DISSERTATION

THE LOCAL ECONOMIC IMPACT OF DEMOGRAPHIC CHANGE

Submitted by

Austin Landini

Department of Economics

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Doctoral Committee:

Advisor: Anita Pena
Co-Advisor: Stephan Weiler

David Mushinski
Jennifer Coats

ABSTRACT

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Little research exists exploring the relationship over time between changes in demographic concentrations and economic outcomes such as tax, spending and income. Given the speed of demographic transformation in the United States over the past few decades, it is important for policymakers to understand the relationship between demographics and economic indicators, as well as potential mechanisms which may drive these relationships.

The following dissertation research is divided into five chapters, with Chapters 1 and 5 introducing the topic and concluding, respectively. In Chapter 2, I argue that there is an endogenous relationship between demographic change and economic outcomes such as tax and expenditure per capita which is biasing previously published results. Taking into account the time impact of unobservable variables in Census data 1980-2010, Census Places which are becoming more diverse have lower tax and expenditure per capita. Because Census Places do not capture the entire US demographic landscape, especially in rural areas, Chapter 3 makes use of ACS 5-year estimates 2010-2019 to show that there is also a robust negative relationship between non-White composition and income per capita at the Census Tract level in Colorado. The fact that Census Places and Tracts which become more diverse over time suffer from reduced tax, expenditure and income per capita is an important consideration for public policymakers moving forward. Still, these results cannot be taken as causal and further research is warranted into mechanisms which may be driving this negative relationship in order to implement policies aimed at reducing residential segregation and inequality. Chapter 4 uses a voluntary contribution game embedded in a list survey to determine whether demographic information about a community could be altering individuals' willingness to contribute to public programs.

In Chapter 2, I begin by commenting on a famous publication by Alesina, Baqir and Easterly (1999) which finds that the relationship at the Census Place level between race heterogeneity and tax/spending per capita is positive. That is, places with higher levels of race heterogeneity have higher levels of tax and spending, but lower spending on `productive' public goods such as road maintenance and sewerage in 1990 Census Data. I begin by

reproducing similar results for the most recently available 2010 Census data, then arguing that these results are likely biased due to endogeneity. Unobserved variables such as bargaining power, culture, and political representation impact both demographic change and tax/spending over time. As a result, cross sectional results which do not incorporate the time impact of these unobserved variables are likely to be inaccurate.

More recent economic literature, especially associated with Opportunity Insights, has produced an extensive analysis of individual-level outcomes given a place of birth. Chapter 3 shifts the unit of analysis from the individual to the place, using US Census Tracts. I argue that demographic change at the Tract level is occurring in predictable ways along racial and income lines. Tracts which increase their White Non-Hispanic population over time are becoming wealthier in terms of aggregate income and income per capita, while Tracts which increase in Minority population become less wealthy. This result suggests that policymakers may be able to combat inequality by understanding and responding to the mechanisms which drive demographic segregation.

Individuals' support for public funds is a complex decision which is influenced by the information the respondent has about the public fund, its contributors, and its use. Individuals may be less willing to contribute to public projects if they perceive (correctly or incorrectly) that others will not contribute. Policymakers would like to understand what types of information are important factors in the contribution decision. Since perceptions and beliefs about the likeliness of others to contribute is a potentially sensitive question, respondents may choose not to answer questions about their beliefs and perceptions truthfully. This effect is known as social desirability bias. To combat social desirability bias, social scientists have in recent years employed the list survey experiment. Chapter 4 combines a list survey type experiment into a voluntary contribution game to examine perceptions about race which could underlay the negative relationship found in Chapters 2 and 3. I find that individuals do use demographic information to influence contribution to public funds, and that contribution levels are highest when the community which will benefit from the public fund is similar in race/ethnicity to that of the respondent.

The results of this body of work suggest that the conflict and inefficiency hypothesis as presented in the literature is flawed. That is, lower public goods spending in diverse areas is not produced by mismanagement of available funds, but rather by a dearth of funds available. Nonetheless, there are elements of residential preference and voting behavior which could be driving observed differences in public goods spending and quality by creating residential segregation which perpetuates economic inequality.

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Chapter 1- Introduction: The Local Economic Impact of Demographic Change

The United States is currently in a period of rapid demographic transition. While in the year 1980, White non-Hispanic residents comprised about 80% of the population, that figure has diminished to just under 58% as of the 2020 Census (census.gov). To study the impact of demographic change it is important to keep in mind two key points. First, the impact of demographic change is a process that is unfolding over time. Both community and individual economic responses to demographic transition are occuring over the course of many years. As a result, the impact on measurable economic outcomes such as local taxation and spending, as well as quality of life indicators commonly used throughout the literature such as poverty and education will be adjusting over time. Second, demographic transition is *not* occuring uniformly across the country, or even across states. Both the speed and racial composition of demographic transition varies, especially by urban/rural areas, but also by area of the country. In many areas of the United States, demographic change is driven by increases in Hispanic residents, however there are others where the transformation is being driven by changes in Black or Asian populations.

Economists and policymakers alike are interested in studying the local economic impact of demographic change in order to prescribe policies which minimize inequality and residential segregation, while expanding the quality of economic opportunity available in all areas. To study this topic is to understand that demographic change is not monolithic, and the policies best suited to respond to local impacts of demographic transition will likely vary at the state, county, city, and even finer geographic levels. Policies aimed at addressing disparities in public goods and services, income, and economic opportunity will require active understanding from policymakers of how demographic change is occuring in their area, and what the needs are of the population given the changes which are occuring. It is unlikely that broad sweeping Federal, or even State level reform will adequately address economic inequality given the diversity of demographic change over time in those jurisdictions. Instead, policy driven by the needs of local communities or neighborhoods from publicly appropriated funds may be advantageous.

