the 5-year ACS or SAIPE.

For these reasons, we use the 5-year ACS when it is available instead of SAIPE. However, we also create an alternate county income group definition using SAIPE in all years so we can perform robustness checks to ensure that our data source switch does not cause changes in results around 2009.

[8] There remains, however, a material distinction between the bottom 10 percent of counties and the bottom 25 percent of counties in the county income distribution. For some analyses we expect to focus on this lower income group as well.

3.3 County Income Group Characteristics and Definition Validation

3.3(a) Geographic and Demographic Characteristics of County Income Groups

Bottom Quartile, Second Quartile, and Top Half counties differ along a number of geographic and demographic dimensions. In this section, we focus on the pre-pandemic distributions based on the 2015–2019 ACS. Figure 3 shows the locations of the counties in each income group using the income definition. Within Census regions, the South has the highest proportion of people living in Bottom Quartile counties (38 percent) while the West has the lowest proportion (9 percent), closely matched by the Northeast (12 percent). Arkansas is the state with the highest share of people living in Bottom Quartile counties.[9] Several states, mostly in the Northeast, have no Bottom Quartile counties: Connecticut, Delaware, Hawaii, Massachusetts, New Jersey, Rhode Island.

Figure 4 shows that Bottom Quartile counties are less urban (and therefore less densely populated) than Second Quartile and Top Half counties. Around two thirds of the population in Bottom Quartile counties live in metro areas compared to 87 percent in Second Quartile counties and 97 percent in Top Half counties. Since Bottom Quartile counties frequently have smaller populations, the percent of counties that are in the Bottom Quartile (55 percent) is larger than the percent of the population that lives in these counties (25 percent).[10]

Note that while the Top Half population is almost entirely in metro areas, only slightly more than half (56 percent) of the total metro population is in Top Half counties compared to the Top Half's share of the overall population (50 percent). Second Income Quartile counties have 25 percent of the metro population, equaling their overall population share. Bottom Income Quartile counties have 18 percent of the metro population, somewhat below their overall population share of 25 percent.

Figure 4 shows that Bottom Quartile counties have similar shares of people aged 65 and older and people identifying as a racial/ethnic minority as Second Quartile and Top Half counties. However, differences across county groups emerge when looking at specific minority groups. A larger share of those living in Bottom Quartile counties identify as non-Hispanic Black (16 percent) than in Second Quartile (13 percent) or Top Half counties (10 percent). In contrast, the opposite pattern emerges for people who identify as non-Hispanic Asian: a smaller share of those living in Bottom Quartile identify as non-Hispanic Asian (2 percent) than Second Quartile (3 percent) and Top Half counties (8 percent). Similar shares of people in each county income group are of Hispanic ethnicity – just under 20 percent.[11]

[9] All of Puerto Rico's municipalities are, however, classified as Bottom Quartile.

[10] As described in the previous section, the percent of the population living in Bottom Quartile counties (25 percent) is pre-determined and the number of counties in each group is a function of how many counties it takes to achieve the pre-determined percent of population in each group.

[11] These similarities in Hispanic population share across county income groups are driven by within county-variation in Hispanic population shares. See Section 4(i).

3.3(b) Income Definition Validation: Correlation with Measures of Economic Well-being

Across a range of measures, economic well-being is lower in Bottom Quartile counties in 2015–2019 using 2019 5-Year American Community Survey data, which demonstrates that our definition successfully captures areas with higher shares of people with economic challenges. Measures of economic success (distress) generally increase (decrease) going from Bottom Quartile to Second Quartile and Top Half county groups. Figure 5 shows how, as county income increases, the share of the population over 25 with a college degree increases and the unemployment rate decreases as income increases. Level differences across Bottom Quartile and Top Half groups in the share with a college degree are largest among these three measures. A key exception to this pattern is the homeownership rate, which is relatively stable across income groups in 2015 - 2019 (though the pattern does not reverse). One reason for this result is variation in homeownership at the neighborhood level that is more difficult to capture at the county level (See Section 4(i) for more details).[12]

Figure 6 shows similar patterns for measures of access to credit in 2019 using the NY Fed/Equifax Consumer Credit Panel.[13] For example, average credit score (measured by Equifax Risk Score, a proprietary credit score similar to other credit scores used in the industry), increases from 683 in Bottom Quartile counties to 699 in Second Quartile and 717 in Top Half counties. The percent of accounts without a credit score increases as income increases across counties, and those without a credit score may have difficulty accessing credit. Measures of financial instability decline as income rises across 2019 county income groups (Figure 7): the percent of credit card holders with credit card delinquency, the percent of credit card holders with high credit utilization, and the percent of consumers in the credit data with third party collections are higher for Bottom Quartile counties and lower for Second Quartile and Top Half counties.[14]

Finally, Table 4 shows that self-reported financial well-being is also lower in Bottom Quartile and Second Quartile counties compared to Top Half counties in 2019 using data from the Survey of Household Economics and Decisionmaking (SHED). Respondents were given the choice of answering that they were living comfortably, doing okay, just getting by, and finding it difficult to get by. The share of people who are not living comfortably or doing okay financially is 29 percent in Bottom Quartile counties compared to 27 percent in Second Quartile and 21 percent in Top Half counties.

4. Sensitivity of Definition to Geographic Unit of Analysis and Cost-of-Living

[12] While these data come from the most recent business cycle peak (2019Q4), similar patterns emerge across county groups when looking at the business cycle trough in the Great Recession (2009 Q2).
[13] Data on credit outcomes in this paper comes from the NY Fed / Equifax Consumer Credit Panel (CCP). The CCP is a representative anonymous random 5 percent national sample from one of the three major credit bureaus of individuals with a Social Security number and credit report. It includes quarterly observations of where the individual lives, their credit score, and other key credit aspects of their credit history such as bankruptcies and debt. No data on race are obtained from the CCP. For more information on the data, see Lee & van der Kaauw (2010).
[14] These outcomes are measured at a business cycle peak, 2019Q4. See Appendix for graphs showing the same credit outcomes for 2009 Q2, a business cycle trough.

4.1 County as Geographic Unit of Analysis

We analyze other geographic units of analysis for outcomes that are available at other levels of geography.[15] One concern with using county is that it may not capture meaningful differences in certain outcomes that may vary at smaller levels of geography, such as neighborhoods. Another related concern is that using county may tend to capture more low-income rural areas than low-income metro areas. Low-income neighborhoods in high-income metro areas would be defined as being in higher-income counties. [16]

To explore this further, we calculate the income definition for larger geographic areas (commuting zones) and smaller geographic areas (census tracts) in using the income definition in 2019.[17] Commuting zones are larger areas of linked economic activity, such as a greater metro area. Commuting zones are made up of counties. Using commuting zones helps with analyses of economic activities that vary at a larger geography than county. For example, the Washington, D.C. area has multiple counties with interconnected economic activity. Census tracts can be thought of as neighborhoods. Census tracts are subdivisions of counties and contain about 4,000 people, with a minimum of 1,200 people and a maximum of 8,000 people. Using census tracts helps address the fact that some economic activity varies at a smaller geography than county. For example, within a single county in the Washington, D.C. area, economic activity can vary widely by neighborhood.

We find that economic disparities that exist at the county level also generally exist at smaller geographies (census tracts) and larger geographies (commuting zones). As a result, broad conclusions we would draw from our analysis are similar regardless of the geographic unit of analysis. For a variety of economic outcomes, we generally find that using counties is a "middle ground" between commuting zones and census tracts. When using census tracts, economic disparities are generally larger than when using counties. When using commuting zones, economic disparities are generally smaller than when using counties.

We see this broad pattern of decreasing geography size and increasing disparities across a variety of economic outcomes using data from the 2019 5-year ACS, covering years 2015 - 2019. In general, the gaps between the bars in Figure 10, Figure 11, and Figure 12 across income groups within geography increase as the size of the geography decreases. For example, Figure 10 panel (a) shows that differences between the Bottom Quartile and the Top Half in the percent of the population 25 and older with at least a college degree are larger for tract than for county (the slope of the bars is steeper for tract). However, such differences still exist using county, and the broad conclusion that educational attainment increases as income group increases is the same across all three geographies. Figure 10 panel (b) shows similar conclusions for unemployment rates in 2015–2019, as does Figure 11 and Figure 12 for measures of access to credit and

[15] Data from credit reports from the NY Fed/Equifax Consumer Credit Panel are available at the tract level on a quarterly basis. Data from the American Community Survey is available at the tract level, but as part of the 5-Year data release, meaning tract-level data are an average of the past 5 years.

[16] This concern arises because of the way income has come to be concentrated differently in urban compared to rural areas in the United States. It is not a mechanical relationship that arises automatically from using county as the unit of analysis.

[17] Income data for census tracts comes from Census and for commuting zones is constructed from Ruggles, et al (2023) and Missouri Census Data Center (2023).

financial distress in 2019 from the NY Fed/Equifax Consumer Credit Panel. Therefore, these results suggest that using county will allow for meaningful analysis of differences in economic success across place.

Homeownership is one key exception to this pattern of separation that increases as the geographic unit decreases. Figure 10 panel (c) shows little separation in homeownership rates between income groups for counties. However, this finding should not be interpreted as showing that geographic differences in homeownership rates by income do not exist. Rather, policies that drove differences in homeownership rates between areas of different income levels such as racial residential segregation had more localized (neighborhood-level) effects than can be observed at the county or commuting zone level. They exist, but at a smaller level of geography. When looking across larger areas like counties, differences across neighborhoods are averaged together, and differences across these larger geographies are muted. This pattern is evident in Figure 10 panel (c) comparing the large differences in homeownership rates using tract-level income to the small differences for county- or commuting zone-level income. Therefore, this analysis is suggestive of the limits of using counties as the unit of analysis for some types of questions.

Another related concern is that using county may capture more low-income rural areas than low-income metro areas. In many cases, low-income neighborhoods in high-income cities may be defined as being in higher-income counties. If this is the case, going from a county-level to a tract-level definition would shift some of the metro population in the Top Half to the lower-income groups.

However, analysis of economic outcomes and metro population shares shows this concern may not make a large difference in this context. Figure 10, Figure 11, and Figure 12 show that for most economic outcomes, we do not miss meaningful differences across income groups by using county. Moreover, Figure 13 panel (d) shows that the shift in metro population going from county to tract is largely between Second Income Quartile and Bottom Income Quartile counties, rather than between Top Half and Bottom/Second Income Quartile counties. Therefore, most of the metro population in lower-income tracts in higher income counties is not being classified as living in the Top Half. The Top Half share is nearly identical for all three geographies.[18]

Figure 13 panel (b) also shows that the county-level definition masks variation in Hispanic population shares compared to a tract-level definition. These patterns are driven by within-county variation in Hispanic population. Some populous Top Half counties have large Hispanic populations living in Bottom Quartile census tracts (largely in the West, e.g. Los Angeles County and Phoenix, AZ/Maricopa County). These Bottom Quartile tracts in Top Half counties have much higher Hispanic population shares than the Top Half county average (36 percent versus 19 percent). When moving from a county-level definition to a tract-level definition, these tracts move from the Top Half to the Bottom Quartile, pulling up the Hispanic population share in the

[18] While a tract-level definition makes the metro population shares closer to the overall population shares across income groups compared to a county-level definition, the differences are relatively small. For county, the metro population shares are 18 percent (Bottom), 25 percent (Second), and 56 percent (Top Half). For tract: 22 percent (Bottom), 23 percent (Second) and 55 percent (Top Half). For Commuting Zone: 18 percent (Bottom), 24 percent (Second) and 57 percent (Top).

Bottom Quartile and reducing the Hispanic population share in the Top Half. The reverse also plays a role: Top Half tracts with smaller Hispanic population shares in populous Bottom Quartile counties (largely Bronx County in New York City and Miami-Dade County). This within-county variation is an important consideration for analyses involving ethnicity.

Finally, the choice of geography also affects the distribution of income groups across regions in the United States compared to other units of geography. Broad geographic patterns are similar across geographic unit of analysis, but some key differences emerge. Figure 14 shows the distribution of income categories using the county-level income definition in 2019 across maps of the United States by unit of geographic analysis. All three maps show concentrations of Top Half areas in the Northeast and Bottom Quartile areas in the South. West Virginia and Mississippi are both in the top five states for Bottom Quartile population across all three geographies, as well as Puerto Rico. However, some differences emerge. Generally, as the geography size increases, the income definition begins to approximate a state-level definition. When using county and Commuting Zone, 6 states and 12 states do not have any Bottom Quartile areas, respectively. However, at the tract level, every state has a Bottom Quartile tract. In addition, going from tract to county to Commuting Zone, the share of the Bottom Quartile population in each Census Region shifts. The South has higher shares of the population in the Bottom Quartile and the Northeast has lower shares as the size of the geographic unit of analysis increases.

4.2 Adjustment for Cost-of-Living

Though the cost-of-living adjustment changes the group of counties that are classified in the Bottom Quartile, it has a limited effect on the economic circumstances of the people defined as living in these lower-income counties as the majority of the population in the Bottom Quartile is classified as Bottom Quartile regardless of the adjustment. We analyze how adding a standard price adjustment, the Bureau of Economic Analysis Regional Price Parities (RPP) from 2019, would change the economic and demographic characteristics of the county income groups using the 2019 5-Year American Community Survey. The Bureau of Economic Analysis (BEA) constructs estimates for each metropolitan statistical area (MSA). BEA estimates for non-MSA areas are based on the aggregate non-MSA area within each state. We apply the MSA-level estimates for counties within MSAs and the non-MSA state-level estimates for counties outside of MSAs. This analysis is like Meyer, Wu, and Curran (2021), except we use our place-based income definition instead of a people-based income definition. In general, the RPP adjusts incomes up for more affordable places and adjusts incomes down for higher cost areas.

In our case, the RPP adjustment does two things: (i) it changes the median income for each county from nominal to price-adjusted, and therefore changes the county income rankings from lowest to highest income and (ii) as a result of re-ranking counties, it changes the group of counties included in each category. The share of the population in Bottom Quartile, Second Quartile, and Top Half counties remains fixed at 25 percent, 25 percent, and 50 percent respectively.

We find that generally the RPP adjustment has little to no impact on measures of economic conditions in our income groups for 2015 - 2019. Figure 15 shows that regardless of the RPP adjustment, similar shares of the population across each county income group in 2015 - 2019

have a college degree, are unemployed, and own a home. Similarly, Figure 16 and Figure 17 show that adjusting for cost-of-living makes little difference across multiple measures of access to credit and financial distress from the NY Fed/Equifax Consumer Credit Panel at the peak of the last business cycle in 2019Q4. In the appendix, we also examine 2009 Q2, the previous business cycle trough, and find that the results are similar. However, some results may be more sensitive to the price adjustment and robustness checks are likely warranted depending on the use case.

The RPP adjustment has a limited effect on economic outcomes because a large share of people is defined as living in Bottom Quartile counties using the income definition from 2019 with and without the adjustment. Though nearly 400 counties change from Bottom Quartile to Second Quartile or Top Half, the share of people in these 400 counties is small. As a result, 80 percent of those defined as living in a Bottom Quartile county are considered Bottom Quartile regardless of the price adjustment. The reason that most people do not shift their county classification despite many counties shifting is because it is the less densely populated, more affordable areas of the country that become classified as Second Quartile or Top Half when the RPP adjustment is applied. Figure 19 shows that when using nominal income, 63 percent of the population in Bottom Quartile income counties live in metro areas. With the RPP adjustment, this metro population share increases to 72 percent.

This metro/non-metro pattern is also evident when comparing metro population shares and maps of the county groups with the nominal income to maps with the RPP adjustment (Figure 18 and Figure 19). The RPP adjustment increases the Bottom Quartile's share of the metro population from 63 to 72 percent and reduces the Top Half metro population from 97 to 93 percent. The Second Quartile metro population is unchanged. A larger share of the population in the Northeast, a more densely populated area, is defined as living in a Bottom Quartile county with the adjustment. With the 2019 income definition, the nominal definition has 12 percent of the population in the Northeast in the Bottom Quartile income group compared to 25 percent with the RPP adjustment. Accordingly, a smaller share of the population in the Midwest, a less densely populated area, is defined as living in a Bottom Quartile county with the RPP adjustment. The nominal definition has 27 percent of the Midwest population in the Bottom Quartile income county group compared to 19 percent with the RPP adjustment. Of the states that have no Bottom Quartile counties in our 2019 nominal county definition (CT, DE, HI, MA, NJ, and RI), just New Jersey adds five Bottom Quartile income counties with the cost-of-living adjustment.

Turning to demographics, the overall minority population share is modestly higher when adjusting for cost-of-living, largely driven by an increase in the Hispanic population. Similar shares of Black, Asian, and American Indian and Alaska Native (AIAN) people live in Bottom Quartile areas in 2015 - 2019 regardless of the cost-of-living adjustment (Figure 19, panel (a)). The population of people aged 65 and older in Bottom Quartile income counties in 2015 - 2019 is similar regardless of the cost-of-living adjustment.

Analyzing the counties that change income groups, counties that move down to the Bottom Quartile with the RPP adjustment are more likely to be urban, higher cost areas, and the counties that move up out of the Bottom Quartile are more likely to be rural, affordable areas. Table 5

shows that counties moving down to the Bottom Quartile have much higher shares of metro population, higher shares of population with college degrees, higher shares of minority population, and lower homeownership rates than counties that are always in the Bottom Quartile. These 50 counties moving down to the Bottom Quartile represent 5 percent of the total US population in 2019. In contrast, counties moving up out of the Bottom Quartile to the Second Quartile or Top Half have slightly lower metro population, similar populations with a college degree, much lower minority population share, and similar rates of homeownership as counties that are always in the Bottom Quartile. These nearly 400 counties also represent 5 percent of the total US population in 2019.

5. Application of Income Definition: COVID-19 Recession Response

To demonstrate an application of this income definition, we consider how those in higher- and lower-income counties fared through the COVID-19 recession. Typically, measures of financial distress increase during a recession, and more so for people living in lower-income households (Boushay, Nunn, O'Donnell, & Shambaugh, 2019). Though many experienced financial distress during the pandemic, government assistance programs like stimulus checks and unemployment benefits frequently provided relief from such distress, including for people in lower-income communities. We use the NY Fed / Equifax Consumer Credit Panel (CCP) to analyze individual-level data on financial distress from people's credit reports to understand how people living in lower-income communities have been affected by the COVID-19 recession and the subsequent recovery.

Policy responses to the COVID-19 recession, such as the Coronavirus Aid, Relief, and Economic Security (CARES) Act could have improved measures of financial distress on credit reports in two ways. The first is through direct payments to households, including stimulus checks and unemployment payments. These payments could have allowed households that lost income to keep making their debt payments and remain current on their credit accounts. They could have also reduced households' need to borrow to cover their expenses using credit cards. The second way is through debt accommodation policy, allowing households who could not make their payments to apply for accommodations that would prevent lenders from reporting their accounts as delinquent on their credit reports. In certain circumstances, lenders were required to report newly delinquent accounts as current.[19] As a result, for some data, the information lenders shared on credit reports changed. For the period studied in this analysis, CARES Acts protections were in place from January 31, 2020 to the last quarter of the analysis, 2022Q2.[20] But for other data, lenders would report the same information as before, such as measures of the dollar amount of debt for a given person.

[19] Whether borrowers took up these accommodations varied in large part by the level of federal involvement in each type of debt. Student loan forbearance for federally backed loans was automatic and universally applied. Mortgage forbearance was required for federally backed loans, but required borrowers to opt-in. For other types of debt, such as credit card and auto loans, accommodations were at the discretion of the lender and required borrowers to opt-in.
[20] CARES Act accommodations began to expire after the end of the national emergency declaration period, which ended on May 11, 2023. Accommodations applied retroactively to January 31, 2020 as the legislation was passed in March 2020. https://files.consumerfinance.gov/f/documents/cfpb_fcra_consumer-reporting-faqs-covid-19_2020-06.pdf
https://www.cdc.gov/coronavirus/2019-ncov/your-health/end-of-phe.html

The analysis shows that as expansive federal policies rolled out during the pandemic, credit card delinquencies declined for households in all three county income groups during the early portion of the pandemic. However, differences emerge for people living in lower- versus high-income counties. In panel (a) of Figure 8, Bottom and Second Income Quartile counties saw somewhat smaller improvements in the percent of credit card holders at least 30 days past due on their credit cards than Top Half counties. Moreover, through this period, it remained the case that the share of those with credit delinquencies were higher in the Bottom Quartile counties (Panel (b) of Figure 8).

Examining more closely the evolution of credit card delinquencies through the pandemic era, Figure 8 shows delinquencies initially spiked in the first quarter of 2020. But after the CARES Act passed in March 2020 (2020Q1), the percent of people with credit cards that were reported as delinquent declined across all three county groups for at least a year. Yet, the decline in delinquencies from 2019Q4–2021Q2 was smaller for Bottom Quartile Counties (8 percent) than Second Quartile (9 percent) and Top Half counties (12 percent).

Reported delinquencies then began to rise around 2021Q4 for all three income groups as expanded federal unemployment benefits expired and the effects of the first stimulus waned.[21] This increase in delinquencies was slightly faster among those in low-income areas. As a result, by 2022Q2, delinquencies in Bottom Quartile counties slightly exceeded their pre-pandemic rates while they remained slightly below pre-pandemic rates in higher-income counties. However, with this measure of financial distress, we cannot separately measure the impacts of the financial relief to households from debt accommodation policies.

Unlike reported delinquencies, credit utilization (Figure 9) would not be directly affected by the debt accommodation policies.[22] Credit utilization measures a person's total credit card debt outstanding as a percent of the total credit limit for all their credit cards. [23] A high credit utilization (over 75 percent) may indicate financial distress or increased consumption.[24] However, regardless of the reason (financial distress or consumption), high credit utilization puts downward pressure on credit scores.