Because appropriation of public funds is often a democratic process in the United States, local policymakers also need to understand how demographic change impacts local community members' perceptions about and support for various public projects and funds. Previous economic literature finds that more diverse Counties, Municipalities and US Census 'Places' have higher levels of taxation and expenditure per capita, but lower spending on 'productive' public goods such as road maintenance, sewerage, and parks (Alesina 1999). In response, a strand of economic literature has formed which attempts to explain this relationship, and generally concludes upon various types of what I describe hereforward as "conflict and inefficiency" hypothesis. These works suggest that diverse geographic areas which have higher levels of tax and expenditure fail to provide commensurate quality public services when individuals within the community have varying preferences, cannot adequately communicate about their needs to pass reform, or are unwill-

ing to share resources outside of their racial/ethnic community (Habyarimana 2007). More recent economic literature, especially associated with Raj Chetty, et al. and Opportunity Insights challenge the conflict and inefficiency theory by demonstrating that there are geospatial differences in adulthood economic outcomes, which vary by race/ethnicity at a very fine geographic level (Chetty, et al. 2016a, 2016b, 2018 and 2020).

Still, little research exists exploring the relationship over time between changes in demographic concentrations and economic outcomes such as tax, spending and income. These measurable economic factors at the community and neighborhood level are likely to drive differences in quality of economic opportunity which underlay disparities in adulthood outcomes by race, ethnicity and neighborhood of birth. In the work to follow, I identify an important intertemporal relationship which contradicts the conflict and inefficiency hypothesis. As communities diversify, which in US data usually corresponds to a reduction of White non-Hispanic combined with increases in Black and/or Hispanic populations, tax and expenditure is actually decreasing rather than increasing as suggested in previous literature. Instead of focusing on potential conflicts between different groups and interests, economic policymakers could work to fight inequality by understanding the factors which drive more diverse communities to be relatively poorer in terms of personal income, economic opportunity, and the ability to tax and spend.

Chapters 2 and 3 of this dissertation identify a negative relationship between demographic heterogeneity and local tax and spending at the US Census Place level for all states, and at the Census Tract level in a study of Colorado. The negative relationship suggests that explanations aside from intergroup conflict may be more pervasive in explaining disparities in economic outcomes. Chapter 4 uses a list experiment embedded in a voluntary contribution public goods game to demonstrate that the information community members have about the demographics of place which they live in may alter their perception of others' contribution and thus their own support for public funds and services. These findings suggest important future work to untangle the implications of demographic transition over time on local level measures such as poverty, inequality, business formation, and economic opportunity.

Chapter 2- An Uneven Landscape of Public Services for People of Color: Identifying Endogeneity in the Relationship Between Local Race Composition and Public Expenditure

I Introduction

Local quality of education, health care, and environmental conditions are important quality of life determinants. Previous economic literature identifies inequality in the provision of public goods at the local community level. For example, educational providers are of higher quality in wealthier areas, and of lower quality in predominantly non White areas– especially inner cities (Darling-Hammond 2007; Lleras 2008). Access to quality health care is limited in low income and racially diverse areas. (Fiscella 2000; Kawachi 2005; Williams 2005).

Alesina, Baqir and Easterly (1999) provide a seminal framework to measure the impact of racial heterogeneity on public goods provision. The authors measure race heterogeneity as a Herfindahl index- the probability that two randomly drawn people from a geographic area will be of different races. While this measure of race heterogeneity is positively associated with expenditures and tax collection per capita, it is negatively associated with "productive" public goods and services: education, roads, and sewage/trash pickup. In the years since the work of Alesina, Baqir and Easterly, there has been an expansive and diverse literature on the role of race diversity on provision of publically funded services.

Following this result, the standing literature on race diversity and public goods and services provision is generally divided into three families of mechanisms by which racial heterogeneity in communities might result in under-provision of important public goods and services: preference, technology, and strategy selection (Habyarimana 2007). If preferences are correlated with group membership, diversity will imply a diversity of tastes, which may cause disagreements or undermine efficacy in determination of public resource provision (Alesina, et al. 2003), thereby resulting in non-pareto optimal outcomes. Bowles and Gintis (2004, 2004a) posit that cooperative strategies may be available within communities which are able to identify themselves along some characteristic, such as gender, race or ethnicity. Technology such as language is a medium by which groups are able to identify cooperators and punish non-cooperators. Finally, under-provision could be the result of strategy selection, wherein group members choose lower levels of provision when the resource is shared with members of other groups than within their own.

Under these three mechanisms, the negative relationship between race heterogeneity and public funding is shown to hold across nations (Alesina, et al. 2003; Baldwin and Huber 2010; Lieberman 2012) and at various units of

analysis including world regions (ex. Banerjee, et al. 2005; Jackson 2013), local districts and municipalities (Bardhan 2000; Habyarimana 2009). These hypotheses, generally summarized as 'conflict and inefficiency' explanations of the relationship between race heterogeneity and public spending, rely on the finding that more racially diverse places collect more tax and spend more per capita, but provide lower spending shares on productive public goods such as roads and sewage.

While Alesina, et al. (1999) demonstrate that the result holds in a cross-section of city level, metropolitan area level, and county level data, this finding has been challenged in more recent literature. For example, Hopkins (2011) finds that the impact of diversity on local public goods provision is neither pervasive nor consistent. In a panel 2000-2010, Lee, et al. (2016) concur, and each indicate that rather than altering overall funding for public services, cities respond to increased race heterogeneity alter the distribution of funding, especially toward police and fire protection. An additional strand of the literature focuses on the impact of income inequality (which may have a racial component taking into account historical US institutions). Corcoran and Evans (2010) find that inequality which reduces the median voter's tax share induces higher educational spending. Likewise, Boustan et al. (2013) show that growing income inequality is associated with the expansion of government revenues and a variety of services. However, it remains unclear that the expansion of services occurs uniformly over the entirety of the local area. Concerns remain that expansion of services may occur primarily in wealthier areas.

Since 1980, the US has undergone a considerable demographic change. In US Cities, the average probability that two randomly selected citizens will be of different races, as defined by the US Census, has increased from around 23% in 1980 to 43.5% in 2010. In this paper, I expand upon the existing literature by introducing an alternative mechanism by which race heterogeneity and public goods provision might be linked. Over time there is a positive correlation between changes in income inequality and changes in residental segregation (Fogli 2019). Previous literature studies location decisions among those relocating and finds that "generally, high income or highly educated households, or households belonging to ethnic groups with high levels of ethnic capital, choose to live in less segregated neighborhoods." (Borjas pg. 25). Migrants into cities tend to seek out ethnic enclaves for more favorable job market outcomes (Edin 2003, Damm 2009).

For these reasons, race composition in a community as measured by the standard heterogeneity measure is likely to be endogenously determined over time, in part by public goods and services provision. As Benabou notes, "Most cities are segregated along income and occupational lines. People with high skill, high wage jobs live together in certain select areas or suburbs, and those with low skill, low wage jobs, or no job at all reside in different parts" (Benabou pg. 1). If there are differences in preferences over public goods selection between groups, or if the groups are less successful in collective action to achieve public goods provision, community formation is important in determining these spending outcomes. Furthermore, low income earners may be drawn to communities which are relatively cheaper and provide less public goods, thereby further diluting the public goods provided, an important concern in the

Tiebout Hypothesis. Endogeneity in the determination of race or income composition would bias contemporaneous results, potentially resulting in an overstated impact of heterogeneity on public goods provision. The possibility that demographic distributions within cities might be in part determined over time by public goods provision and previous racial composition remains unaddressed and is an important shortcoming of the literature (Banerjee, et al. 2005, Singh & vom Hau 2016).

These concerns are significant enough to warrant further investigation into the relationship between race heterogeneity, as commonly measured in the literature, and expenditure or taxation per capita at the local level. Recent work accounting for endogeneity in the relationship suggests that more diverse cities collect less tax and spend less, rather than the opposite (Trounstine 2016). If the basis for the conflict and inefficiency hypothesis is that in diverse (usually large) cities, there is plentiful tax collection and spending, but inefficiencies or disagreements on how to best use the money, resulting in under-provision. If instead, more diverse communities are collecting less tax, and spending less, the conflict theory is unjustified. Instead, empirical evidence points to an intertemporal sorting mechanism which is illuminated using panel data on cities' racial composition and spending.

Section II describes data used to illuminate the relationship between racial heterogeneity at the Census Place level. Section III replicates Alesina, Baquir and Easterly's (1999) results updating from 1990 Census Data to 2010. Sections IV discusses why use of cross-sectional data may lead to flawed conclusions about the true relationship between race and local tax/expenditure, and presents time series estimates, while Section V introduces an instrumental variable approach to potentially address concerns about endogeneity in the model. Section VI concludes.

II Data

This study builds on the present literature by introducing a novel dataset featuring public goods expenditures and race composition at the city level over time, from 1980 to 2010. In addition, I use predicted race composition as an instrument to address endogeneity. The year 1980 is chosen as a starting point due to data quality for measuring racial heterogeneity in cities. Before 1980, Census data on race is limited to "White, Black, and other".

Decennial city data 1980-2000 are taken from 1983, 1994, and 2000 City Data Books (Haines 2010). Since the Census Bureau discontinued the City Data books series following 2007, 2010 data has been scanned using OCR from the 2013 County and City Extra: Annual Metro, City, and County Data Book (Gaquin and Ryan 2013). Data in each from each City Book corresponds to the most recent decennial census demographic information, combined with U.S. Census Survey of Governments as well as labor statistics provided by the Bureau of Labor Statistics. Tables 1 and 2 present a selection of important summary statistics over the 40-year panel.

Given changing demographics, the number of cities over 25k population varies over the years in the sample. There are 1422 cities considered in 2010, 1083 in the 2000 and 1990 sets, and 957 in 1980. To reproduce the Alesina, et al.

style contemporaneous analysis, I use the 2010 cross-section. I also conduct panel analysis with the variables available for the complete 1980-2010 sample, for which there are 734 observations in the continental United States. Figure 1 demonstrates the spatial distribution of these panel observations.

City level provision should most directly reflect the needs and preferences of community members, but quality and quantity of public goods and services provided often varies widely within close proximity. Study at the city level over time allows for a detailed analysis of the relationship between community race heterogeneity and public goods provision. The US Census defines race categorizations which may be arbitrary or socially constructed. Nonetheless, these classifications broadly represent groups which are politically salient in the U.S. economy (Alesina 1999). Given proportions of each race in a population, the standard definition of race heterogeneity:

$$h_i = 1 - \sum_i (race_i)^2$$

$$i = \text{[White, Black, Asian, Pacific Islander, Other]}$$

is a common measure used throughout the literature. Due to the introduction of multi-race categories in the 2000 survey, I use only one-race data, representative of 97% of the population in the 2010 Census.[1]. While authors of previous studies argue that the correlation between "Other" and "Hispanic" is high enough to be used as a proxy, the correlation between the two may be highly variable between cities. The race heterogeneity measure tells gives only a general measure of diversity in a community, however, during recent US history, increased diversity has most commonly meant relative decreases White population, and relative increases in non-White populations. For this reason in later sections, I provide additional first difference estimates for White, Black and Hispanic, and consider changes in the group identifying as "White" compared to "non-White".