The pattern for high credit card utilization through the pandemic is broadly similar to the pattern for delinquencies. Throughout this period, it remained the case that the share of those with high credit card utilization was higher in the Bottom Quartile counties (Panel (b) of Figure 9). However, after a small increase in the first quarter of 2020, the share of credit card holders with

[21] Initially, federal unemployment benefits were an additional $600/week from March 2020 to July 2020. An executive order extended unemployment benefits at a reduced $300/week rate through September 2020. When benefits resumed in December 2020, it was at the $300/week level.

[22] However, debt accommodation policies could have a behavioral effect on households' credit utilization. For example, suppose someone in the household loses a job. Without an accommodation on their mortgage payment (e.g., forbearance), they may have to increase their use of credit card debt to cover expenses, increasing credit utilization. With an accommodation on their mortgage, they may be less likely increase their credit card debt because they can postpone their mortgage payments.

[23] We use credit utilization instead of credit balances or credit limits to examine differences across county income groups to control for the correlation between these measures and income.

[24] The credit bureau dataset does not allow us to differentiate between an individual who rolls over balances from month-to-month and incurs interest payments and one who pays off their credit card every month.

high credit utilization fell across all county groups after relief measures went into effect (Figure 9, panel (a)). This decline continued through 2021Q2, except for a slight increase in 2020Q4 that was likely related to three-month pause in federal unemployment benefits and seasonal variation. By 2021Q2, the share with high credit utilization fell by slightly more (19 percent) in Top Half counties compared to Second Quartile counties (17 percent) and Bottom Quartile counties (15 percent). These declines in high credit utilization shares then began to reverse as the effects of federal policies began to decline but remain below 2019 levels as of 2022Q2. Panel (b) of Figure 9 shows that these movements in high credit utilization shares were a clear break from the stable trends seen in the years leading up to the pandemic.

Bottom Quartile counties were consistently closer to their pre-recession level than Second Quartile and Top Half counties, meaning the improvements to high credit utilization shares were smaller for these lower-income counties. Larger declines for Top Half counties likely reflected a reduction in credit card spending (consumption) rather than an increase in credit limits, which would also reduce the share of people with high credit utilization. Other analysis shows that consumer spending fell by more in high income zip codes (Chetty, Freidman, Hendren, Stepner, & Team, 2021).

Using this relatively simple definition, we see that people living both lower- and higher-income counties saw improvements in measures of financial distress, but those in lower-income counties saw smaller such improvements. Moreover, despite these improvements, people living in lower-income counties continued to have higher levels of financial distress before and after the COVID recession.

6. Conclusion

In this paper, we showed how a simple, county-level income definition using publicly available data can be used to analyze economic conditions across lower- and higher-income communities. for a variety of economic indicators. This simple, population weighted, county-level income definition succeeds at capturing communities that face higher versus lower economic distress. Lower-income counties have higher unemployment, lower shares of college educated residents, and lower credit scores than higher income counties. Counties are a reasonable "middle ground" between census tracts, which approximate neighborhoods, and commuting zones, which approximate labor markets. Adjusting for cost-of-living does little to improve the definition's ability to identify counties with more versus fewer economic challenges. One exception to this finding is the homeownership rate, which does not vary systematically by county income level, but does vary widely by census tract. As a result, researchers should exercise caution when using county-level housing data to examine differences by county income.

When data availability limits analyses of economic conditions across geography, this simple definition is a reasonable approach to analyzing economic indicators across different communities. Future research may explore whether this definition can extend our understanding of economic differences across place in a variety of different economic circumstances beyond the COVID-19 recession and recovery.

References

Ananat, E. (2011). The Wrong Side(s) of the Tracks: The Causal Effects of Racial Segregation on Urban Poverty and Inequality. *American Economic Journal*.

Austin, B., Glaeser, E., & Summers, L. (2018). Jobs for the Heartland: Place-Based Policies in 21st Century America. *NBER Working Paper 24548* .

Baum-Snow, N., Hartley, D., & Lee, K. O. (2019). The Long-Run Effects of Neighborhood Change on Incumbent Families. *Federal Reserve Bank of Chicago Working Paper*.

Bennett, K. J., Probst, J. C., & Pumkam, C. (2011, September). Obesity Among Working Age Adults: The Role of County-Level Persistent Poverty in Rural Disparities. *Health & Place, 17*(5), 1174-1181. Retrieved from https://www.sciencedirect.com/science/article/abs/pii/S1353829211000906

Benzow, A., Fikri, K., Newman, D., O'Dell, K., & Lettieri, J. (2020). *The Spaces Between Us: The Evolution of American Communities in the New Century.* Economic Innovation Group. Retrieved from https://eig.org/wp-content/uploads/2020/10/EIG-2020-DCI-Report.pdf

Betz, M. R., Partridge, M. D., Farren, M., & Labao, L. (2015). Coal mining, economic development, and the natural resources curse. *Energy Economics*.

Bisha, A. (2014). Changes in Areas With Concentrated Poverty: 2000 to 2010. *American Community Survey Reports*.

Boushay, H., Nunn, R., O'Donnell, J., & Shambaugh, J. (2019). The Damage Done by Recessions and How to Respond. In B. I. The Hamilton Project, *Recession Ready: Fiscal Policies to Stabilize the American Economy.*

Brown, M., & Mazewski, M. (2015). Stepping Stone or Quicksand? The Role of Consumer Debt in the U.S. Geography of Economic Mobility. In *Economic Mobility: Research & Ideas on Strengthening Families, Communities & the Economy.*

Chetty, R., & Hendren, N. (2018). The Impacts of Neighborhoods on Intergenerational Mobility II: County-Level Estimates. *Quarterly Journal of Economics, 133*(3), 1163-1228. doi:https://doi.org/10.1093/qje/qjy006

Chetty, R., Freidman, J., Hendren, N., Stepner, M., & Team, O. I. (2021, November). *Opportunity Insights* . Retrieved from Track the Recovery: https://www.tracktherecovery.org/

Chetty, R., Hendren, N., & Katz, L. F. (2016). The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment. *American Economic Review, 106*(4), 855-902. doi:http://dx.doi.org/10.1257/aer.20150572

Chetty, R., Hendren, N., Kline, P., & Saez, E. (2014). Where is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States. *Quarterly Journal of Economics*.

Chetty, R., Hendren, N., Kline, P., Saez, E., & Turner, N. (2014). Is the United States Still a Land of Opportunity? Recent Trends in Intergenerational Mobility. *American Economic Review*.

Clampet-Lundquist, & Massey, D. S. (2008). Neighborhood Effects on Economic Self-Sufficiency: A Reconsideration of the Moving to Opportunity Experimen. *American Journal of Sociology*.

Currie, J., & Schwandt, H. (2016). Mortality Inequality: The Good News from a County-Level Approach. *Journal of Economic Perspectives, 30*(2), 29-52.

Cutler, D. M., & Glaeser, E. L. (1997). Are Ghettos Good or Bad? *Quarterly Journal of Economics*.

Deryugina, T., & Molitor, D. (2020). Does When You Die Depend on Where You Live? Evidence from Hurricane Katrina. *American Economic Review*.

Diamond, R., & Moretti, E. (2021). Where is Standard of Living the Highest? Local Prices and the Geography of Consumption. *Working Paper*.

Dobkins, L., & Yannies, I. (2001). Spaital interactions among U.S. cities: 1900-1990. *Regional Science and Urban Economics*, vol. 31, issue 6, 701-731.

Erikson, D., Reid, C., Nelson, L., O'Shaughnessy, A., & Berube, A. (2008). *U.S., The Enduring Challenge of Concentrated Poverty in America: Case Studies from Communities Across the.* Richmond: Federal Reserve Bank of Richmond.

Finkelstein, A., Gentzkow, M., & Williams, H. (2021). Place Based Drivers of Mortality: Evidence from Migration. *American Economic Review*.

Fishback, P. V., Rose, J., Snowden, K. A., & Storrs, T. (2021). New Evidence on Redlining by Federal Housing Programs in the 1930s. *National Bureau of Economic Research*.

Ganong, P., & Shoag, D. (2017). Why has regional income convergence in the U.S. declined? *Journal of Urban Economics*.

Gaydosh, L., & McLanahan, S. (2021). Youth academic achievement, social context, and body mass index. *Population Health*.

Glaesar, E., & Gyuorko, J. (2005). Urban Decline and Durable Housing . *Journal of Political Economy*, 113(2): 345–000.

Glaesar, E., & Mare, D. (2001). Cities and Skills. *National Bureau of Economic Research. Working Paper 4728.*

Glaeser, E. (2010). Introduction. In E. Glaeser, *Agglomeration Economics* (pp. 1-15). Chicago: University of Chicago and National Bureau of Economic Research.

Glaeser, E., & Saiz, A. (2004). The Rise of the Skilled City. *Brookings-Wharton Papers on Urban Affairs*.

Hacker, S. (2000). Mobility and Regional Economic Downturns. *Journal of Regional Science.*

Hellerstein, J., & al, e. (2011). Neighbors and Coworkers: The Importance of Residential Labor Market Networks. *Journal of Labor Economics*.

Hsieh, C.-T., & Moretti, E. (2019). Housing Constraints and Spatial Misallocation. *American Economic Journal*.

Iceland, J., & Hernandez, E. (2017). Understanding trends in concentrated poverty: 1980–2014. *Social Science Research*.

Interagency Technical Working Group on Evaluating Alternative Measures of Poverty. (2020). *Final Report* .

Islam, T., Minier, J., & Ziliak, J. P. (2014). On Persistent Poverty in a Rich Country. *Southern Economic Journal*.

Katz, L., Kling, J., & Leibman, J. (2001). Moving to Opportunity in Boston: Early Results of a Randomized Mobility Experiment. *Quarterly Journal of Economics, 116*(2), 607-654. Retrieved from http://hdl.handle.net/10.1162/00335530151144113

Kim, S. (2003). Economic Integration and Convergence: U.S. Regions 1840-1987. *National Bureau of Economic Research. Working Paper 6335.*

Kling, J., Leibman, J., & Katz, L. (2007). Experimental Analysis of Neighborhood Effects . *Econometrica*.

Larrimore, J., Mortenson, J., & Splinter, D. (2023). Earnings Business Cycles: The Covid Recession, Recovery, and Policy Response. *Journal of Public Economics*.

Lee, D., & van der Kaauw, W. (2010). An Introduction to the New York Fed Consumer Credit Panel. *Federal Reserve BanXk of New York Staff Reports*.

Ludwig, J., Duncan, G. J., Gennetian, L. A., Katz, L. F., Kellser, R. C., Kling, J. R., & Sanbonmatsu, L. (2012). Neighborhood Effects on the Long-Term Well-Being of Low-Income Adults. *Science*.

Manduca, R. A. (2019). The Contribution of National Inequality to Regional Economic Divergence. *Social Forces*, 622-648.

Margo, R. A., & Kim, S. (2003). Historical Perspectives on U.S. Economic Geography. *National Bureau of Economic Research. Working Paper 9594.*

Massey, D., & Denton, N. A. (1998). *American Apartheid.* Cambridge: Harvard Univerity Press. Retrieved from https://www.hup.harvard.edu/catalog.php?isbn=9780674018211

Mayer, S. E., & Sarin, A. (2005). Some mechanisms linking economic inequality and infant mortality. *Social Science and Medicine*.

Meyer, B., Wu, D., & Curran, B. (2021). Does Geographically Adjusting Poverty Thresholds Improve Poverty Measurement and Program Targeting? *Working Paper*.

Miller, K. K., Crandall, M. S., & Weber, B. A. (2002). Persistent Poverty and Place: How Do Persistent Poverty and Poverty Demographics Vary Across the Rural-Urban Continuum. *Economic Research Service Measuring Rural Diversity Conference*.

Missouri Census Data Center. (2023). *Geocorr 2022: Geographic Correspondence Engine*. Retrieved from https://mcdc.missouri.edu/applications/docs/geocorr2022-help.html

Mitchell, B., & Franco, J. (2018). HOLC "Redlining" Maps: The persistent structure of segregation and economic inequality. *National Community Reinvestment Coalition*.

Mitchener, J. K., & McLean, W. I. (1999). U.S. Regional Growth & Convergence, 1880-1980. *The Journal of Economic History*, Vol 59, No. 4. 1016-1042.

Moretti, E. (2004). Human capital externalities in cities. *Handbook of regional and urban* .

Moretti, E. (2011). Local Labor Markets. In D. Card, & O. Ashenfelter (Eds.), *Handbook of Labor Economics* (Vol. 4B, pp. 1237-1313). San Diego, CA: North Holland. Retrieved from https://www.sciencedirect.com/science/article/pii/S0169721811024129

Nunn, R., Parsons, J., & Shambaugh, J. (2018). The Geography of Prosperity. In J. Shambaugh, & R. Nunn (Eds.), *Place-Based Policies for Shared Economic Growth* (pp. 11-42). The Hamilton Project, Brookings Institution. Retrieved from https://www.hamiltonproject.org/assets/files/PBP_FramingChapter_0927_3.pdf

Proctor, B. D., Semega, J. L., & Kollar, A. M. (2016). *Income and Poverty in the United States: 2015.* Washington, DC: United States Census Bureau.

Quillian, L. (2014). Does Segregation Create Winners and Losers? Residential Segregation and Inequality in Educational Attainment. *Social Problems*.

Ram, R. (2021). Income convergence across the U.S. states: further evidence from new recent data. *Journal of Economics and Finance*.

Reardon, S., & Bischoff, K. (2011). Income Ineqaulity and Income Segregation. *American Journal of Sociology*, 1092-1153.

Roback, J. (1982). Wages, Rents, and the Quality of Life. *Journal of Political Economy*.

Robert, S. A. (1999). Socioeconomic Position and Health: The Independent Contribution of Community Socioeconomic Context. *Annual Review of Sociology*.

Rothwell, J. (2015). Sociology's revenge: Moving to Opportunity (MTO) revisited. *The Brookings Institution Social Mobility Memos*. Retrieved from https://www.brookings.edu/blog/social-mobility-memos/2015/05/06/sociologys-revenge-moving-to-opportunity-mto-revisited/

Rothwell, J. T., & Massey, D. S. (2014). Geographic Effects on Intergenerational Income Mobility. *Economic Geography*.

Ruggles, S., Flood, S., Sobek, M., Backman, D., Chen, A., Cooper, G., . . . Schouweiler, M. (2023). IPUMS USA: Version 14.0 [dataset]. *Minneapolis, MN: IPUMS*.

Sachs, J. D., & Warner, A. M. (1999). The Big Rush, Natural Resource Booms And Growth. *Journal of Development Economics*.

Sampson, R. (2015). Individual and Community Economic Mobility in the Great Recession Era: The Spatial Foundations of Persistent Inequality. In *Economic Mobility: Research & Ideas on Strengthening Families, Communities & the Economy.*

Sanbonmatsu, L., Kling, J., Duncan, G., & Brooks-Gunn, J. (2006). Neighborhoods and Academic Achievement: Results from the Moving to Opportunity Experiment. *Journal of Human Resources*.

Sanbonmatsu, L., Lugwig, J., Katz, L. F., Gennetian, L. A., Duncan, G. J., Kessler, R. C., . . . Tessler Lindau, S. (2011). Moving to Opportunity for Fair Housing Demonstration Program - Final

Impacts Evaluation. *U.S. Department of Housing and Urban Development Office of Policy and Research*.

Shrider, E. A., Kollar, M., Chen, F., & Semega, J. (2020). Income and Poverty in the United States. *U.S. Census Current Population Reports*.

Singh, G. K., Kogan, M. D., & Slifkin, R. T. (2017, August). Widening Disparities in Infant Mortality and Life Expectancy Between Appalachia and the Rest of the United States, 1990-2013. *Health Affairs, 36*(8), 1423-1432. Retrieved from https://www.healthaffairs.org/doi/pdf/10.1377/hlthaff.2016.1571

Solari, C. D. (2012, December). Affluent Neighborhood Persistence and Change in U.S. Cities. *City Community, 11*(4), 370-388. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4001929/pdf/nihms558155.pdf

Sommeiller, E., & Price, M. (2018). *Income ineqaulity in the United States by state, metropolitan area, and county.* Washington, DC: Economic Policy Institute.

U.S. Bureau of Labor Statistics. (2021, November 23). *Employment Level [CE16OV]*. Retrieved from FRED, Federal Reserve Bank of St. Louis: https://fred.stlouisfed.org/series/CE16OV, November 23, 2021.

U.S. Department of Agriculture Economic Research Service. (2021, November 24). *Rural Poverty & Well-Being.* Retrieved from USDA ERS: https://www.ers.usda.gov/topics/rural-economy-population/rural-poverty-well-being/#historic

Watson, T. (2009). Ineqaulity and the Measurement of Residential Segregation by Income of American Neighborhoods. *Review of Income and Wealth*, 820-844.

William, W. J. (1987). *The Truly Disadvantaged.* Chicago: University of Chicago Press. Retrieved from https://press.uchicago.edu/ucp/books/book/chicago/T/bo13375722.html

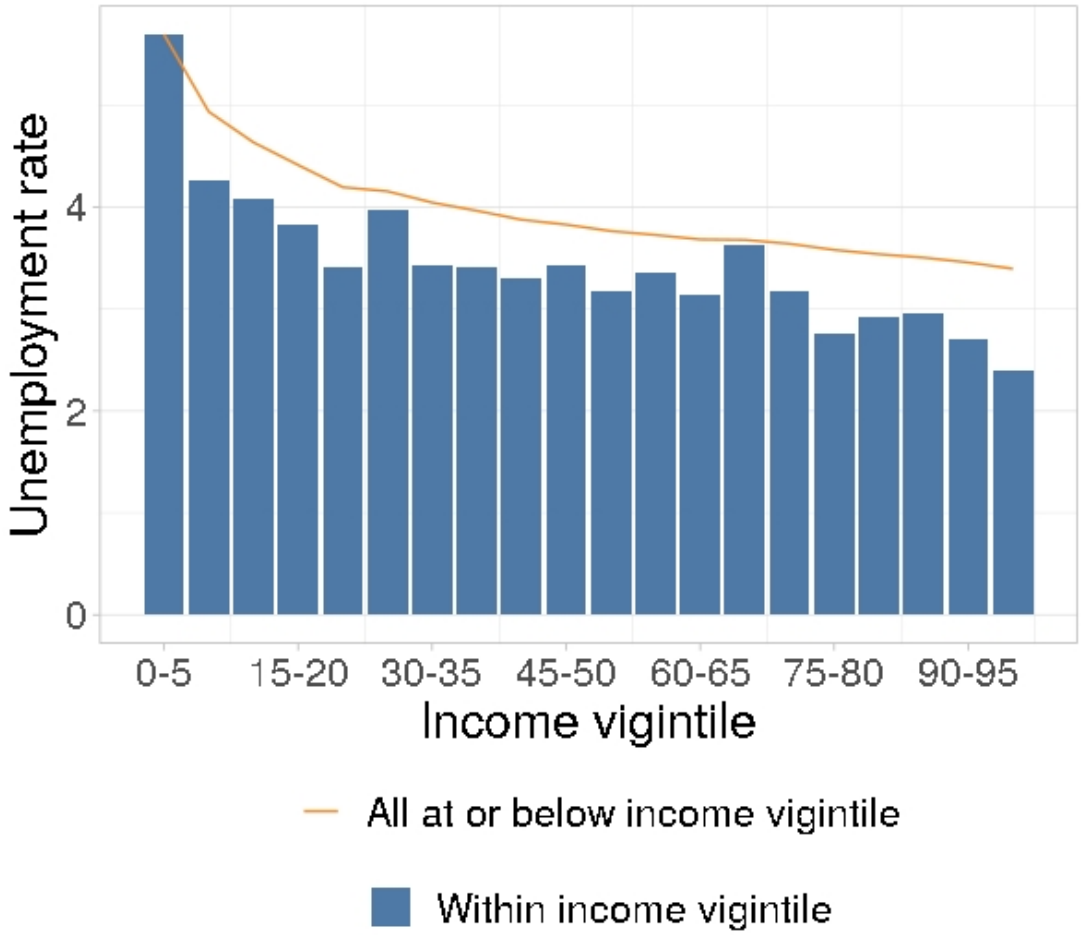
Wu, J., & Gopinath, M. (2008). What Causes Spatial Variations in Economic Development in the United States? *American Journal of Argricultural Economics*, 392-408.

Xu, W., Engelman, M., Palloni, A., & Fletcher, J. (2020). Where and When: Sharpening the Lens on Geographic Disparities in Mortality. *Population Health*.

Zabek, M. (2018). Local Ties in Spatial Equilibrium. *FEDS Note*.

Figures and Tables

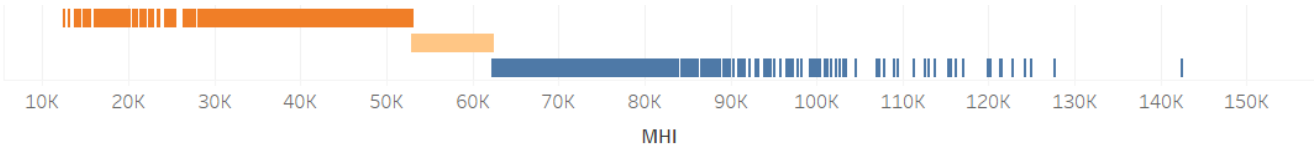
Figure 1: Unemployment Rate of 2019 Bottom Income County Group by Population Coverage



Notes: Each bin represents one population-weighted county median income vigintile representing 5 percent of the population of all US counties. Bars show unemployment rate within each vigintile. Line shows cumulative unemployment rate in counties at or below a given vigintile. Unemployment data from December 2019 Bureau of Labor Statistics Current Population Survey. County income data from 2015 – 2019 5-year American Community Survey.