Figure 2 maps the geospatial distribution of the Race heterogeneity measure H_i while Table 3 lists the 20 most and least diverse Census Places. From these figures we can observe both a North/South and Urban/Rural pattern in the Places which are most and least diverse. The 20 most diverse places are almost entirely within California, with three in the NY/NJ area. Most are in or near major metropolitan areas. The 20 least diverse places are all in the North and primarily in the Midwest and Northeast with the exceptions of Bountiful, UT and Lewiston, ID. These places are primarily smaller micropolitan areas. The study of US Census Places imposes a limitation which is that we largely do not observe more rural and less populated areas, as suggested by the dispersion of the Places. Future research should investigate whether results found here are driven by the most populated Places (which are frequently also most diverse).

Figure 3 maps the geospatial distribution of non-White population growth, while Figure 4 lists the 20 Places least and most rapidly diversifying. While the Midwest and Great Plains are diversifying (and somewhat rapidly compared

[1]Hispanic is not mutually exclusive with other race categories. Other and Hispanic have .898 correlation in the 2010 data, and about .870 overall across the panel

to their histories), the greatest rates of change are largely near the coasts, in and near metropolitan areas. Conversely, places which are either very slowly diversifying or in some cases becoming more white (of which there are 14 cases out of 734 observed) are primarily located in the South and in Texas. It is interesting to observe that both the most and least rapidly diversifying places seem to spend and tax less than average. Among the 20 least diverse places, only 7 (35%) spend more per capita than the US average and only 7 collect more tax per capita than average. Among the 20 most diverse Places, only 4 (20%) spend more per capita than average, while 6 (30%) collect more tax than the US average.

This finding lends itself to the conclusion that diversifying Places are located near large metro areas with high spending and tax but may not themselves have high rates of spending and tax from which to fund public goods and services. Over time many central business districts have diversified and become more expensive to rent and own property. As this process happened, low income residents were pushed to outlying suburbs either by the necessity of rent burden, preference for communities with members of similar race/ethnicity, or by institutional design. Data in this set appears to be capturing the trend of diversification occurring near, but not inside, large city centers.

Figure 4, with Tables 5 and 6 in combination demonstrate that many of the places which spend the least per capita are smaller and more rural. However, this list also includes predominantly non-White metropolitan suburbs such as Baldwin Park, Bell Gardens, Bellflower and Rosemead, California, all in the Los Angeles area, as well as North Chicago. The Places with the highest expenditure per capita are predominantly located in the Northeast. Interestingly, many of these places are also racially diverse. Majority Black cities: Baltimore, Flint, Richmond, Trenton in addition to majority Hispanic Chelsea, MA make the list of highest spenders. Additional research could be warranted to determine how why these places in particular spent more and how the spending was allocated in comparison to places which spent much lower amounts compared to US Averages.

Figure 5 with Tables 7 and 8 in combination demonstrate the geospatial nature of tax and changes in tax per capita as compared to US averages. Like the spatial distribution of expenditure per capita, the largest tax collectors are mostly in the Northeast, while the lowest are located more in rural areas. Unlike expenditures per capita, where many of the highest and lowest are non-White, most of both the highest and lowest tax collecting Places are predominately White. Changes in tax per capita could reflect prevailing political regimes. Out of the 20 Census Places which *reduced* tax collection by the most, 17 were located in Wisconsin or Massachusetts. While the highest tax collectors were more geographically disperse, many were larger cities such as Denver, New Orleans, New York and San Francisco.

III Empirical Specification

To test the relationship between race heterogeneity and public expenditure and tax, I will use variations of the basic empirical specification:

$$Spending_i = \alpha_i + \beta_1 h_i + \Theta X_i + \varepsilon_i$$

Using the main outcome variables Tax and Expenditure per capita. Table 1 presents population and demographic summary statistics while Table 2 presents summary statistics for main dependent public finance variables from the 1980-2010 panel. Public goods provision data are taken from the City Data books and supplemented with more detailed Census government finance data 1967-2012 from the 5-year Census of Governments aggregated by Pierson, et al (2015). While government finance data is available for all townships, racial composition data from the census is only widely available for cities over 25000 population.

X is a vector of controls specific to city i. For each regression, in addition to the measure of race heterogeneity, I include control variables, following as closely to the literature as possible. As controls, I include logged income per capita city population since wealthier, more developed cities may provide more public goods and there scale effects might exist in large cities. I use educational attainment as defined by percent of population over age 25 with at least a college degree since this group is likely to demand better quality public goods. Since inequality could motivate disparity in public goods provision (An, et al 2018), I include inequality as measured by the ratio of per capita to median income[1], with poverty rate as a robustness check. I include the percentage of population over age 65 since the empirical local public good literature has emphasized the role of age structure as a determinant of preferences for public goods. Finally, I include intergovernmental transfers as a measure of state level policy.

At this point, I focus my analysis on the relationship between the race heterogeneity measure chosen, h_i and tax collection and expenditure per capita. A contemporaneous analysis suggests that there is something about race heterogeneity today which impacts tax and spending today. However, race should only impact these public measures via its effects on other variables; some of which, like income, are observed, others of which are not. The impact of race on observed and unobserved variables in the model is more likely to be dynamic, meaning a panel analysis may provide more robust conclusions.