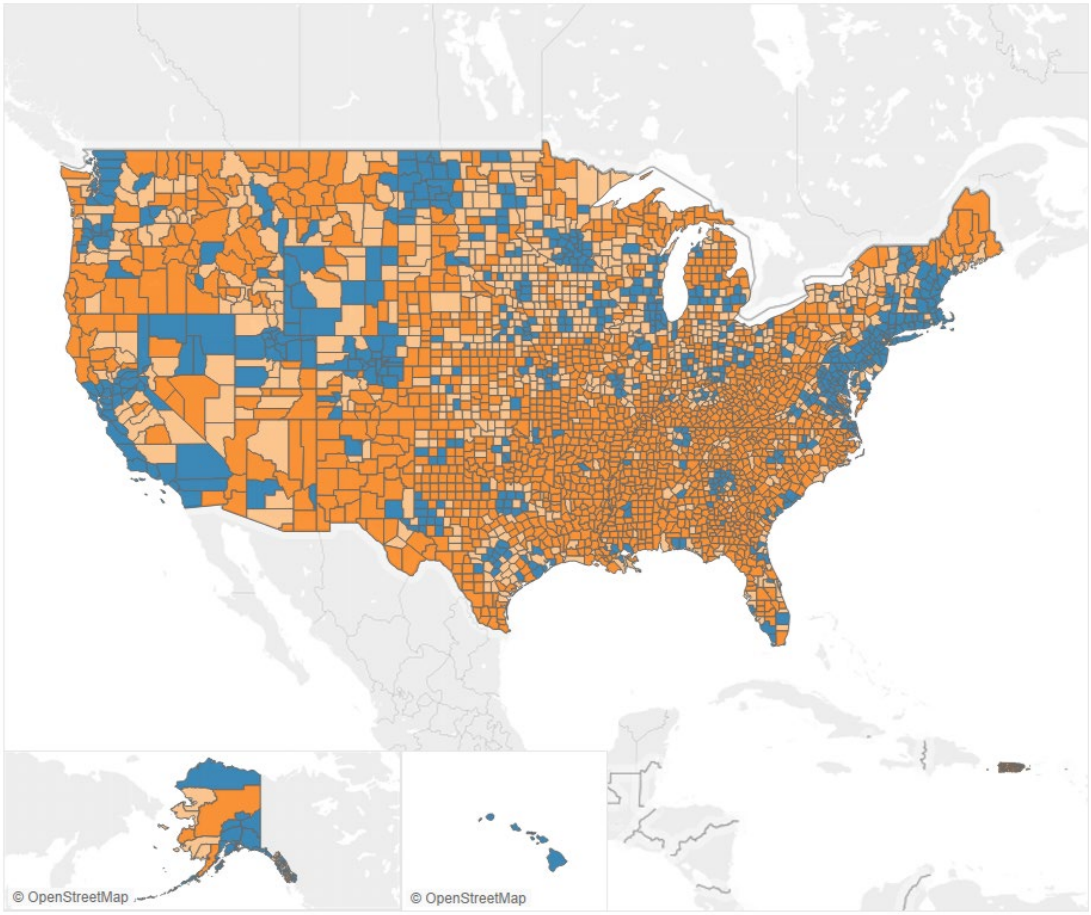
Figure 2: Distribution of County Median Household Income by County Group in 2019

Bottom Income Quartile: Orange, Second Income Quartile: Light Orange, Top Half: Blue



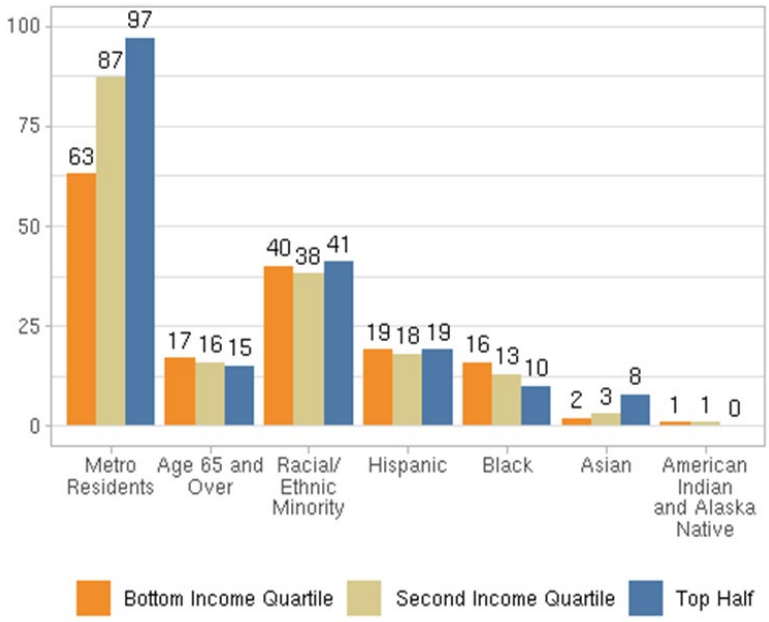
Notes: 2019 income groups based on 2015–2019 5-year American Community Survey.

Figure 3: Map of Counties by Income Classification, Income Definition in 2019
Bottom Income Quartile: Orange, Second Income Quartile: Light Orange, Top Half: Blue



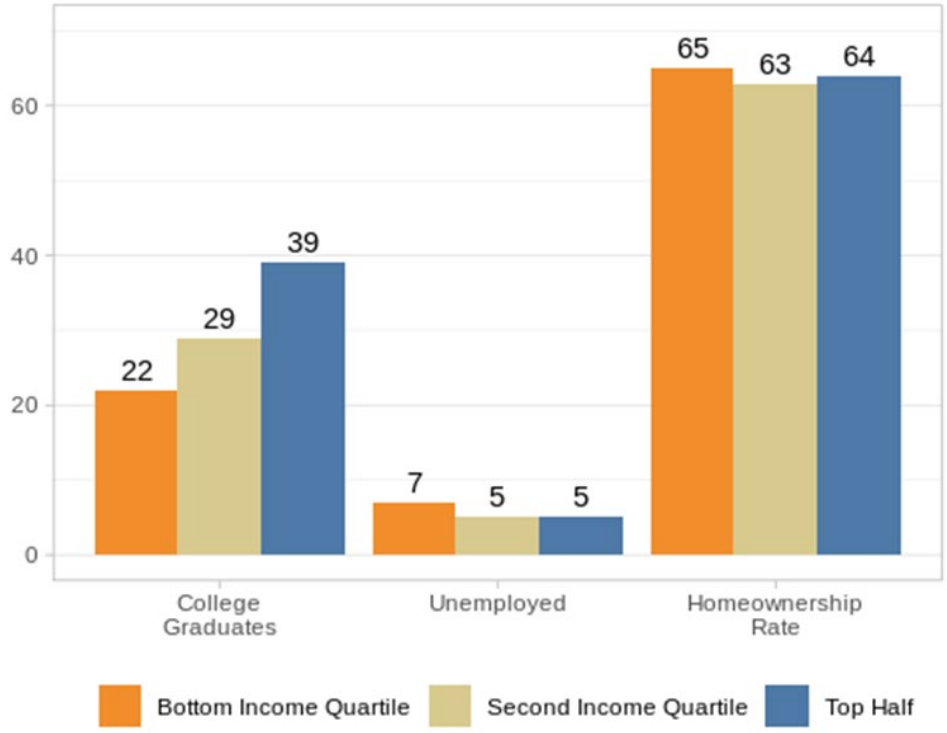
Notes: 2019 income groups based on 2015–2019 5-year American Community Survey. All Puerto Rican municipalities are in the Bottom Income Quartile. County map file from Tableau.

Figure 4: Demographic Characteristics by County Group, Percent of Population 2015 - 2019



Notes: 2019 income groups based on 2015–2019 5-year American Community Survey. Demographic data from 2015–2019 5-year American Community Survey. Hispanic share includes all Hispanic individuals while Black, Asian, and American Indian and Alaska Native shares include only non-Hispanic individuals. Individuals who identify as multiple races/ethnicities are not included here.

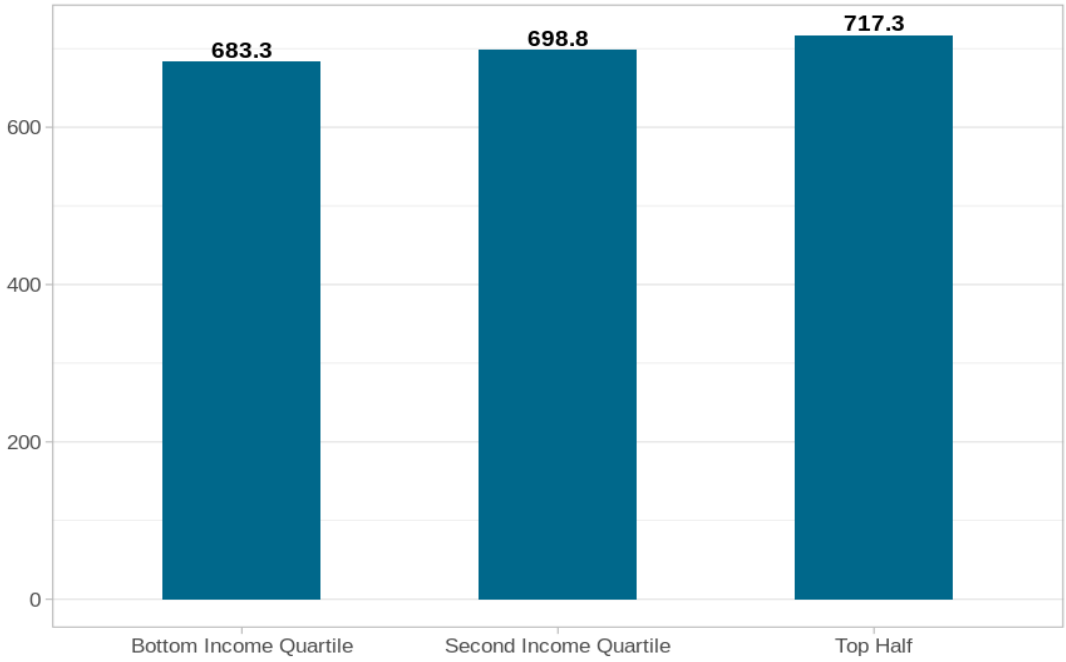
Figure 5: Measures of Economic Well-Being by County-Group, Percent of Population 2015 - 2019



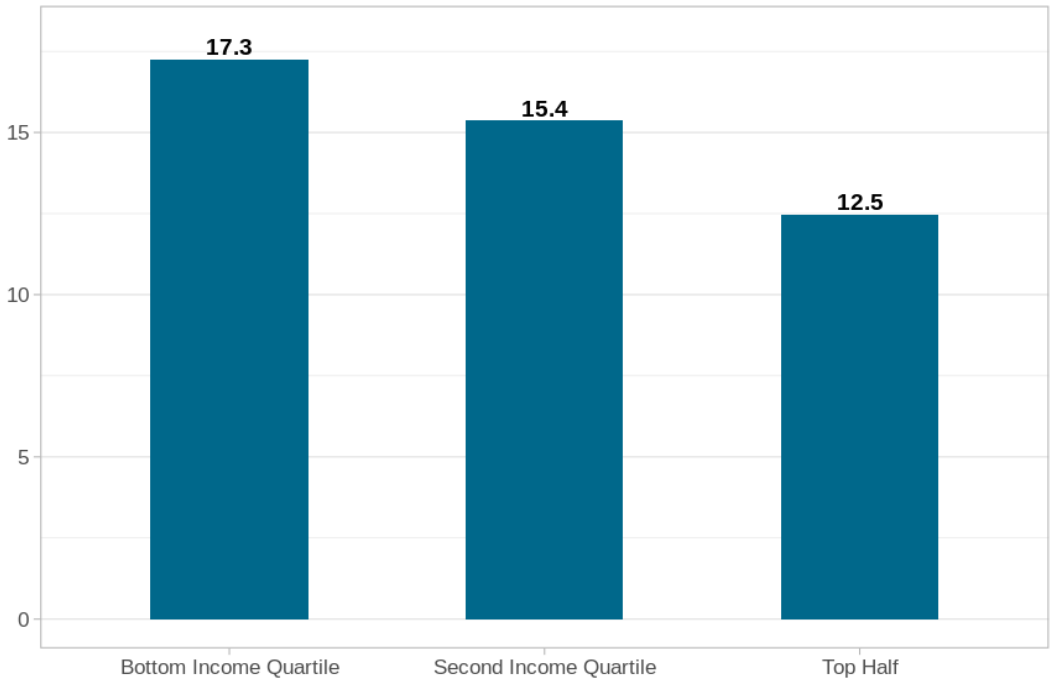
Notes: 2019 income groups based on 2015–2019 5-year American Community Survey. Outcome data from 2015–2019 5-year American Community Survey. College graduates as share of population age 25 and older.

Figure 6: Access to Credit Across County Groups, 2019Q4

(a) Average Credit Score



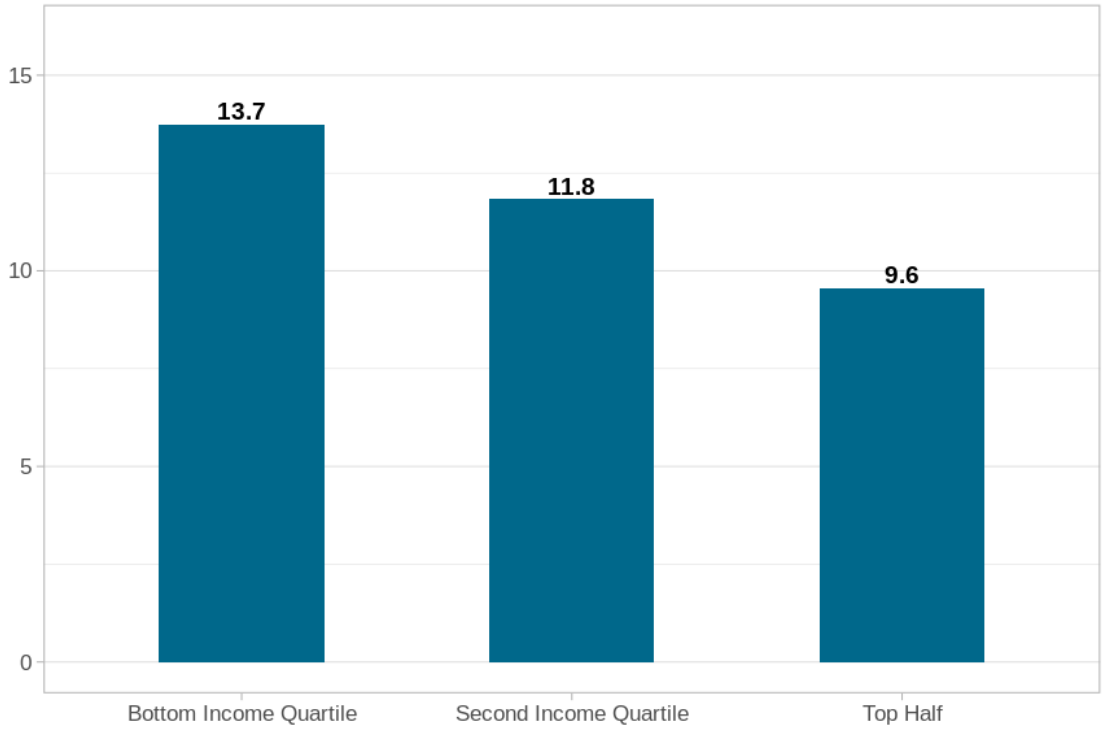
(b) Percent Unscored



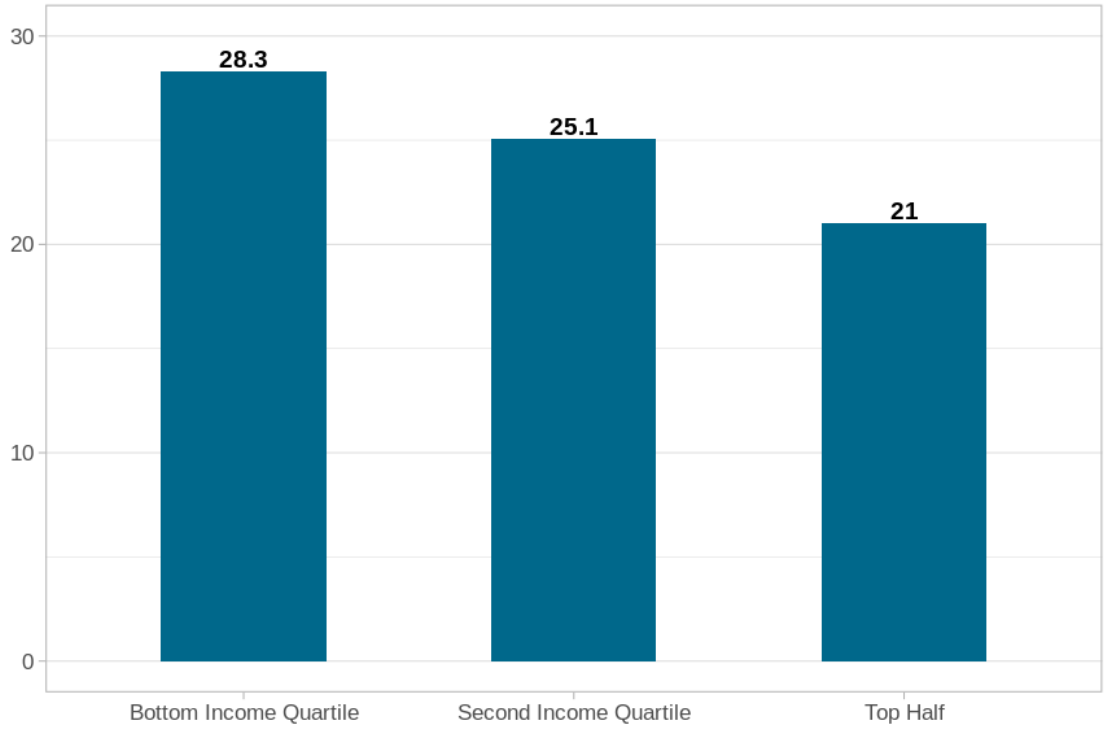
Notes: NY Fed/Equifax Consumer Credit Panel (CCP). 2019 income groups based on 2015–2019 5-year American Community Survey. Average credit score is the Equifax Risk Score, a proprietary credit score similar to other credit scores used in the industry. Percent unscored in panel (b) refers to the percent of accounts without a credit score. For example, individuals a limited credit history may not have a credit score. 2019 income groups based on 2015–2019 5-year American Community Survey.

Figure 7: Financial Instability Across County Groups, 2019Q4

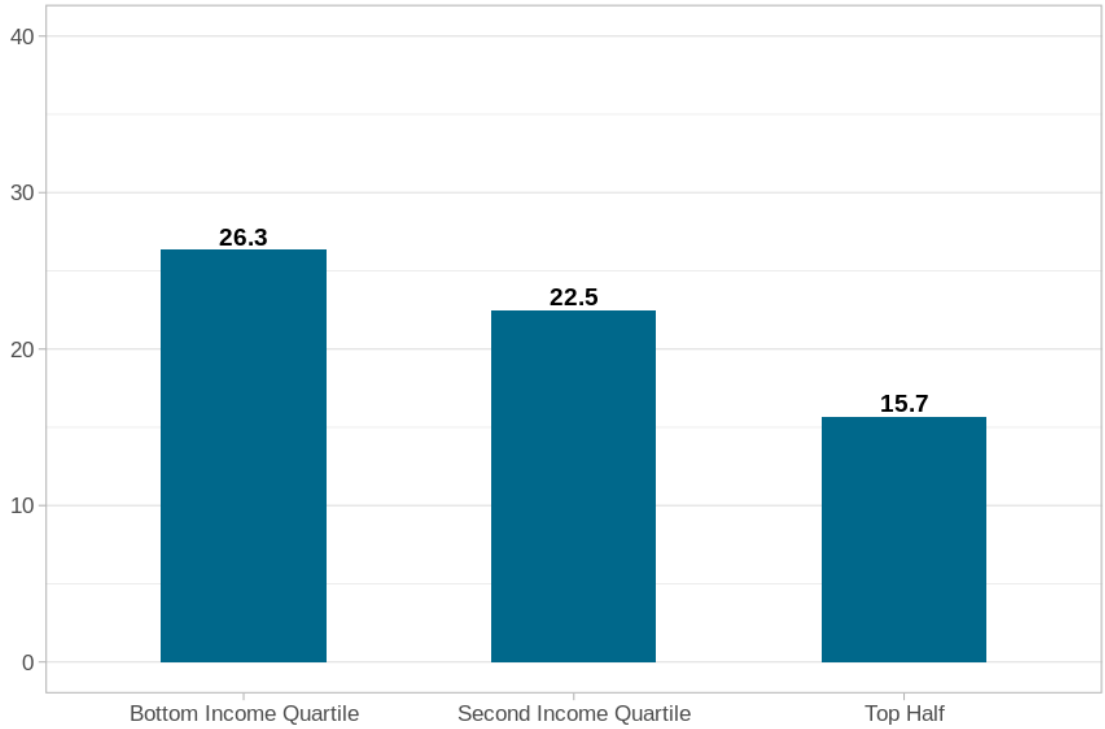
(a) Percent of Credit Card Holders that are Delinquent (30 Days Past Due or More)



(b) Percent with Over 75 Percent Credit Card Utilization



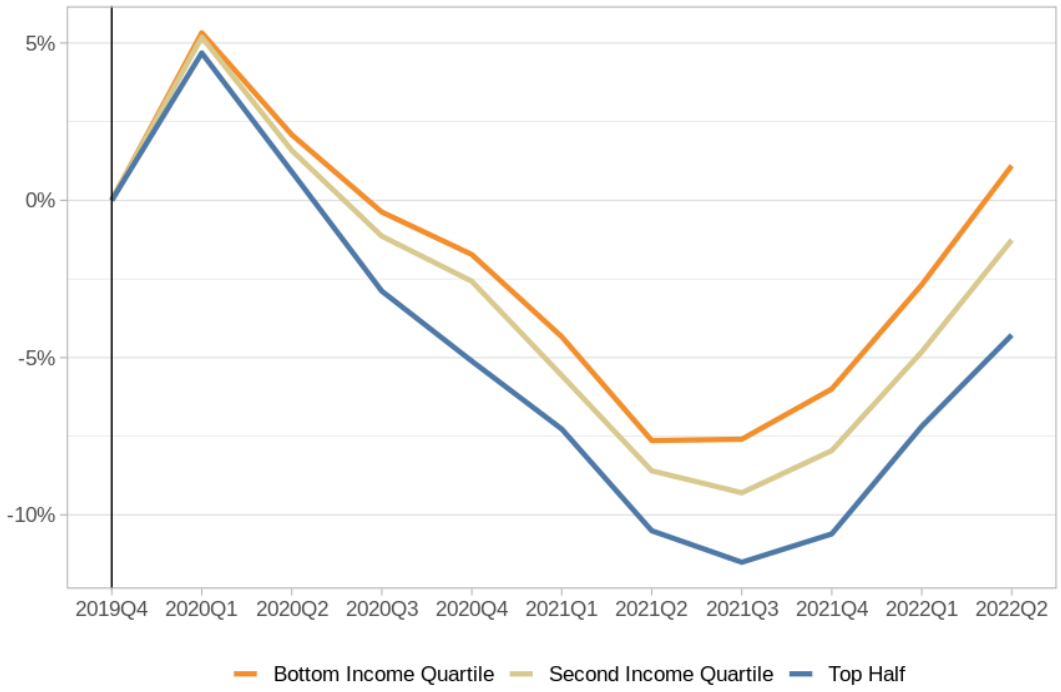
(c) Percent with Any Third Party Collections



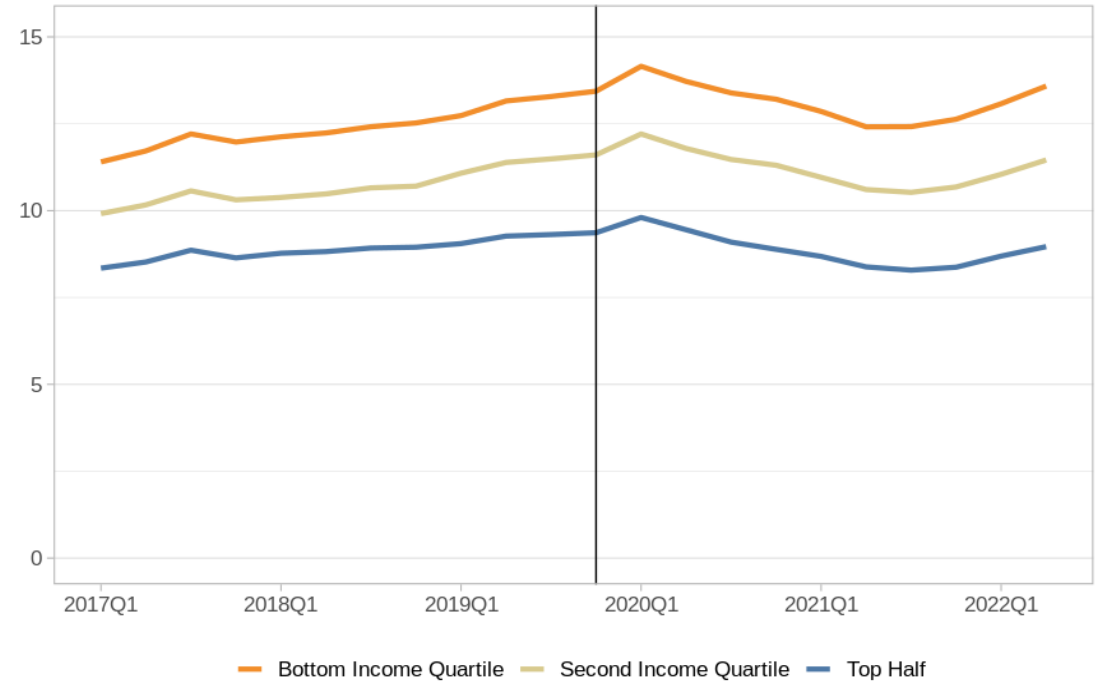
Notes: NY Fed/Equifax Consumer Credit Panel. Denominator is sample of individuals in the CCP data in each income group. 2019 income groups based on 2015–2019 5-year American Community Survey. In panels (a) and (b), credit cards refer to cards issued by banks and not retailers. The denominators for panels (a) and (b) are the same and are equivalent to the number of credit card holders. The third-party collections in panel (c) includes a broader set of consumers with debt not regularly reported to credit bureaus, such as debt from unpaid utility bills.

Figure 8: Percent of Credit Card Holders that are Delinquent (30 Days Past Due or More)

(a) Percent Change from 2019Q4



(b) Level 2017 Q1-2022 Q2

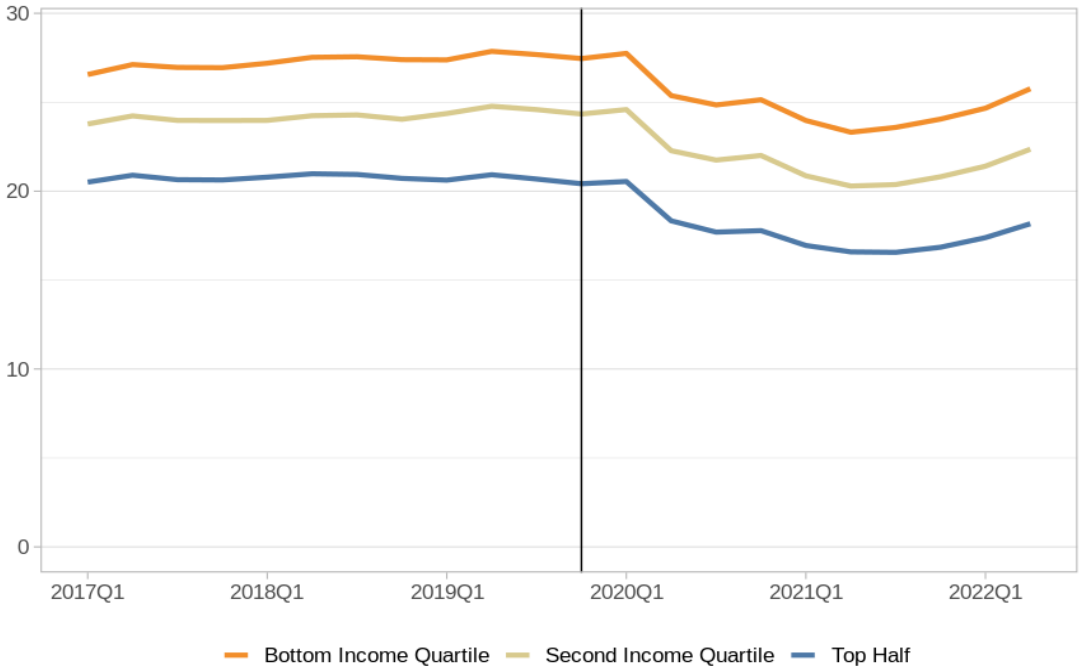


Notes: NY Fed/Equifax Consumer Credit Panel (CCP). 2019 income groups based on 2015–2019 5-year American Community Survey. Credit cards refer to cards issued by banks and not retailers. The denominators for panels (a) and (b) are the same and are equivalent to the number of credit card holders.

Figure 9: Percent of Credit Card Holders with Over 75 Percent Credit Card Utilization

(a) As Percent Change from 2019Q4

(b) Level, 2017 Q1 - 2022 Q2

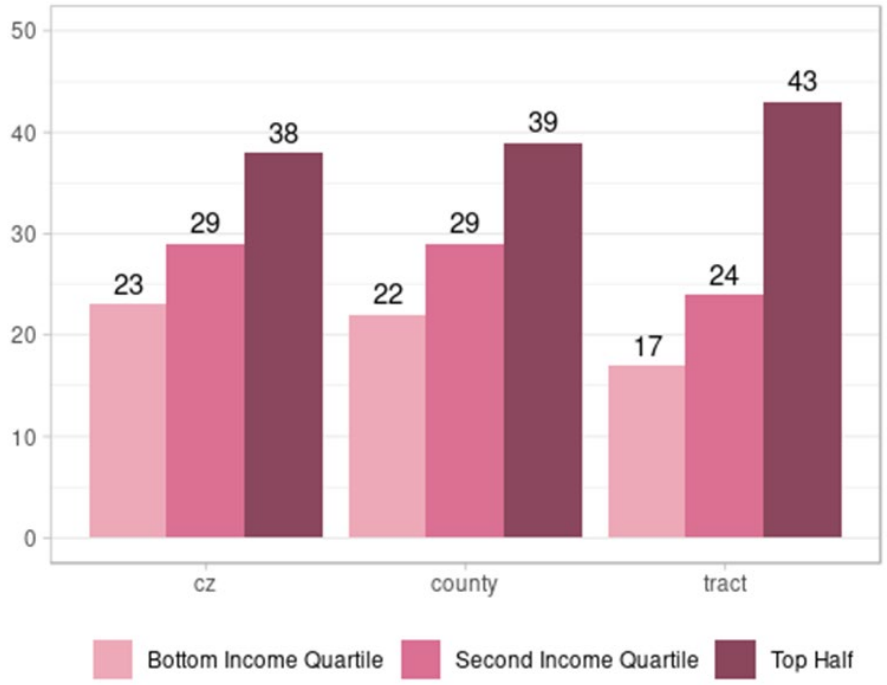


Notes: NY Fed/Equifax Consumer Credit Panel (CCP). 2019 income groups based on 2015–2019 5-year American Community Survey. Credit cards refer to cards issued by banks and not retailers. The denominators for panels (a) and (b) are the same and are equivalent to the number of credit card holders.

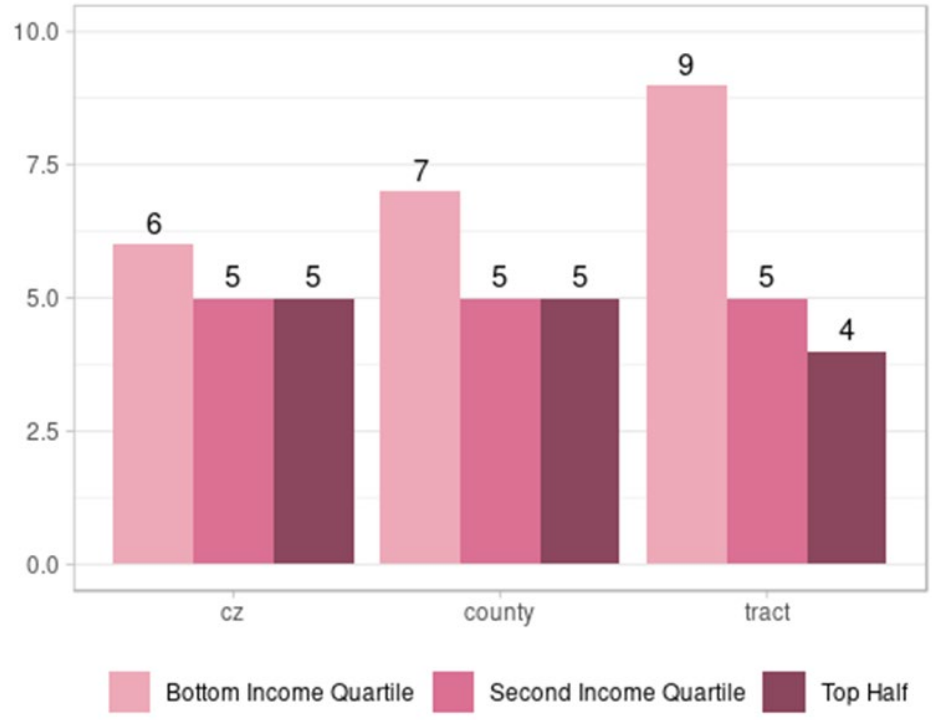
Figure 10: Economic Well-Being Indicators by Geographic Unit of Analysis, 2015 - 2019

(Commuting Zone (CZ), county, census tract)

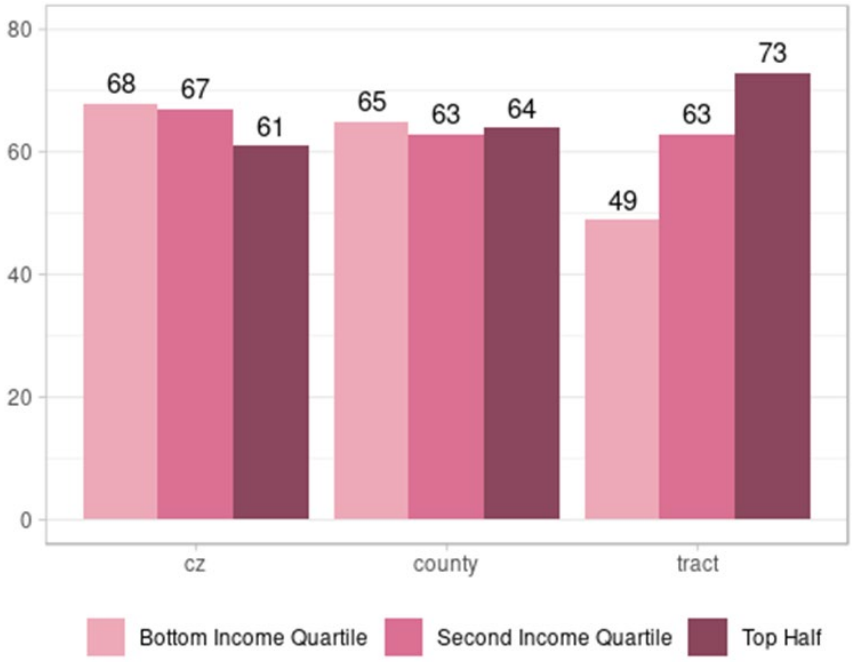
(a) Percent of Population 25 and Older with At Least a Bachelor's Degree



(b) Percent of Population Unemployed



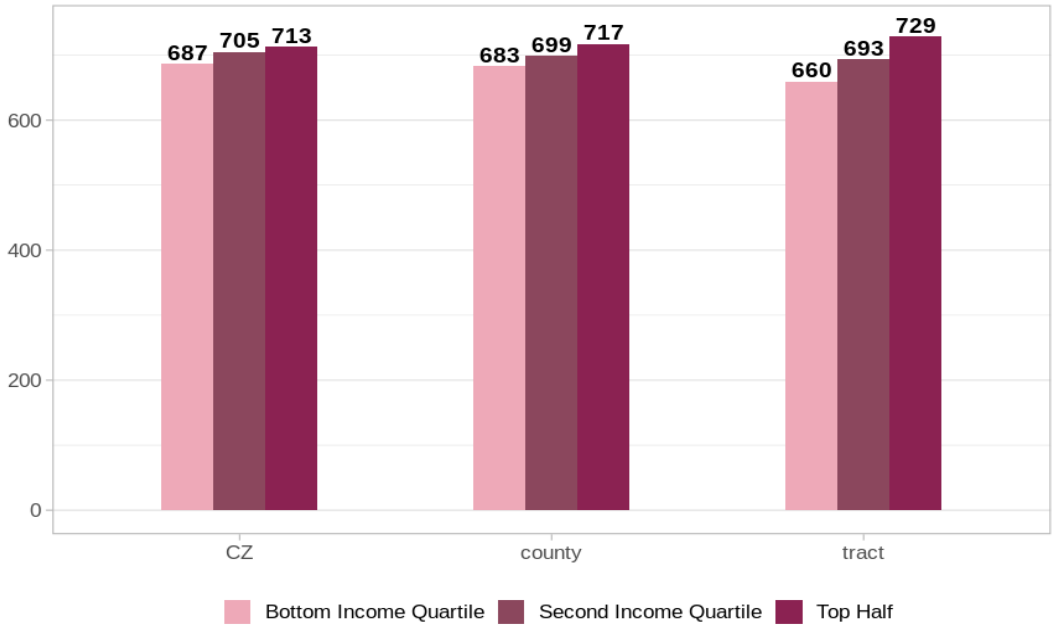
(c) Homeownership Rates



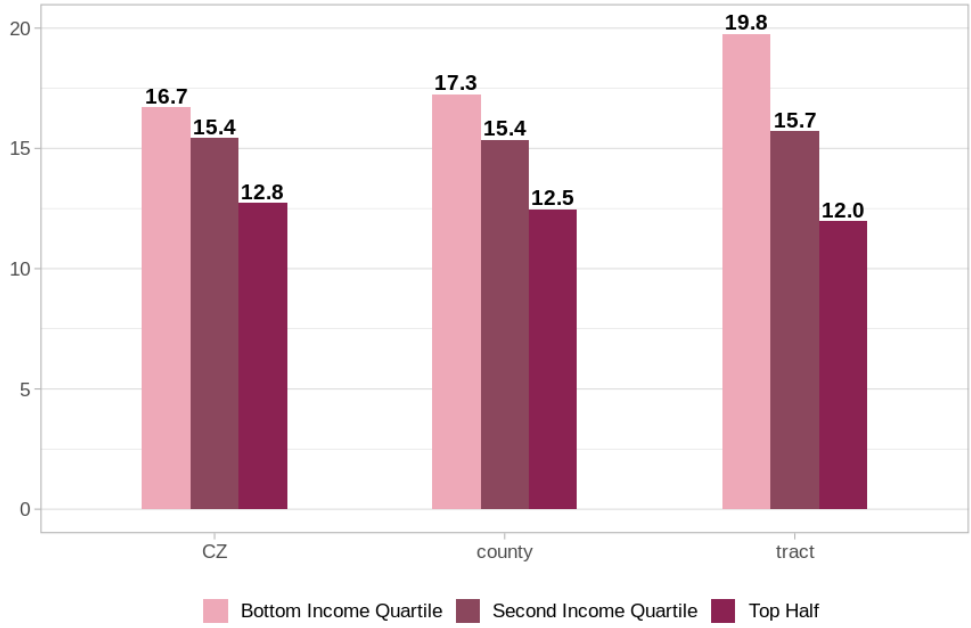
Notes: 2019 income groups based on 2015–2019 5-year American Community Survey. Outcome data from 2015–2019 5-year American Community Survey.

Figure 11: Access to Credit by Geographic Unit of Analysis, 2019Q4
(Commuting Zone (CZ), county, census tract)

(a) Average Credit Score



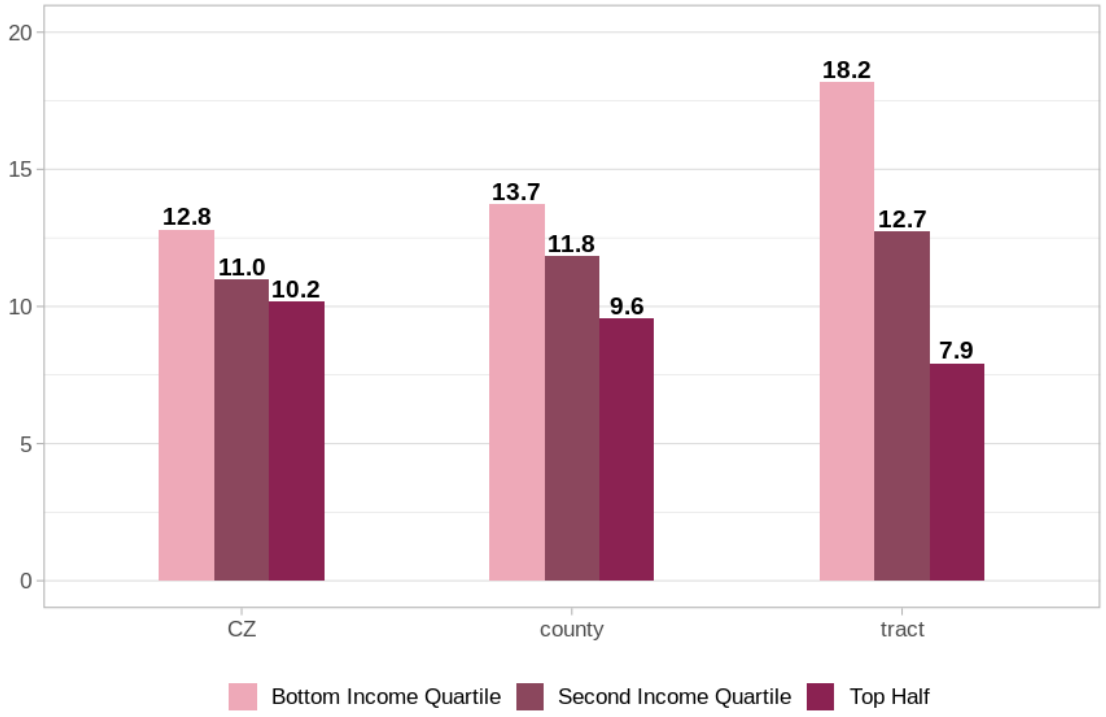
(b) Percent Unscored



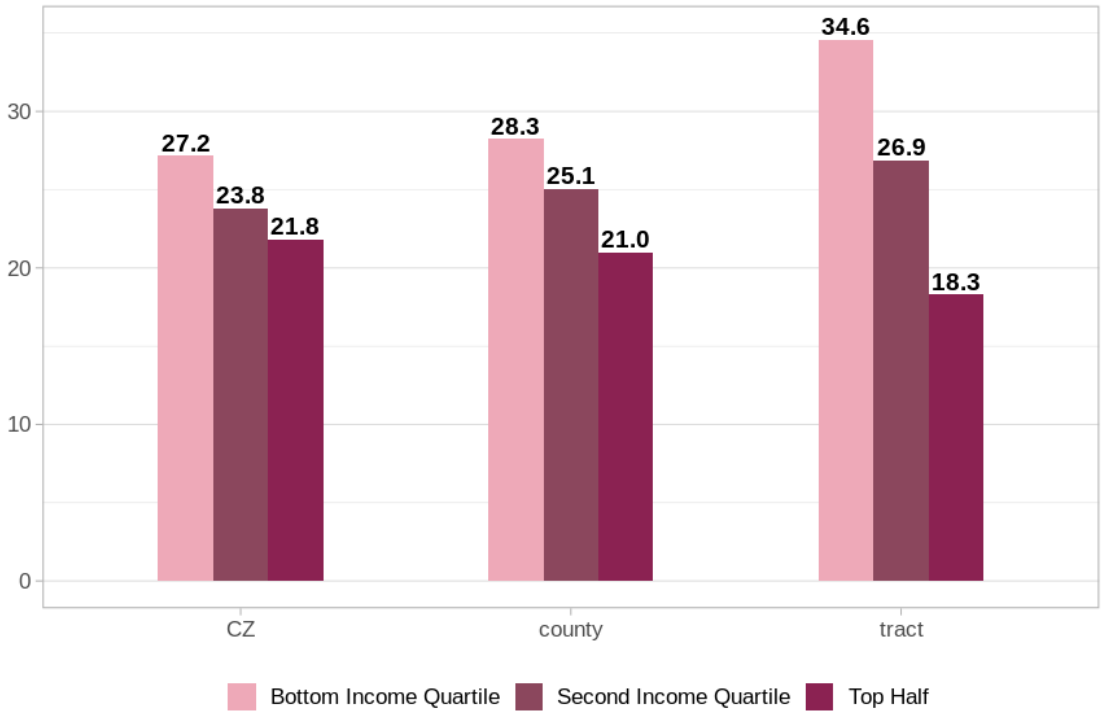
Notes: NY Fed/Equifax Consumer Credit Panel. 2019 income groups based on 2015–2019 5-year American Community Survey. Average credit score is the Equifax Risk Score, a proprietary credit score similar to other credit scores used in the industry. Percent unscored in panel (b) refers to the percent of accounts without a credit score. For example, individuals a limited credit history may not have a credit score. 2019 income groups based on 2015–2019 5-year American Community Survey.