To highlight this issue present first difference estimates of the form:

$$\Delta Spending_{it} = \beta \Delta h_{it} + \Theta \Delta X_{it} + \Psi Year_t + \varepsilon_{it}$$

There is also reason to believe that the relationship between Race and Expenditure/Tax at the local public level is endogenous. To address this issue, I create an instrument from predicted Race compositions based on 1980 starting point and national trends. The approach is a two stage IV specification using the predicted values:

$$h_{it} = \beta_1 Z_{it} + \Theta X_{it} + \Psi Year_t + \varepsilon_{it}$$

$$Spending_{it} = \theta_1 \hat{h_{it}} + \Gamma X_{it} + \varphi Year_t + u_{it}$$

[1] Mean income data to calculate mean to median ratio was not available for 1980. Small/large households would inflate/deflate this measure, but the bias should be negligible in large samples.

Where the instrument Z_{it} is the local predicted values from the national trend. Using this approach allows for a more formal testing of endogeneity in the relationship between race composition and local public taxation and spending per capita.

This instrumental approach follows from Boustan, et al. (2013) who use the same process to create predicted GINI coefficients. More broadly, Bartik (1991) Shock Instruments popularized by Blanchard and Katz (1992) predict local employment growth rate by interacting local industry employment shares with national industry employment growth rates (Goldsmith-Pinkham, et al. 2020). Bartik-style instruments have been used widely in the Regional Science literature. Gould, et al. (2002) use Bartik shocks to examine the causal effect of income on local crime rates. Additional literature has used these instruments to explore the impacts of income inequality on happiness (Luttmer 2005), and how local labor market shocks impact skill-specific amenities (Diamond 2016). Saiz (2010) and the literature following it estimate housing supply elasticities using local housing market shocks generated using a Bartik-style procedure (Baum-Snow and Ferreira 2015). Despite the broad implementation of Bartik shocks in the Regional Science literature, there have not yet been studies to analyze the impact of demographic change using this style of instrument.

In presenting this variety of models, I demonstrate that the true value of the coefficient on Race heterogeneity for both expenditure and tax is likely negative. This result is damaging for the conflict and inefficiency school of hypotheses, which rely on greater tax and spending, but relatively lower investment in productive goods and services.

IV Results

The 2010 cross section contains 1422 cities across the continental United States. Alaska and Hawaii are not considered due to data inconsistency. Table 9 presents the results of OLS analysis. Table 10 compares these findings to the baseline results presented in Alesina, et al. (1999), converted to 2010 dollars where applicable. In a cross-section, the impact of race across time is remarkably consistent. The race heterogeneity measure is positively related to tax collection and expenditure per capita.

Using the same specification as the literature, I find coefficients which are categorically similar to those in the Alesina paper, adjusted for inflation. The coefficients on both tax and expenditure per capita are positive and statistically significant at the 99% percent confidence level. Further, the h_i measure is negatively related to percent spending shares on highways and sewage as well as highway spending per capita, but positively related to police share. These results verify the main relationships found the literature, for the most modern available Census data. Despite apparent increases in tax collection and expenditure per capita, expenditure shares on productive public goods aside from police decline. In addition to these main results, I also find the negative relationship to hold for spending share on parks, but a positive relationship between race heterogeneity and both housing and welfare spending shares.

If these results are accurate, then the conflict an inefficiency hypothesis is potentially justified for the most recent data. Cities do appear to be collecting more tax revenue and spending more, but not spending on productive public goods. Cross-sectional estimates, however, assume fundamentally that there must be something about race composition in the present which impacts public funding contemporaneously. It is more likely that the impact of changes in race distribution in a community's public funding measures unfold over time. Cross-sectional estimates are likely to be biased by omitted variables, sorting, and simultaneity.

Instead of viewing the relationship as a contemporaneous one, it may be more instructive to think about how changes in composition over time will impact tax and spending in that time period. Table 11 presents the result of the First Difference model. The coefficients of interest on real tax per capita and real spending per capita are reversed from the cross-section. Changes in per capita expenditures and tax collection are now negatively related to changes in the race heterogeneity measure. A percent increase in race heterogeneity leads to -$13.81 decreases in real spending and -$7.20 tax revenue per capita over each 10 year period. Since it is difficult to conceptualize the impact of this value in a per person measurement over a decade's time, I find it more instructive to consider, given these results, how the *average* change in the heterogeneity measure would impact spending and tax. The mean change in race heterogeneity would correspond to an -6.4% decrease in real spending and -7.8% decrease in tax revenue per capita over each 10 year period.

The reversal of this coefficient is damaging to the conflict and inefficiency theory. We now see that if a more racially diverse community is providing relatively lower levels of public goods, that it may actually be due to a dearth of tax revenue available to fund public measures, rather than disagreements or inability to pass public funding measures. Instead, future research should focus on attempting to explain statistically why more diverse places feature relatively *less* tax and spending per capita. One possible link is via income per capita, which is included as a control in the model. As the residents of Census Places become wealthier in terms of income per capita, there is a higher tax pool for income taxes, in addition to the possibility of greater sales and other types of taxes in the community. This in turn could be used to finance higher levels of public expenditure. As expected increases in income per capita predict higher expenditure and tax, but the relationship in the model is weak and only significant at the 10% significance level for expenditures.