Figure 12: Financial Instability Across County Groups by Geographic Unit of Analysis, 2019Q4
(Commuting Zone (CZ), county, census tract)

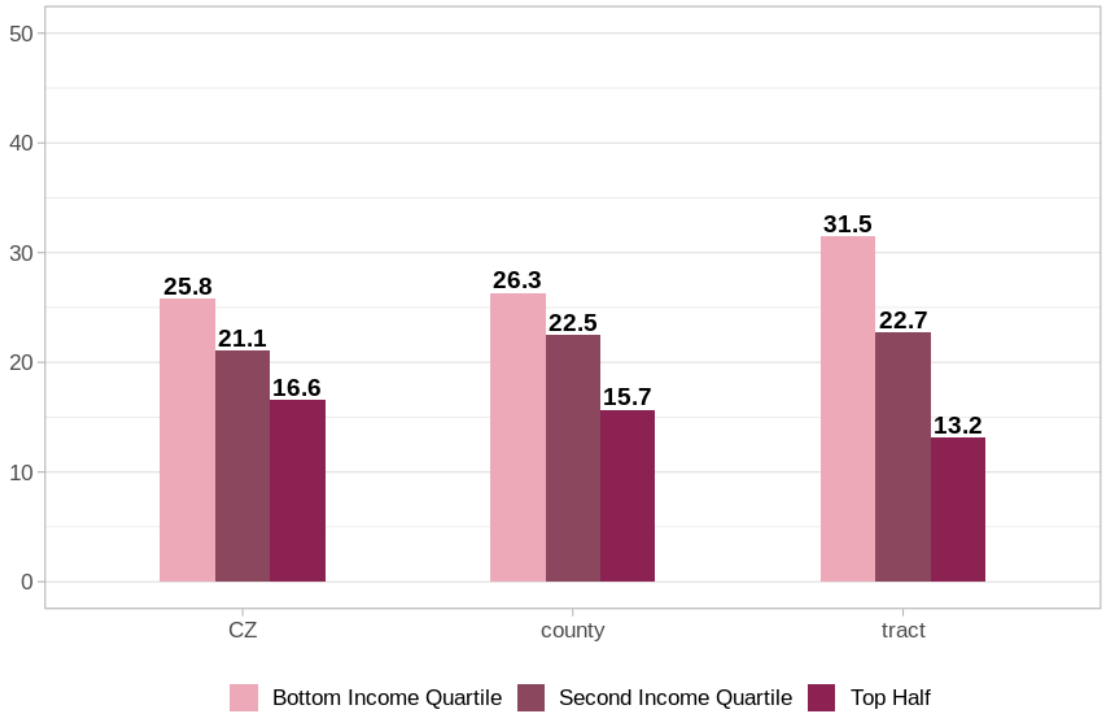
(a) Percent of Credit Card Holders that are Delinquent (30 Days Past Due or More)



(b) Percent with Over 75 Percent Credit Card Utilization



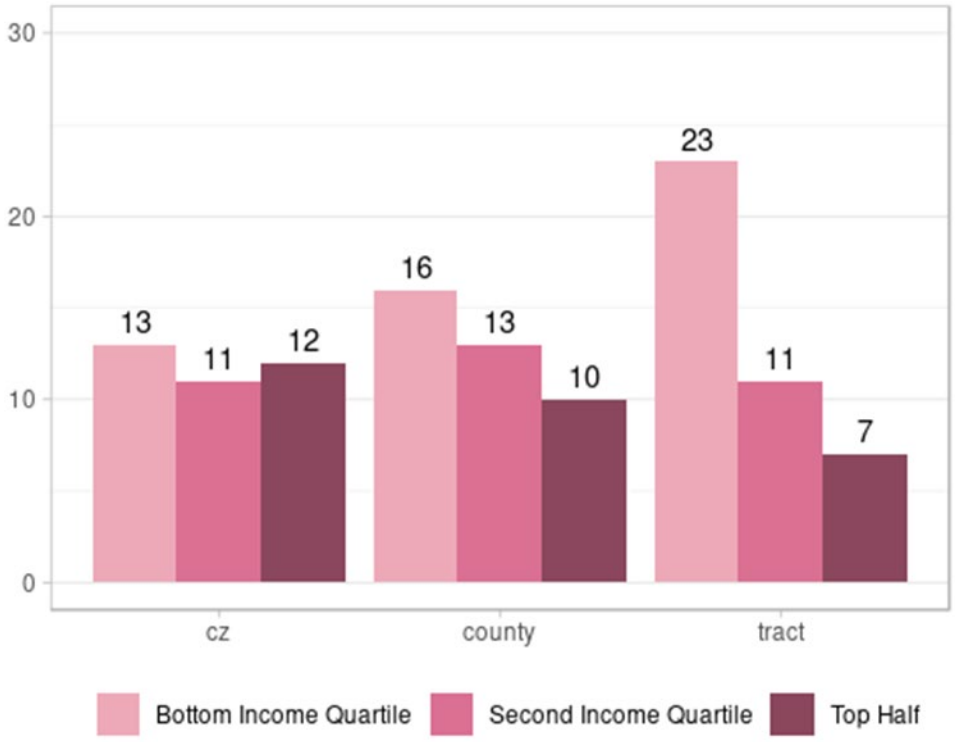
(c) Percent with Any Third-Party Collections



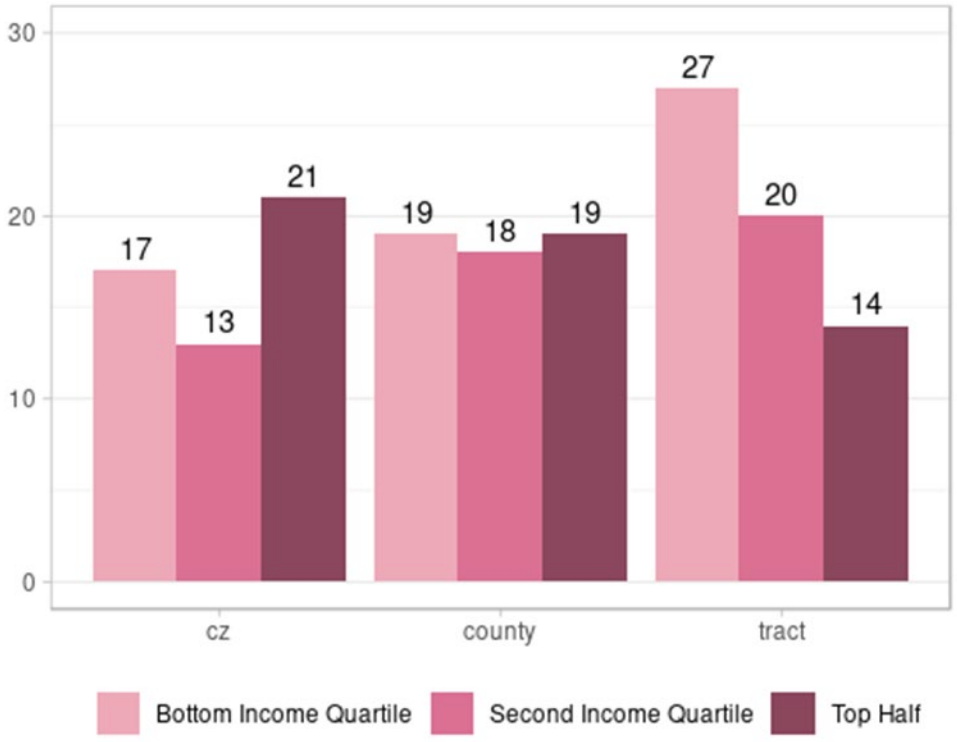
Notes: NY Fed/Equifax Consumer Credit Panel. 2019 income groups based on 2015–2019 5-year American Community Survey. In panels (a) and (b), credit cards refer to cards issued by banks and not retailers. The denominators for panels (a) and (b) are the same and are equivalent to the number of credit card holders. The third-party collections in panel (c) includes a broader set of consumers with debt not regularly reported to credit bureaus, such as debt from unpaid utility bills.

Figure 13: Demographic Characteristics by Geographic Unit of Analysis, 2015 - 2019
(Commuting Zone (CZ), county, census tract)

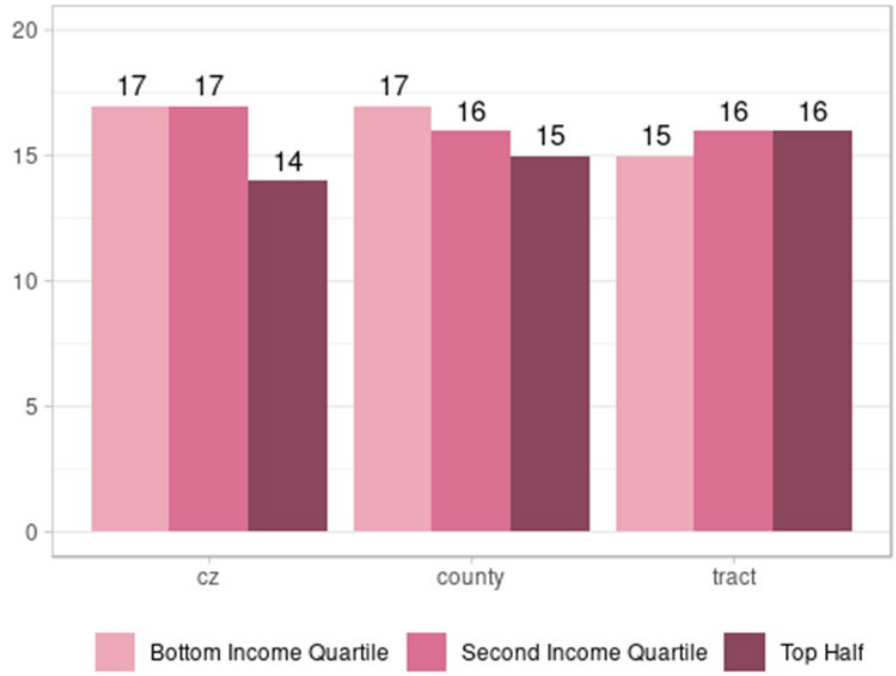
(a) Percent of Population Non-Hispanic Black



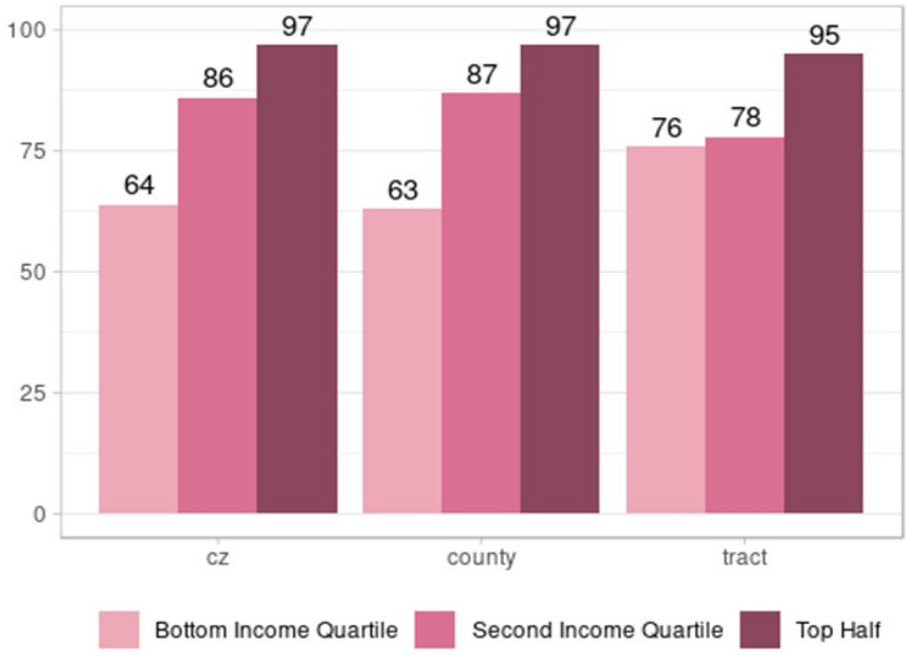
(b) Percent of Population Hispanic (of any race)



(c) Percent Age 65 and Older



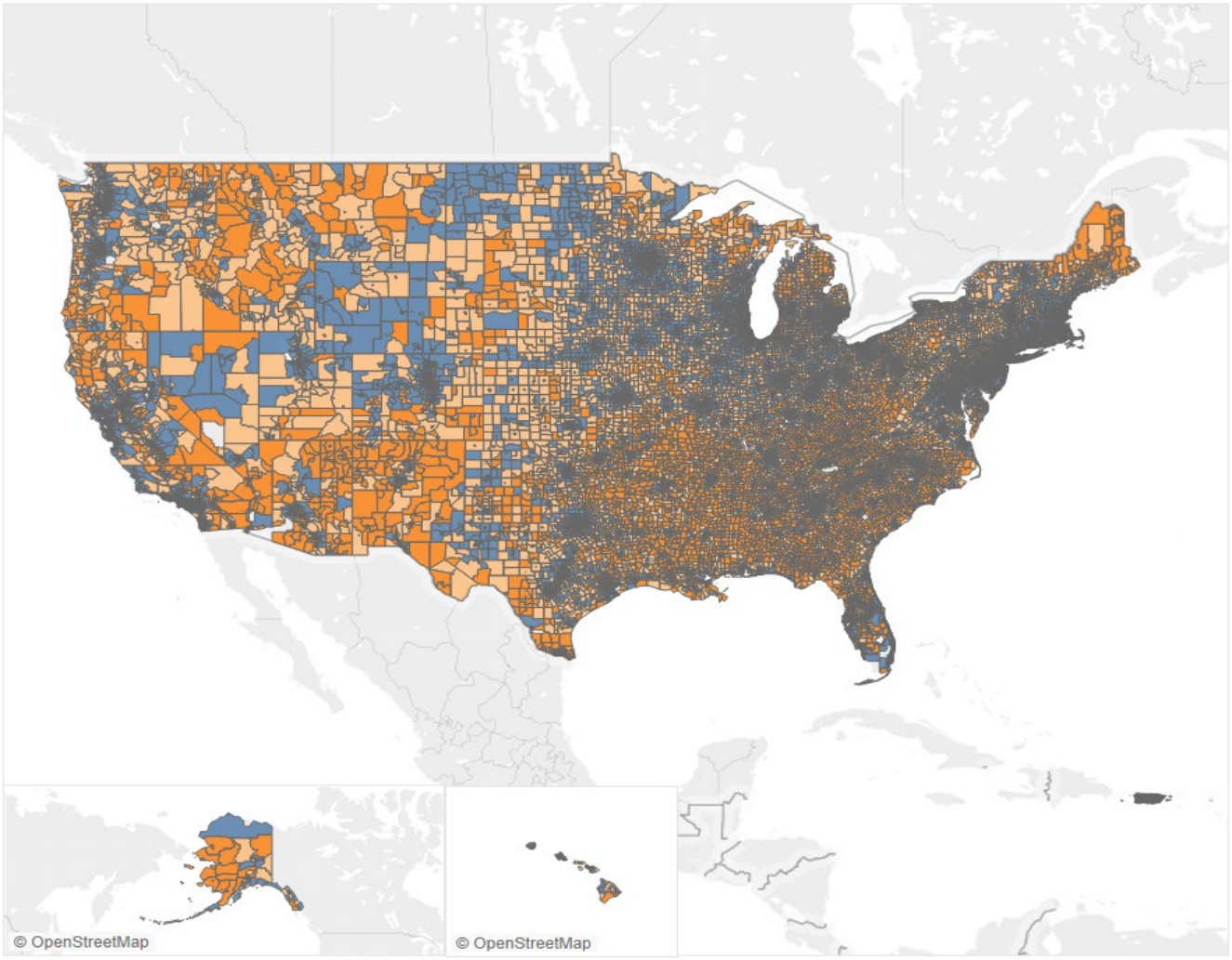
(d) Percent of Population in Metro Areas



Notes: 2019 income groups based on 2015–2019 5-year American Community Survey. Metro area designation is a county-level designation only. Therefore, all tracts within a county will have the same metro designation, but not all counties within a commuting zone will necessarily have the same metro designation. Demographic data from 2015–2019 5-year American Community Survey. Hispanic share includes all Hispanic individuals while Black, Asian, and American Indian and Alaska Native shares include only non-Hispanic individuals. Individuals who identify as multiple races/ethnicities are not included here.

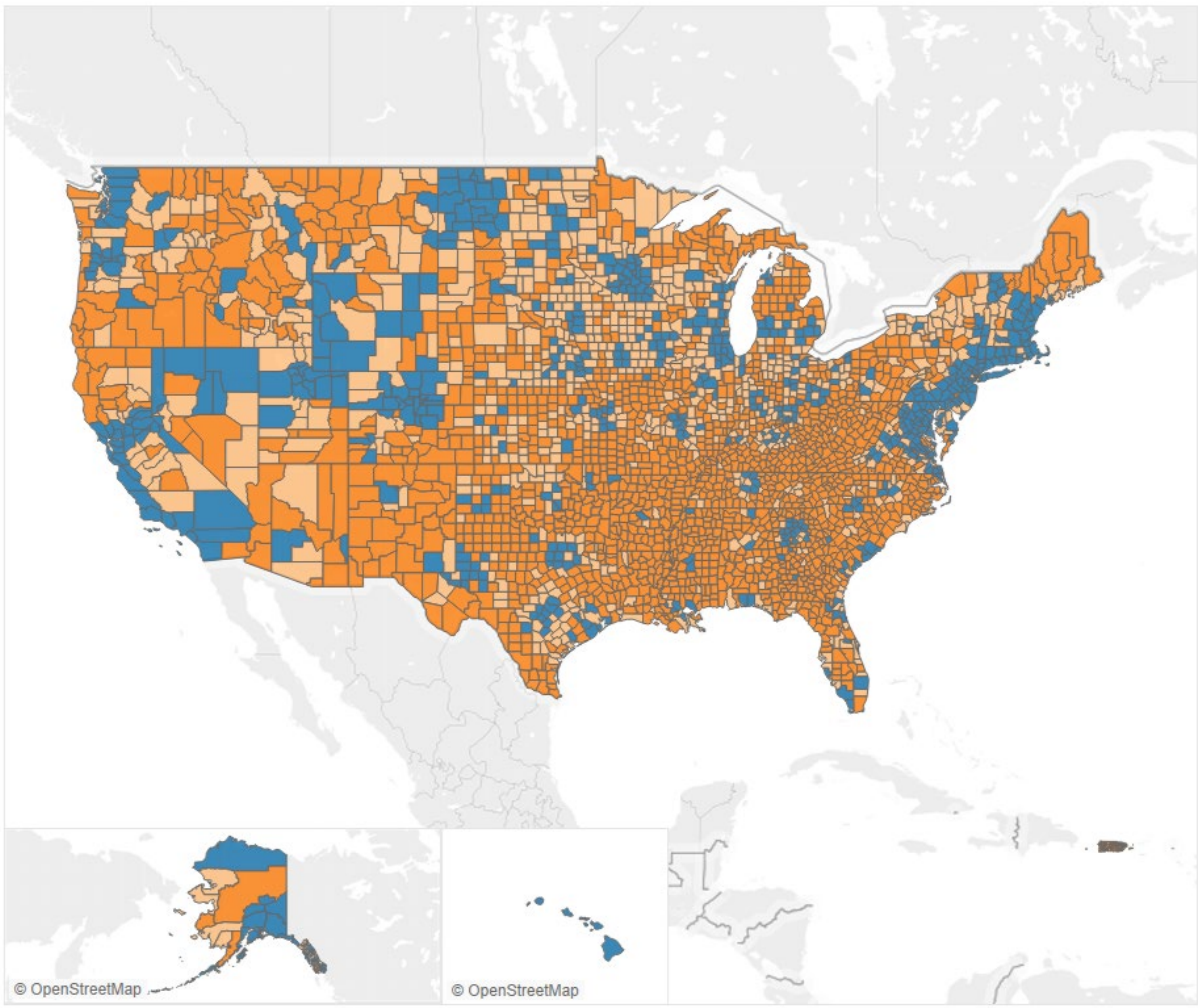
Figure 14: Income Groups by Unit of Geographic Analysis, Income Definition in 2019
Bottom Income Quartile: Orange, Second Income Quartile: Light Orange, Top Half: Blue

(a) Census Tract



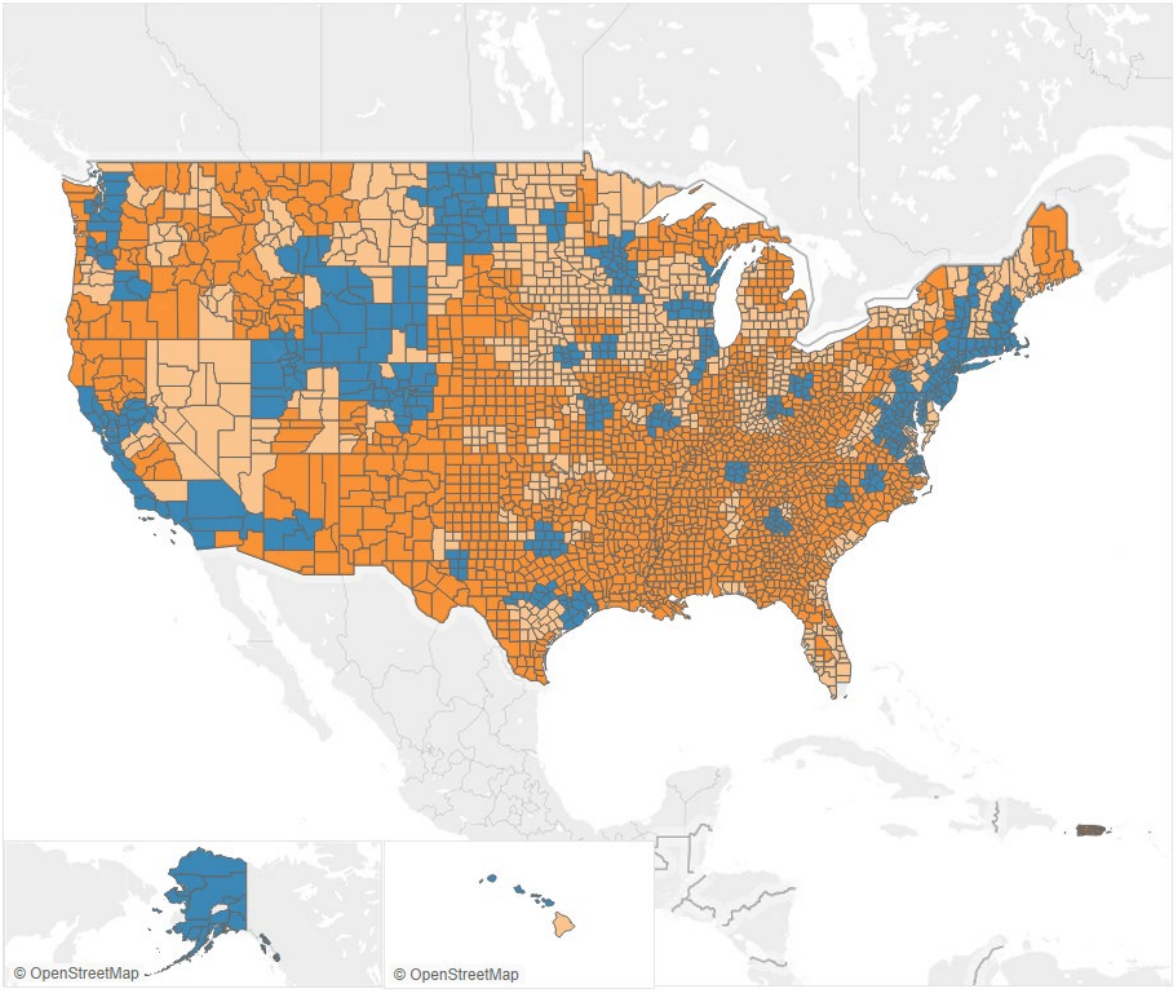
Notes: 846 Puerto Rican census tracts are in the Bottom Income Quartile, 28 are in the Second Income Quartile, and 7 are in the Top Half. Other Puerto Rican census tracts are omitted due to low population. Tract map file from Census.

(b) County



Notes: All Puerto Rican municipalities are in the Bottom Income Quartile. County map file from Tableau.

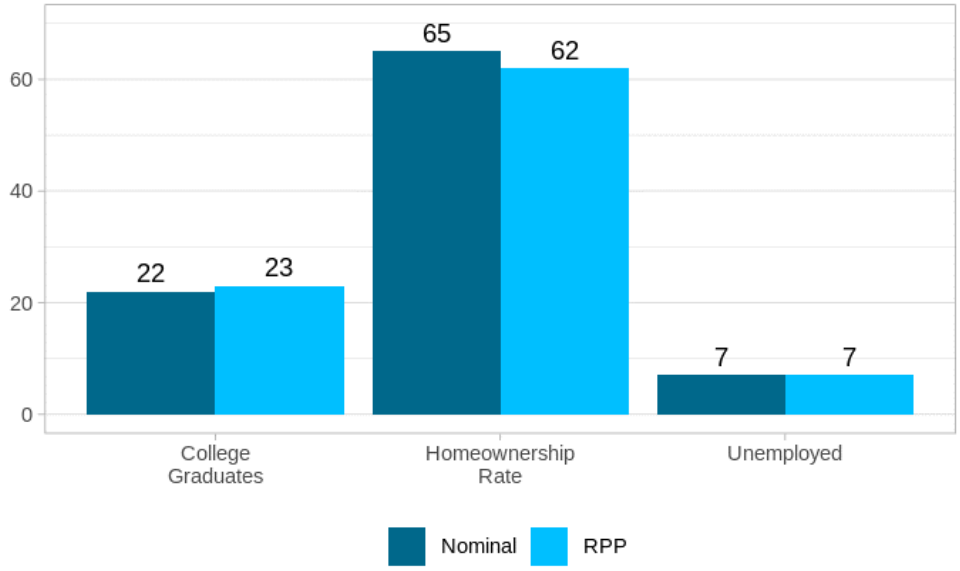
(c) Commuting Zone



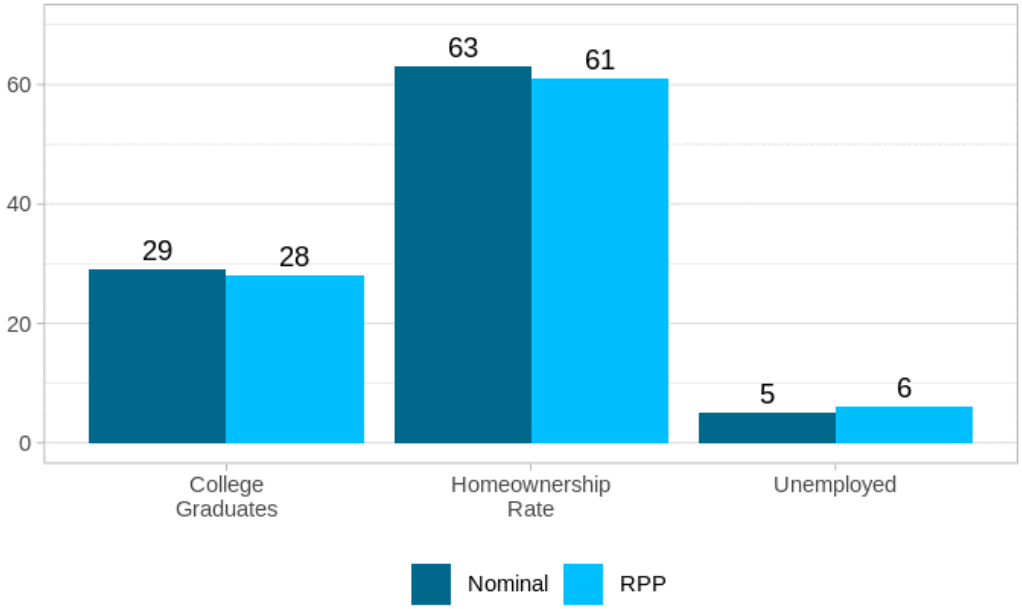
Notes: For panel (c), a county-level shapefile (Tableau) with a crosswalk to commuting zones (Missouri Census Data Center, 2023) is used to display commuting zones level income groups (Ruggles, et al., 2023), which are made up of counties. 2019 income groups are based on 2015–2019 5-year American Community Survey. Since Puerto Rico is not assigned commuting zones in the data, we manually place Puerto Rico into the Bottom Income Quartile for commuting zones. We choose this because the maximum value for county median household income in Puerto Rico is $35,928, while the minimum value for county median household income for counties in the Second Income Quartile outside of Puerto Rico is $52,872.

Figure 15: Measures of Economic Well-Being by County-Group, 2015 - 2019, Nominal Income Definition vs. Cost-of-Living Adjusted using Regional Price Parities (RPP)

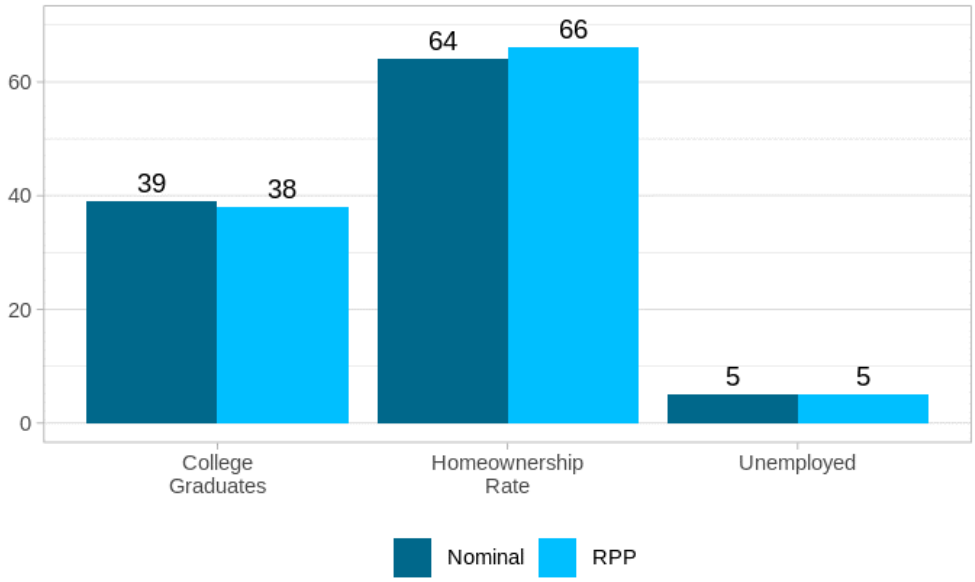
(a) Bottom Income Quartile



(b) Second Income Quartile



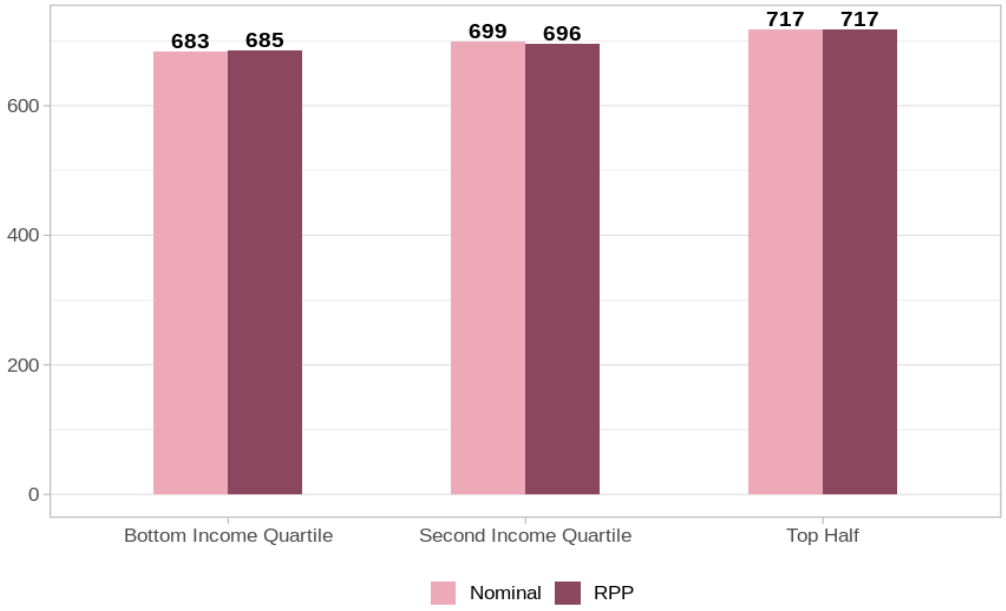
(c) Top Half



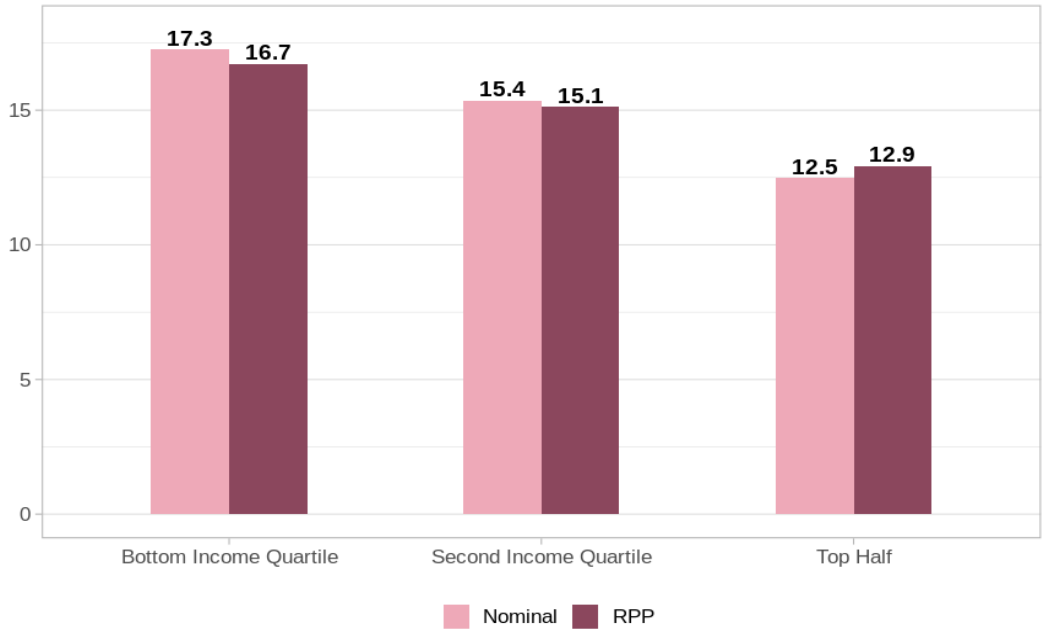
Notes: 2019 income groups using 2015–2019 5-year American Community Survey. Outcome data from 2015–2019 5-year American Community Survey.

Figure 16: Access to Credit Across County Groups in 2019, Nominal Income vs. Cost-of-Living Adjusted Definition using Regional Price Parities (RPP), 2019Q4

(a) Average Credit Score



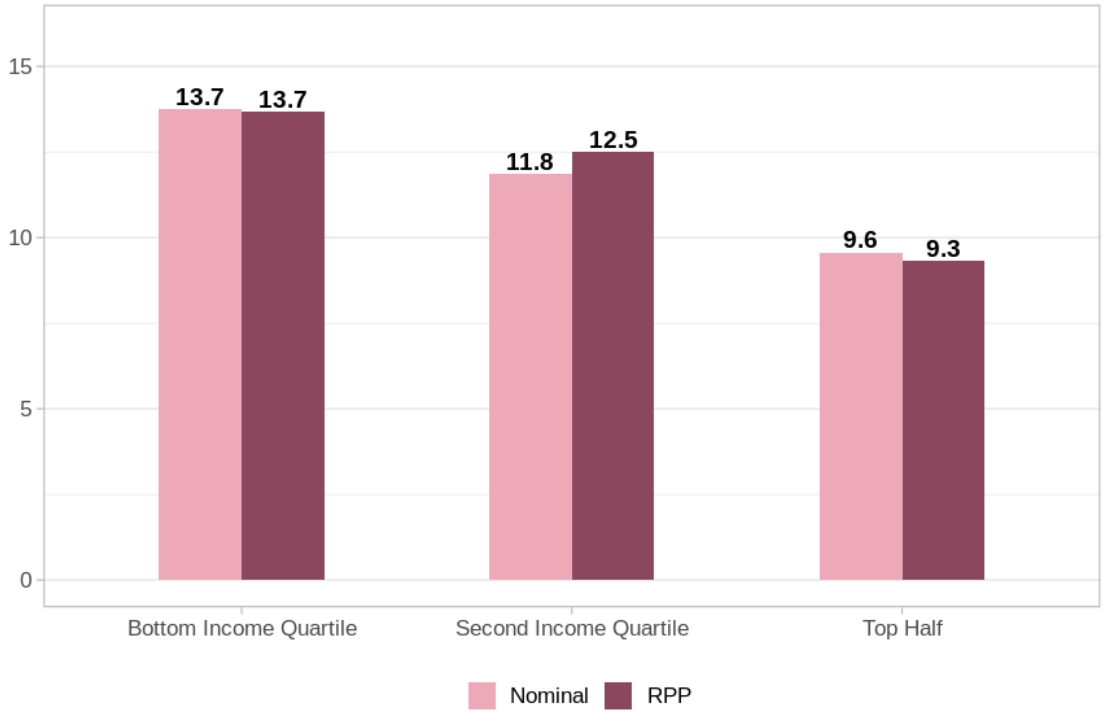
(b) Percent Unscored



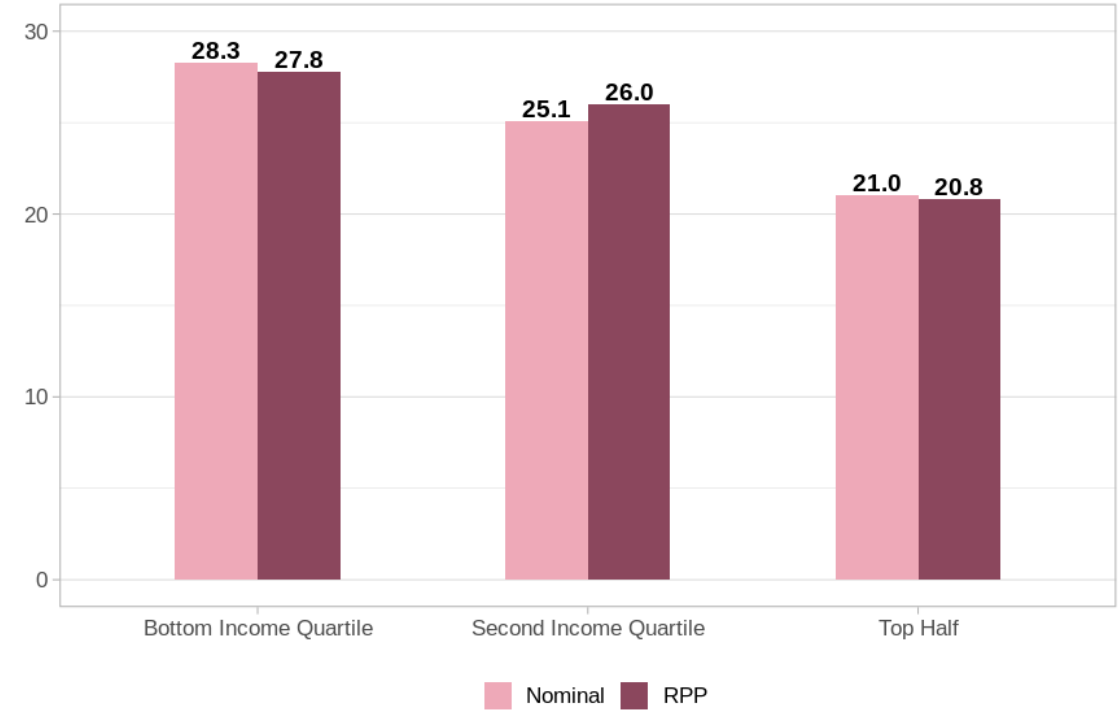
Notes: NY Fed/Equifax Consumer Credit Panel. 2019 income groups based on 2015–2019 5-year American Community Survey. Average credit score is the Equifax Risk Score, a proprietary credit score similar to other credit scores used in the industry. Percent unscored in panel (b) refers to the percent of accounts without a credit score. For example, individuals a limited credit history may not have a credit score. 2019 income groups based on 2015–2019 5-year American Community Survey.