But does this negative coefficient persist over time? Table 11 also presents results from an Arellano-Bond (1991) type specification which includes lagged values of the main outcome and response variables of interest. The addition of lags does not significantly alter the magnitude of the coefficients of interest on race h_i. While the coefficient on the lagged race measure remains negative (although statistically insignificant), the coeffcient on the lagged race measure for tax is positive. This result is amenable with the literature on ethnic enclaves, which suggests that over time as communities diversify, cultural enclaves form amongst the subgroups of residents which then leads to formation of business and social networks. Originating in Bonacich and Modell (1980), an ethnic economy is one in which

"immigrant and ethnic minorities create their own employment opportunities in the general labor market [...] The constitutive businesses are networked together in various ways depending on the type of industry and on the ethnic group (Zhou 1998), but an integral component of all ethnic economies is the operation of some form of socio-relational ties among economic agents and firms." (Mitchell 2000 p. 394). Over time, growing minority groups within racially heterogeneous communities are able to slowly develop the political and social capital required to coordinate public goods expansion and pass tax collection and spending measures. In other words, the group's efficacy, or ability to achieve together a socially optimal result, is increasing as the prevailing ethnic mix ingrains itself into the structure of a community.

Still, it is likely that the omitted variables in the regression, such as bargaining power, culture, and political representation, and neighborhood preference are actually time variant, and so will continue to cause endogeneity bias in the parameters. In an attempt to correct this endogeneity, I instrument the race heterogeneity measure using predicted values from US national trend. To create the instrument following Boustan (2013), I use race composition of each Census 'Place' in the balanced panel in 1980 as the starting point. From 1980, I predict 1990 values using the national trends for each race, then use those to create a predicted race heterogeneity measure in 1990. Predictions for years 2000 and 2010 are computed using the previous years' prediction and national trends for that decade. National trends should not be influenced by the local policy or institutional decisions which influence local Place-level community composition.

To demonstrate this issue, I implement a Durbin-Wu-Hausman (Wooldridge 2010) test to determine whether the race heterogeneity measure is endogenous. Table 12 presents the results of this test. In the first stage, the potentially endogenous race heterogeneity measure is regressed on the set of controls and the predicted race instrument to obtain the residuals v_2. In the second stage, I include the stored residuals v_2 in the original models from Table 11. The t-statistic values on the stored residual v_2 are 7.41 and 8.55 for real expenditure and tax, respectively. From this test, we can reject the strict exogeneity of the race heterogeneity at the $<1\%$ confidence level. Instrumental variable modeling is probably a good idea, provided that we can trust the specification of the instruments.

Table 13 presents the results of the panel instrumental variables regression with a linear time trend, while Table 14 presents the first stage and diagnostic testing, and Table 15 shows the cross-correlation of main covariates. The predicted race heterogeneity measure is highly correlated with the true values, but should not be directly influenced by the omitted variables and sorting which are causing problems for the measurement chosen. Diagnostic testing using the Stock-Yogo method demonstrates that the instrument is sufficiently strong. Further, a test using the difference in Sargan-Hansen statistics between models with and without the endogenous regressor indicate that the race heterogeneity measure is endogeneous at the $>99\%$ confidence level for both tax and spending.

Instrumental variables results confirm the findings from the first difference model, that the relationship between race heterogeneity and local tax and spending per capita over time is negative. A percent increase in race heterogeneity

leads to -$9.36 decrease in real spending and -$6.35 decrease in tax revenue per capita over each 10 year period. Interpreted as an impulse-response at the mean, the average change in race heterogeneity is associated with a -4.3% decrease in real spending and -6.9% decrease in tax revenue per capita over each 10 year period.

Minority groups sorting into cities are frequently low income, and do not have sufficient bargaining power or representation in local policy to pass spending measures targeted at their demographic or neighborhood. As a result, in the short run, the *a priori* belief should be that the coefficients on tax and especially spending might become more negative accounting for the endogeneity. More simply, minority groups are most frequently sorting into areas which are cheaper to live in. These areas often collect less tax and spend less, and because the influx of residents does not provide a sufficient tax basin to fund spending measures, these communities are most likely to become economically disenfranchised.

Demographics statistics demonstrate that in the United States over time White populations have been decreasing while Black, Asian, Other, and the Hispanic Ethnicity have increased. As a result, increases in the race heterogeneity measure generally correlate with larger non-White populations. Still, from a policy perspective, it would be good to be more sure that the correct conclusion is more-White places spend and tax more while less-White places do the opposite. If this is the case, the economic conclusions shift to address 1) how to convince city planners and public policymakers not to pursue predominantly White non-Hispanic communities as a means of maximizing government revenues, tax and expenditure and 2) how to promote economic opportunity in Places which are rapidly diversifying and often feature high-density low income neighborhoods.

Tables 19 and 20 demonstrate that the negative relationship is driven by non-White groups in the race heterogeneity measure. The mean change in White population over each 10-year period is -5.64%. Since the coefficient on White percent is positive, increases in the White population would increase both expenditure and tax per capita. A percentage change in the White population increases expenditure per capita by $17.62, while percentage changes in Black and Hispanic reduce expenditure per capita by -$8.40 and -$12.44, respectively.

Similar patterns emerge for taxation where percentage changes in the White population increase tax per capita by $7.67, while percentage changes in Black and Hispanic reduce tax per capita by -$2.83 and -$3.93 respectively. A possible explanation lies in the labor market fragmentation literature, which ultimately could explain some degree of residential segregation along income and race lines. An alternative explanation could revolve around gentrification. Especially in larger cities, many communities which were largely Black and Hispanic in 1980 and 1990 underwent a revitalization, or gentrification which led to higher spending, and a higher income base from which to collect tax. The pre-gentrification population is likely to have consumption patterns of a lower social class in addition different ethnic and racial constitution as compared to the post-gentrification population (Spain 1980, Zukin 1987, LeGates & Hartman 2013). The results of Tables 19 and 20 demonstrate that the negative effect of the race heterogeneity measure on expenditure and tax appears to be driven by increases on non-White heterogeneity.

Labor market polarization, or a gap between concentration of higher and lower-skilled workers may arise following population migration and demographic change could in part explain the negative relationship between growth in non-White populations and declines in expenditure and tax. If people who work in traditionally minimum wage jobs such as services cluster in some areas while those who work in non-routine, higher skill positions live elsewhere (Rendall and Weiss 2016, Fan and Pena 2020). This type of polarization is likely to occur between US Census Places which are close together, such as clusters around large cities like Los Angeles and New York. Additional research could consider case studies of these closely clustered places to determine whether labor market polarization is occurring between communities by income and racial composition. However, a large degree of the labor market polarization will also occur within the Places themselves at the neighborhood level. This potentially justifies future research about the relationship between demographic composition and local expenditure, tax, and other economic indicators such as income and employment, at an even finer geographic level such as Census Tracts.

The idea that over time racially diversifying communities could experience business and capital growth and ultimately lead to wealthier communities with higher tax and expenditure is another potential justification for the conclusion of this paper, that economic policymakers should study the relationship between race diversity and local tax/spending. The goal should not be to reduce diversity or prevent the formation of ethnic enclaves, but rather, to understand why over time some communities become economically disenfranchised, while others thrive, and to promote progressive policies to improve standards of living in Places which suffer from lower tax/spending and thereby lower quality public goods and services. While public policymakers could choose to interpret the results of this and similar works as being supportive of demographic segregation in favor of Whiteness in order to increase tax and spending in the community, this is not the desired policy prescription. The formation of "Ghettos" characterized by low income per capita and often high concentration of racial minorities is associated with reductions in a variety of economic quality of life indicators from education and human capital formation to crime, income, health and life expectancy (Cutler and Glaeser 1997).

V Conclusion

In the preceding sections, I demonstrate that the conflict and inefficiency hypothesis regarding the relationship between race composition in a community and public goods spending, as shown by Alesina, et al. (1999) is likely flawed. The standing hypothesis relies a positive relationship between race heterogeneity and tax/spending per capita, but a negative relationship between race and spending shares on important public goods/services. While the result holds for updated cross-section of 2010, in panel data covering US Census Places of over 25k residents 1980-2010, I extend the literature on the relationship between local race composition and public tax and expenditure by demonstrating that the race heterogeneity measure is strongly endogenous, and that accounting for this endogeneity, the relationship between

race heterogeneity and tax/spending per capita is negative and not positive. This finding is damaging to the conflict and inefficiency hypothesis.

As an alternative, I suggest the presence of a sorting mechanism in which mixed communities are more likely to arise in places with lower income per capita and thus public goods provision. Further research is warranted to determine whether there is any causal connection over time between public goods spending and race composition, which ultimately feeds back into contemporaneous estimates of the impact of race heterogeneity on current expenditure/tax.

Policymakers should not take these results as indication that policies which create homogeneous communities would be welfare improving. There is extensive literature asserting that residential segregation, especially along race and income lines, is harmful for communities (see: Cutler and Glaeser 1997). Instead, these findings should be seen as a call for proactive rather than reactive local policy.

Historically, unsuccessful policy approaches have tried to cover up urban decay (blight) with band-aid policies such as community restoration and gentrification. Instead, policymakers should look to combat urban decay proactively. In US cities, areas of town which tend to be more diverse (non-white) are generally less well traversed and even rundown. If we know that the areas of cities which are most likely to become disused and suffer form shortcomings in tax revenue to fund local expenditure, we should encourage city planners and local policymakers to engage in people or place-based policies designed to increase economic activity in these areas. Further, it might be possible to promote state and national level policymakers to engage in tax revenue sharing programs designed to combat urban decay/blight.

Policy solutions which focus on creating economic opportunity in Census Places which are becoming poorer over time are critical in the present day. As economic inequality expands within communities, there is growing social discontent which, in turn, puts pressure on local policymakers. The results of this paper should be interpreted as evidence that rather than conflict an inefficiency driving inefficient spending in more diverse areas, there may actually be less tax and spending to begin with. This problem could arise if income and business activity in the area are sufficiently low, or as a product of evolving political conditions over time. Each of these potential mechanisms warrants additional study.

VI Discussion and Robustness

The panel instrumental variables procedure used to demonstrate that race composition is endogenously related to tax and expenditure per capita uses a created variable, the predicted race composition in a Place. This procedure should create consistent estimates. In some well cited cases of using a predicted variable in the first stage, the covariance matrix for the second stage is adjusted to take into account the variability of estimates (Hole 2006). Efficiency of

standard errors may be improved using the Murphy-Topel procedure (see: Murphy and Topel 1985, Hardin 2002).[1]

Important omitted variables in the model might include culture, representation or policy which varies at the state level. To account of this concern, Table 16 presents the first difference and instrumental variables models from Tables 11 and 13, with the addition of state level fixed effects which are suppressed in the output. The addition of state level fixed effects does not alter the interpretation of the coefficients in either model. It may be noteworthy if the addition of state level effects change the magnitude of the coefficents in the FD model by more than in the IV model. This potentially highlights the existence of time varying, state level omitted variables which are biasing the pooled, and to a lesser extent, the FD model.