Figure 17: Financial Instability Across County Groups in 2019, Nominal Income Definition vs. Cost-of-Living Adjusted using Regional Price Parities (RPP), 2019Q4

(a) Percent Card Holders that are Delinquent (30 Days Past Due or More)



(b) Percent with Over 75 Percent Credit Card Utilization

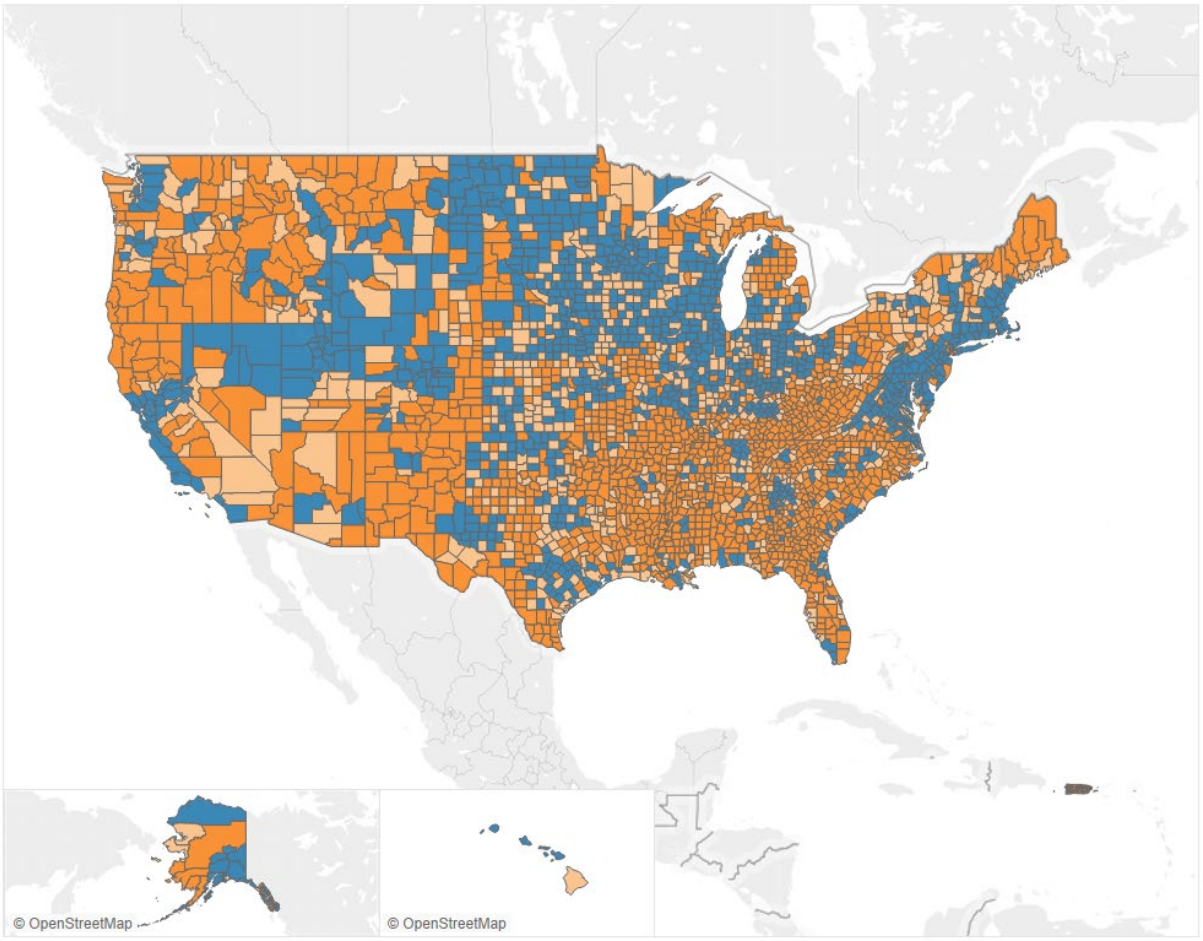


(c) Percent with Any Third-Party Collections

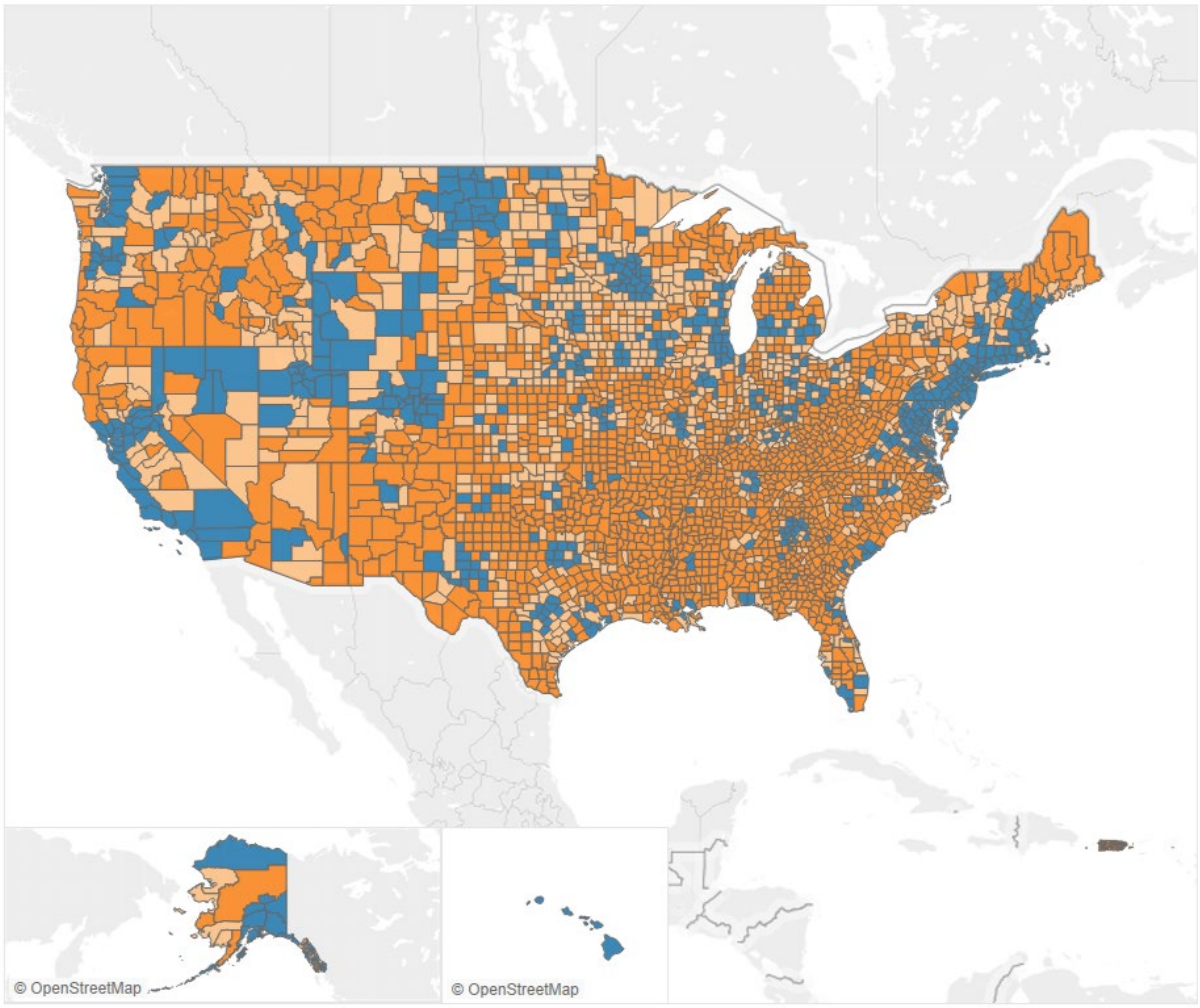
Notes: NY Fed/Equifax Consumer Credit Panel. 2019 income groups based on 2015–2019 5-year American Community Survey. In panels (a) and (b), credit cards refer to cards issued by banks and not retailers. The denominators for panels (a) and (b) are the same and are equivalent to the number of credit card holders. The third-party collections in panel (c) includes a broader set of consumers with debt not regularly reported to credit bureaus, such as debt from unpaid utility bills.

Figure 18: Map of Counties by Income Classification in 2019, Nominal Income Definition vs. Cost-of-Living Adjusted using Regional Price Parities (RPP)
Bottom Income Quartile: Orange, Second Income Quartile: Light Orange, Top Half: Blue

(a) RPP Adjusted



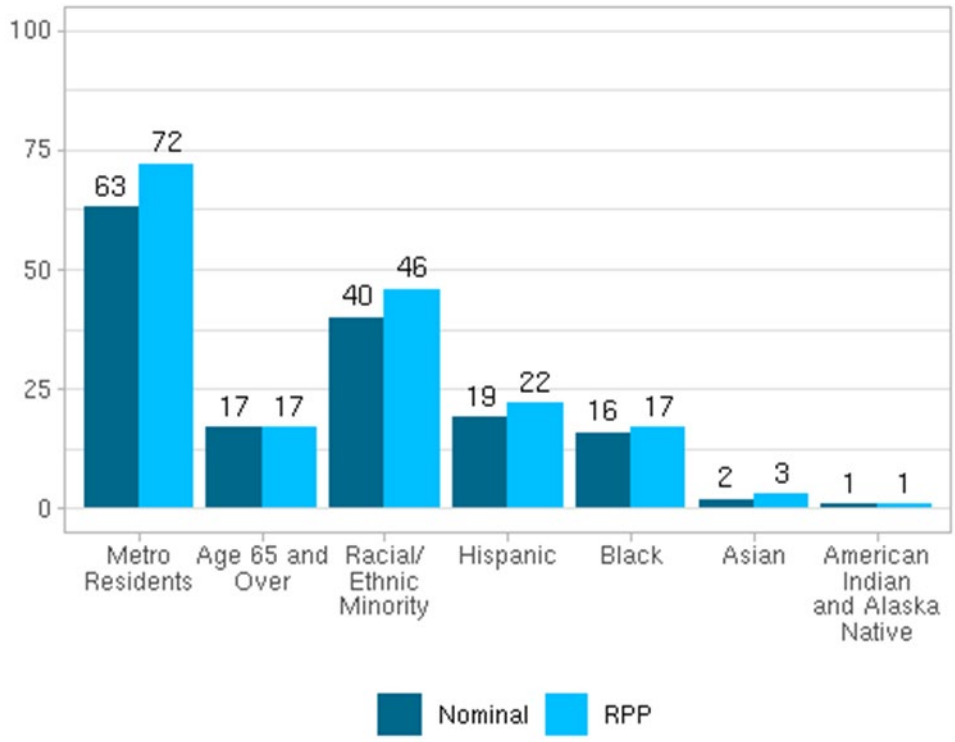
(b) Nominal



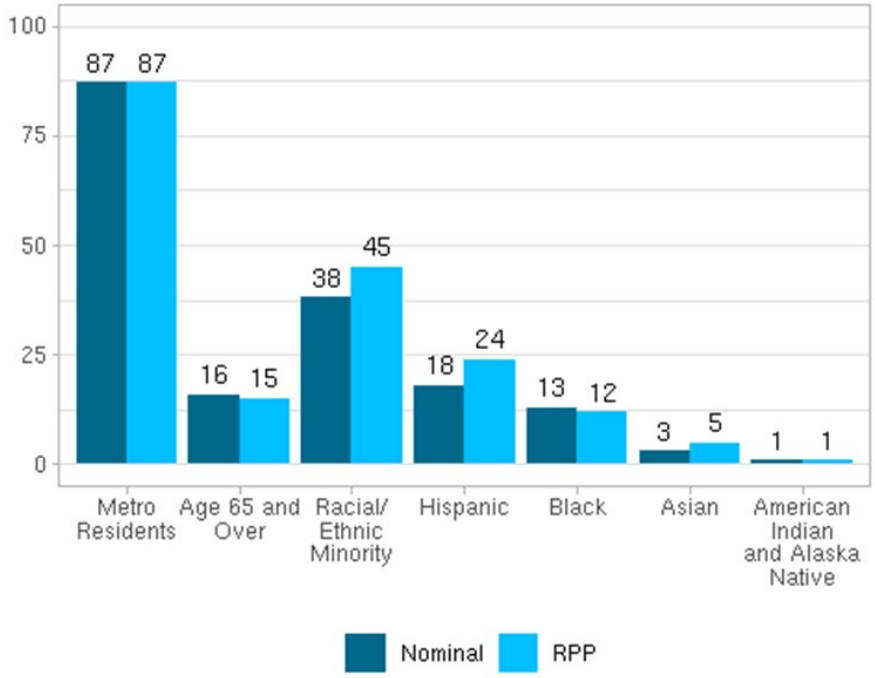
Notes: All Puerto Rican municipalities are in the Bottom Income Quartile. 2019 income groups based on 2015–2019 5-year American Community Survey. Cost-of-living adjustments use the Bureau of Economic Analysis Regional Price Parities (RPP).

Figure 19: County Demographic Characteristics, 2015 - 2019, Nominal Income Definition vs. Cost-of-Living Adjusted using Regional Price Parities (RPP)

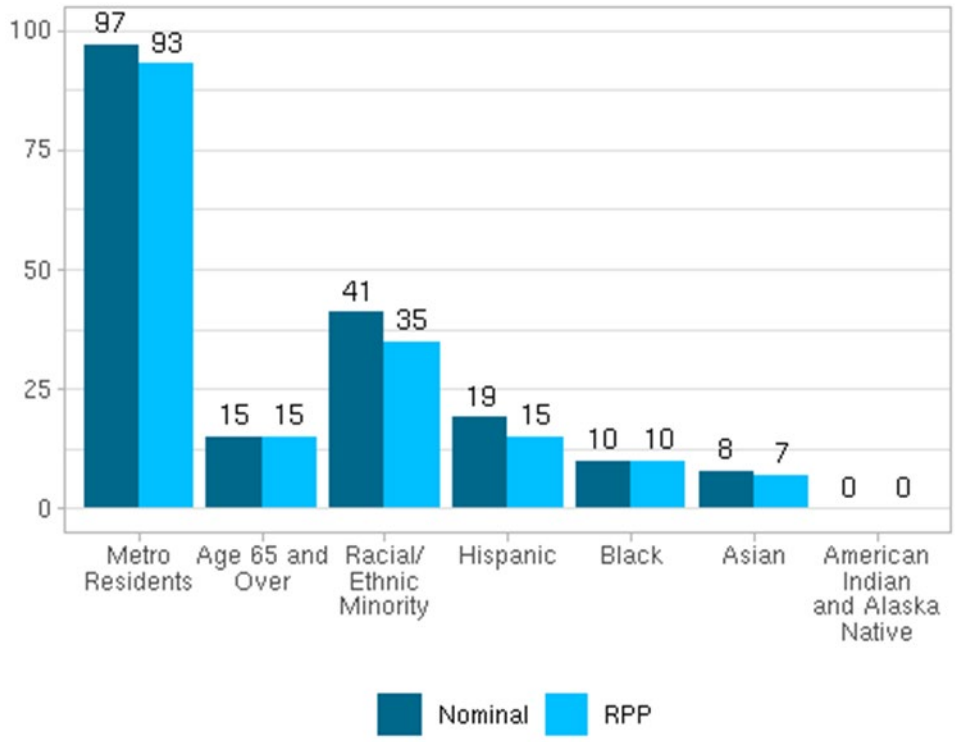
(a) Bottom Income Quartile



(b) Second Income Quartile



(c) Top Half



Notes: Income groups based on 2015–2019 5-year American Community Survey, cost-of-living adjustments using the Bureau of Economic Analysis Regional Price Parities (RPP). Hispanic share includes all Hispanic individuals while Black, Asian, and American Indian and Alaska Native shares include only non-Hispanic individuals. Individuals who identify as multiple races/ethnicities are not included here. Demographic data from 2015–2019 5-year American Community Survey.

Table 1: Income Definition County Group Income Ranges, Income Definition in 2019

	Bottom Quartile	Second Quartile	Top Half
Median Household Income	< $52,835	$52,835-$62,233	> $62,233

Notes: 2019 income groups based on 2015–2019 5-year American Community Survey

Table 2: Summary Statistics of Median Household Income by County Group, 2015 - 2019

	mean	median	min	max	count
Bottom Quartile	42,907	44,510	12,441	52,835	1,787
Second Quartile	56,921	56,762	52,872	62,233	799
Top Half	74,721	70,168	62,236	142,299	634

Notes: 2019 income groups based on 2015–2019 5-year American Community Survey

Table 3: Economic Well-Being by County Group, 2015 - 2019

	Bottom Quartile	Second Quartile	Top Half	Top Half Minus Bottom Quartile (Gap)
Unemployed	7	5	5	-2
College Graduates	22	29	39	17
Homeownership Rate	65	63	64	-1

Notes: 2019 income groups based on 2015–2019 5-year American Community Survey. Outcome data from 2015–2019 5-year American Community Survey.

Table 4: Self-Reported Financial Well-Being Across County Groups in 2019	Percent Not Living Comfortably or Doing Okay Financially
Bottom Quartile	29
Second Quartile	27
Top Half	21
Difference (Top-Bottom)	8

Notes: 2019 Survey of Household Economics and Decision-making. 2019 income groups based on 2015–2019 5-year American Community Survey.

Table 5: Characteristics of Counties Moving in and out of Bottom Quartile with RPP Adjustment, 2015-2019

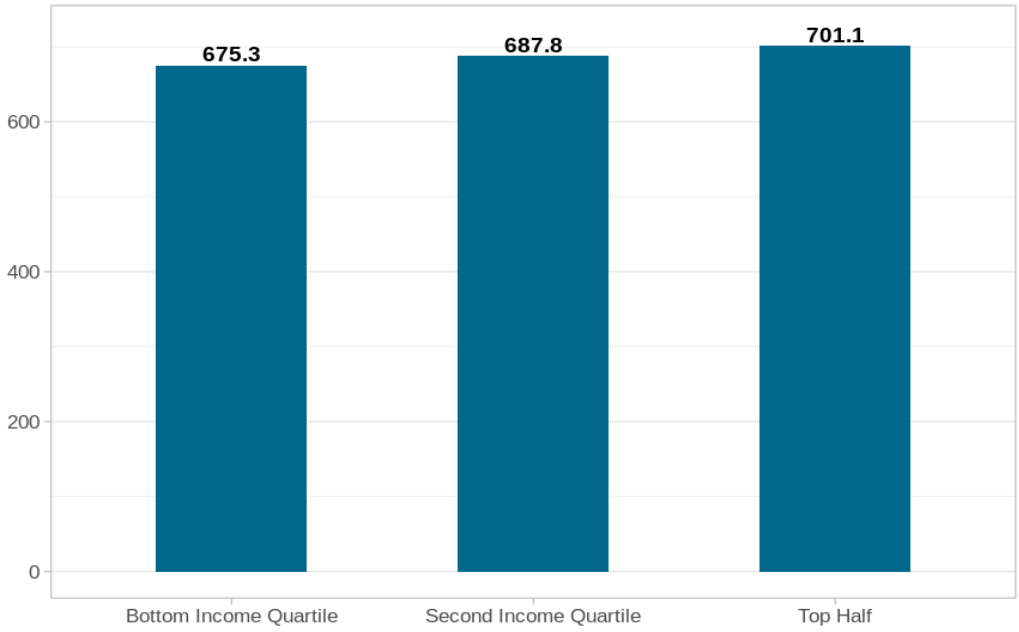
	Always Bottom Quartile	Move into Bottom with RPP adjustment	Move out of Bottom with RPP adjustment
Number of Counties	1,390	50	397
Percent of Population	20	5	5
Percent Racial/Ethnic Minority	43	55	26
Percent Black	17	17	14
Percent American Indian and Alaska Native	1	0	1
Percent Asian	2	8	1
Percent Hispanic	21	26	8
Percent Non-Metro Residents	73	40	79
Percent College Graduates	21	31	23
Homeownership Rate	64	54	68
Percent Poverty	21	15	16
Average Median HH Income	40,741	56,690	50,490
Average Adjusted Income MSA Nonmetro	46,963	54,866	59,396

Notes: 2019 income groups based on 2015–2019 5-year American Community Survey. Outcome data from 2015–2019 5-year American Community Survey. Cost-of-living adjustments using the Bureau of Economic Analysis Regional Price Parities (RPP).

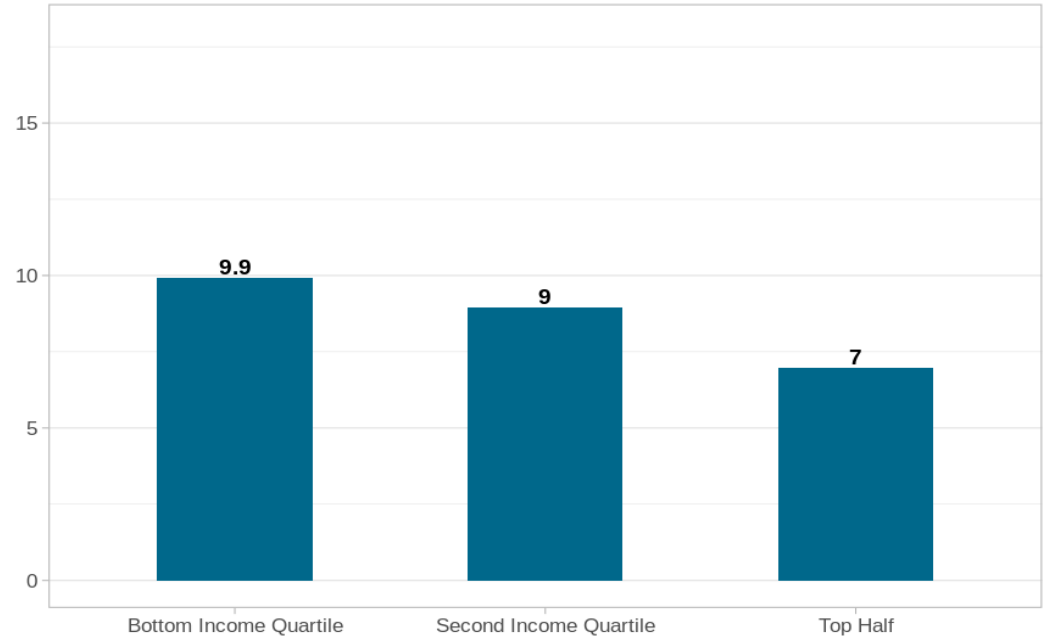
Appendix 1: Results for Credit Outcomes in 2009 Q2 (Trough of Last Business Cycle)

Figure A1: Access to Credit Across County Groups, 2009 Q2

(a) Average Credit Score



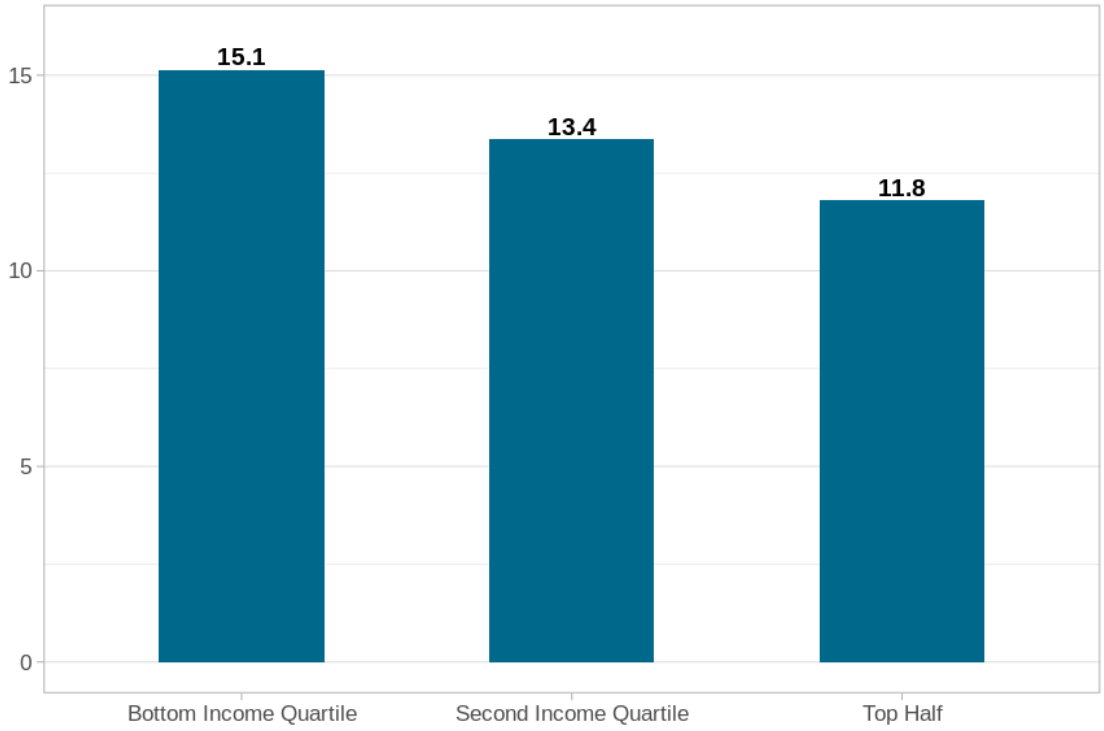
(b) Percent Unscored



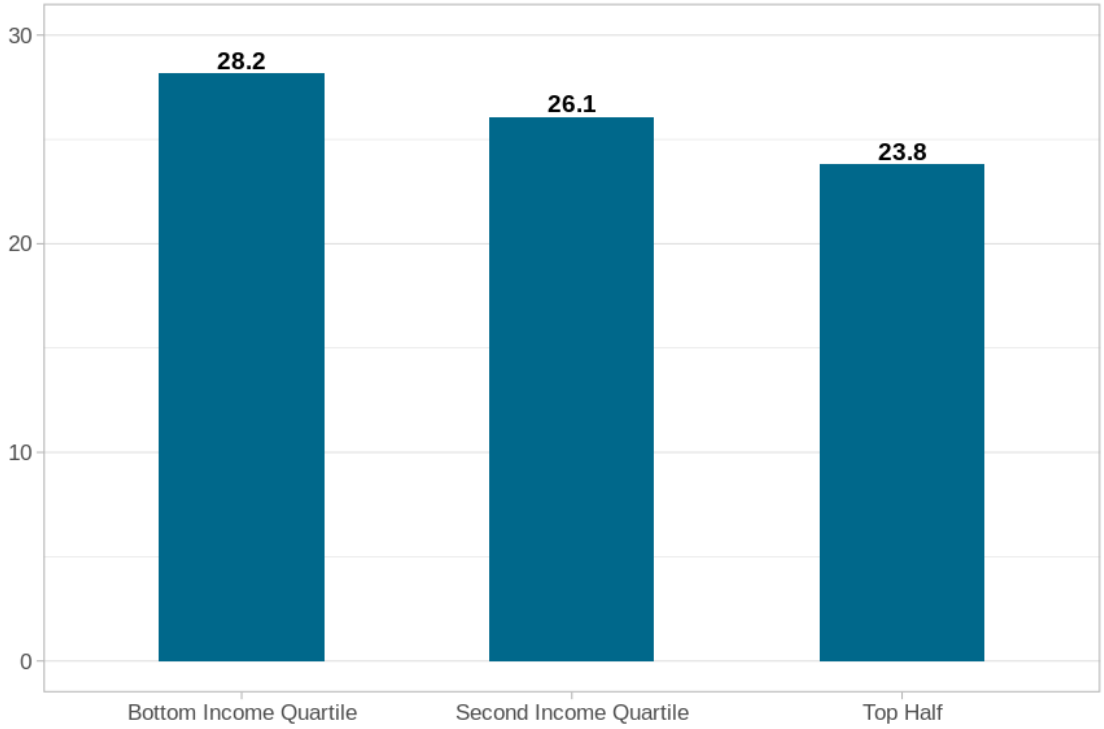
Note: Income classifications reflect geographic boundaries in the 2005-2009 5-year American Community Survey data. Credit values come from Equifax's Consumer Credit Panel and reflect geographic boundaries as of 2009. County boundaries that changed throughout the 2010's were not able to be matched and are thus omitted from this analysis. Average credit score is the Equifax Risk Score, a proprietary credit score similar to other credit scores used in the industry. Percent unscored in panel (b) refers to the percent of accounts without a credit score. For example, individuals a limited credit history may not have a credit score.

Figure A2: Financial Instability Across County Groups, 2009 Q2

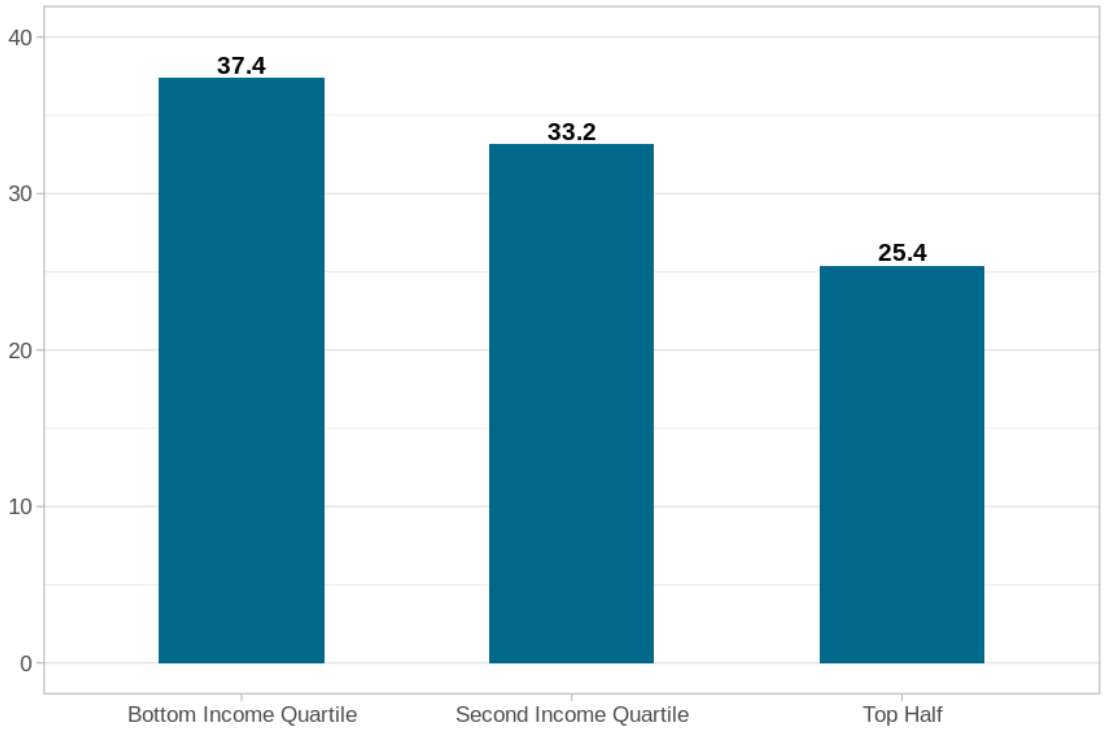
(a) Percent of Card Holders that are Delinquent (30 Days Past Due or More)



(b) Percent with Over 75 Percent Credit Card Utilization



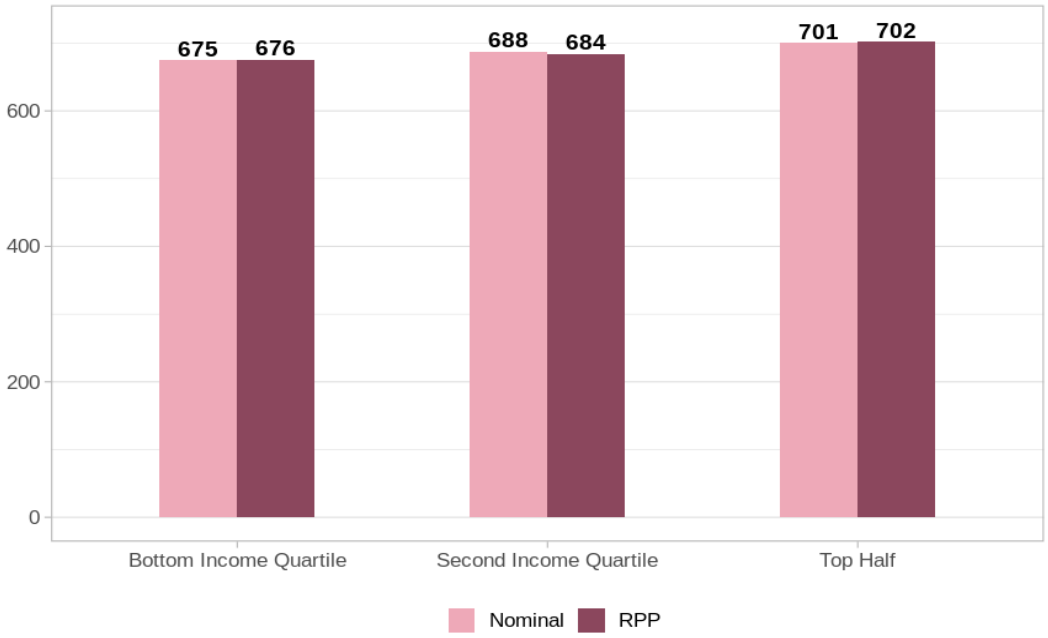
(c) Percent with any third-party collections



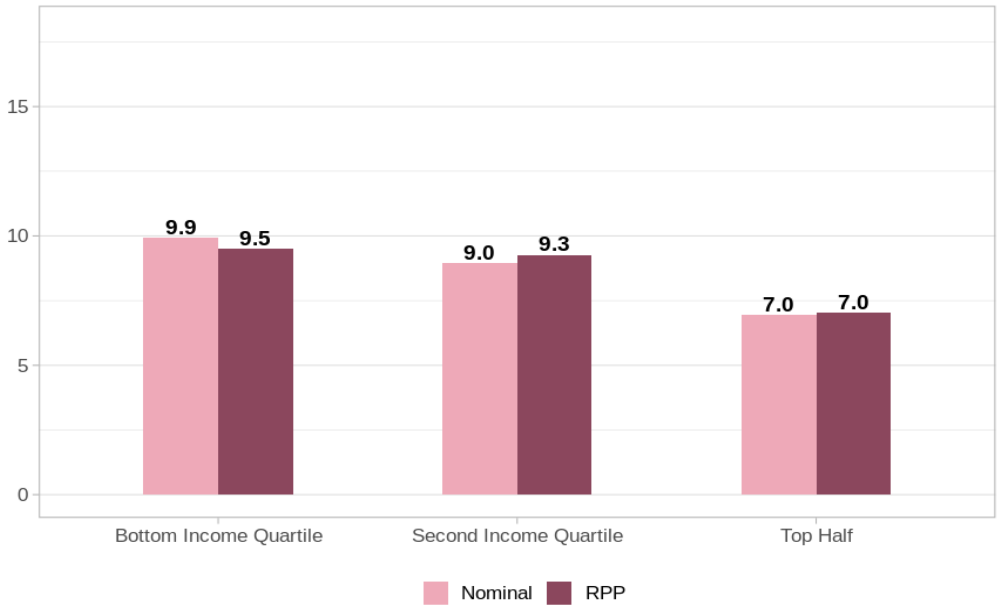
Note: Income classifications reflect geographic boundaries in the 2015-2019 5-year American Community Survey data. Credit values come from Equifax's Consumer Credit Panel and reflect geographic boundaries as of 2009. County boundaries that changed throughout the 2010's were not able to be matched and are thus omitted from this analysis. In panels (a) and (b), credit cards refer to cards issued by banks and not retailers. The denominators for panels (a) and (b) are the same and are equivalent to the number of credit card holders. The third-party collections in panel (c) includes a broader set of consumers with debt not regularly reported to credit bureaus, such as debt from unpaid utility bills.

Figure A3: Access to Credit Across County Groups, Regional Price Parity Adjusted and Unadjusted, 2009 Q2

(a) Average Credit Score



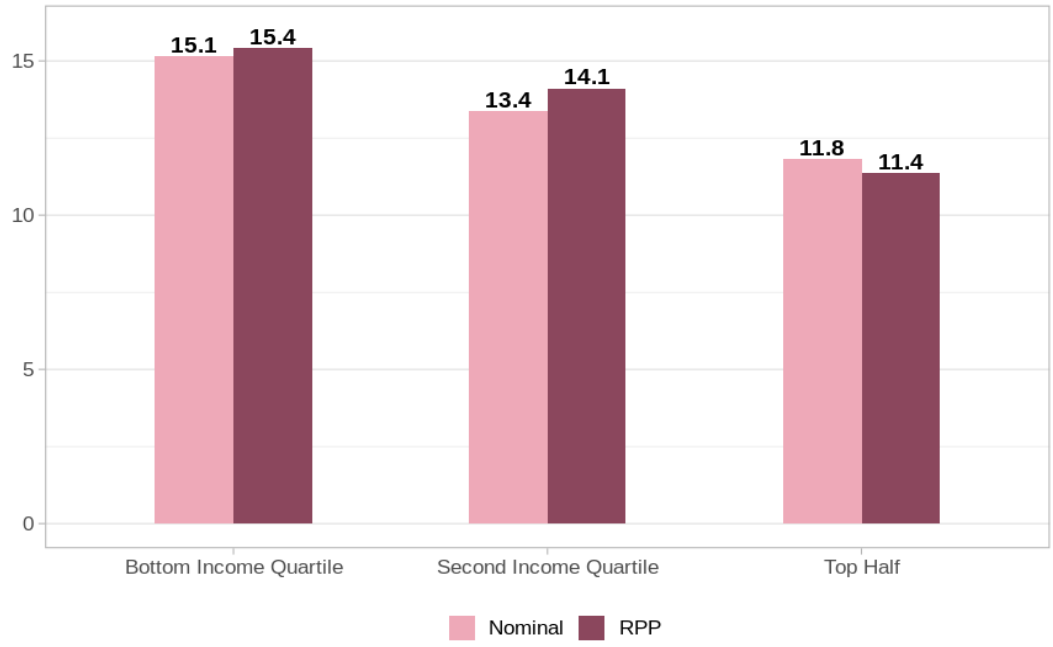
(b) Percent Unscored



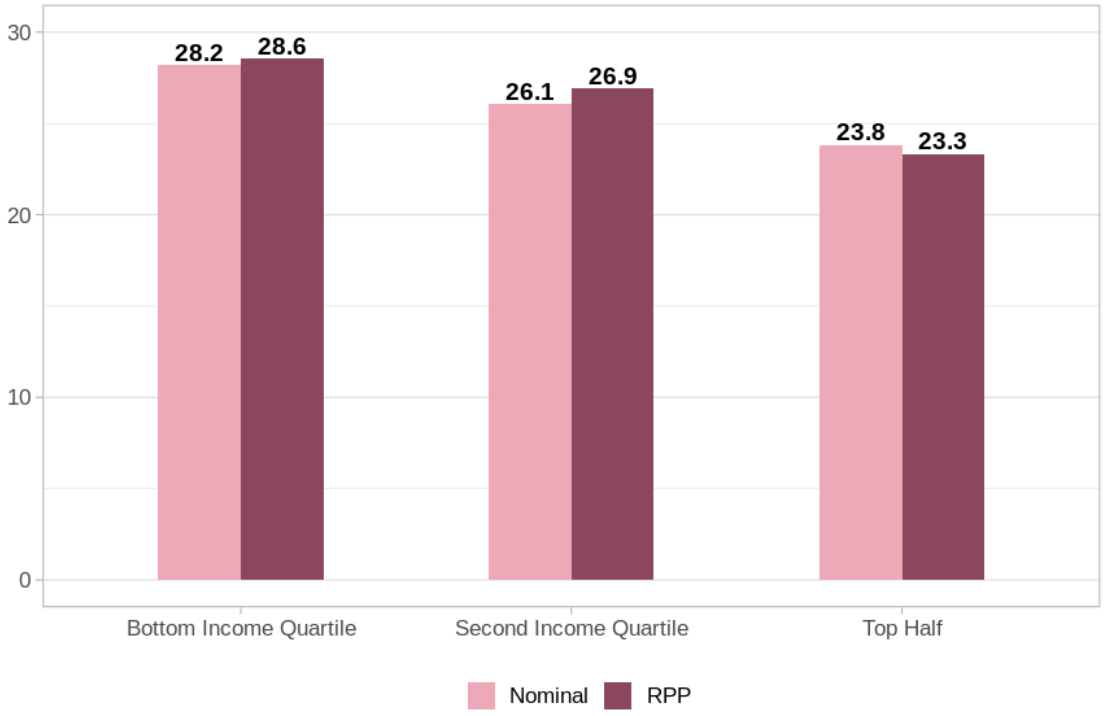
Note:Income classifications reflect geographic boundaries in the 2015-2019 5-year American Community Survey data. Cost-of-living adjustments use the Bureau of Economic Analysis Regional Price Parities (RPP). Credit values come from Equifax's Consumer Credit Panel and reflect geographic boundaries as of 2009. County boundaries that changed throughout the 2010's were not able to be matched and are thus omitted from this analysis. Average credit score is the Equifax Risk Score, a proprietary credit score similar to other credit scores used in the industry. Percent unscored in panel (b) refers to the percent of accounts without a credit score. For example, individuals a limited credit history may not have a credit score.

Figure A4: Financial Instability Across County Groups, Regional Price Parity Adjusted and Unadjusted, 2009 Q2

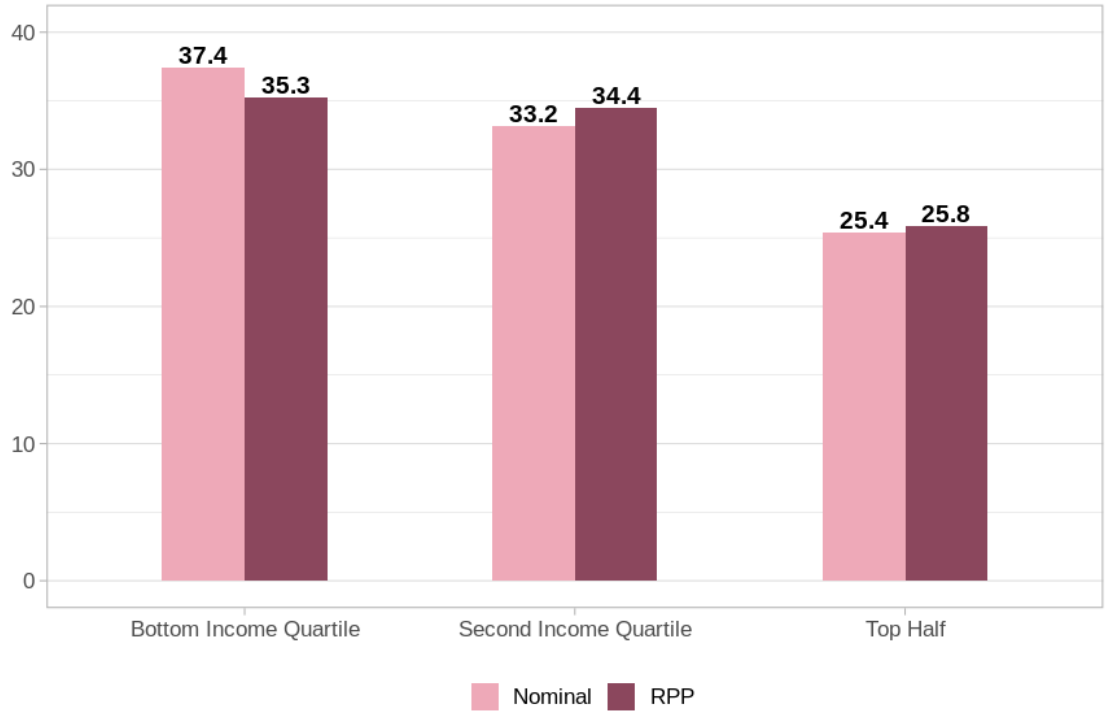
(a) Percent of Credit Card Holders that are Delinquent (30 Days Past Due or More)



(b) Percent with Over 75 Percent Credit Card Utilization



(c) Percent with Any Third-Party Collections



Note: Income classifications reflect geographic boundaries in the 2015-2019 5-year American Community Survey data. Cost-of-living adjustments use the Bureau of Economic Analysis Regional Price Parities (RPP). Credit values come from Equifax's Consumer Credit Panel and reflect geographic boundaries as of 2009. County boundaries that changed throughout the 2010's were not able to be matched and are thus omitted from this analysis. In panels (a) and (b), credit cards refer to cards issued by banks and not retailers. The denominators for panels (a) and (b) are the same and are equivalent to the number of credit card holders. The third-party collections in panel (c) includes a broader set of consumers with debt not regularly reported to credit bureaus, such as debt from unpaid utility bills.