If the sign of the coefficients on race heterogeneity for real spending and tax outcomes are actually negative, more research is warranted into mechanisms by which the variation in race could be impacting public finance. The first is the potential for reverse causality. To illuminate this, Table 17 presents the FD framework used previously, but with race h_i as the outcome variable, and the spending outcomes real expenditure and tax per capita used as independent variables in the model.

In the specification with race heterogeneity as an outcome, changes in both real expenditure per capita and real expenditure per capita are negatively, and significantly related to changes race heterogeneity. Interestingly, the coefficients remain negative when a lag of the spending or tax measure is included, however, the coefficient on that lagged measure is reversed. This result might further suggest the presence of 'ethnic enclaves'. As over time (20 years may be sufficient) these communities become more establish, there is small business and income growth which results in more tax and spending within the community. This process is attractive to members of that race or ethnicity group who then move to or close to the community over time. (Note that aggregation of a certain race would actually reduce race heterogeneity, evidence of which is in the negative lagged heterogeneity coefficient.)

While I present evidence in favor of a sorting hypothesis over the confict and inefficiency theory, I am only able to identify correlation between heterogeneity and tax/spending. Further research should consider the potential causal impact of race heterogeneity over time these public finance measures. One possibility is a supply/demand model for local government economic activity. After identifying the factors which affect tax and spending per capita, the underlying structural model is estimable with and without a race heterogeneity measure to determine whether the variables have a statistically significant causal impact on tax and spending per capita.

In later work, I intend to specify a structural public finance model and fit it to local Colorado data. Even so, such a structural model would not likely be able to account for all of the unobserved variables which are impacting tax and spending. Likewise, the dynamic choice framework of public goods games may be incomplete; "[. . .]if residential choice is hampered by wealth constraints or interacts with other inherited characteristics, the long-run equilibrium

[1] I argue that this adjustment is not necessary because unlike the canonical cases where the first stage predictions are generated from an econometric model $E[y_1|X_1, \theta_1]$, the first stage predictions in this method are calculated using population parameters: Racial composition in 1980, and the observed growth rate of Races in the US in 10-year spans from 1980 to 2010.

(of a dynamic choice model) may depend on the history of the communities" (Benabou pg. 25). While it is not generally possible for the researcher to observe a history of racial interaction and policy within a community, it may be possible to create a valid proxy by studying employment and earnings by location and race composition. The a priori expectation is that if individuals are sorting into ethnic enclaves in pursuit of more favorable employment outcomes (Edin 2003, Damm 2009), the amount of segregation chosen will have important impacts on income per capita, and thus tax and spending per capita.

The impact of outliers in real spending/tax, or the race heterogeneity measure could be a potential cause for concern. In the case of real spending and tax, I look for outliers by first differencing and identifying individual observations at the extremes. These extreme observations were compared to the Willamette College aggreates from the Census of Governments publically available. While the data is drawn from the same place, the data set was published independently from the city and county factbooks which compose my dataset, so makes a good consistency check. I found the results in my dataset to be generally valid, even those which showed extreme changes in tax and spending per capita over the 10 year periods.

Censorship of the data to remove observations for tax and spending at the extremes may result in further bias if there is endogeneity in the determination of whether a place receives the treatment (being dropped from the sample). Cursory results which may be biased due to the assignment of treatment do not impact the magnitude or significance of important results and so are omitted here.

Data validation checks for the race heterogeneity measure are more complicated due to the limitations on collecting and publishing this data. The ACS surveys provide a potential validation source, but are only small sample estimates, especially for the smaller places included in my sample. As with the case of real spending/tax, censorship of the data may result in bias. To check for the impact of outliers in the heterogeneity measure, I censor the data in Table 18 to include only values of race heterogeneity between 5% and 70%. This restriction is mostly arbitrary, except that it results in the exclusion of about 100 data points, about half at each extreme. Results are presented with the sole purpose of demonstrating that extreme values of the race heterogeneity measure do not appear to be impacting the magnitude or significance of published coefficients in any meaningful way.

As a test of instrumental validity, I include a specification in Table 21 with three IVs instead of one. The additional IVs are lagged variables as suggested in Alesina (1999). Wooldridge (2010) suggests that when there are more instruments than are required to identify an equation, we can implement a Sargan-Hausman test to determine whether the additional instruments are valid, in the sense that they are uncorrelated with the error term. Under the null hypothesis, the potential instruments are uncorrelated. Rejection of the null hypothesis would be cause to reevaluate the choice of IVs. However, the test does not indicate which of the IVs fail the exogoeneity requirement. It could be one or all of them. Using the Bartik shock race instrument as well as the two lags, we reject the null hypothesis of the Sargan-Hausman test. To test further, I also use % foreign born as a contemperaneous instrument. For all combinations using

any lagged variable the null hypotheis is rejected. However for the combination of only contemperaneous variables, the Bartik shock and % foreign born, in this case, we fail to reject the null hypothesis. This result leads the author to believe that it is the lagged variables which are potentially problematic in a panel of only four time periods. However, I also provide disaggregated race measures in Tables 19 and 20 in order to demonstrate that more diversity as measured by growth of Black or Hispanic is driving the relationship in the Herfindahl measure. An additional relevance test for weak instruments is reported using the method of Stock and Yogo (2005) in Table 41a.

A final type of concern surrounds the size or location of the places included in the sample. Since I observe only Census Places greater than 25k in population, we might want to know whether the size of the city is a meaningful determinant of the relationship between race heterogeneity and real spending/tax. Likewise, unobserved variables at the state or regional level such as culture or political representation could vary the results geographically. The impacts of spatial and size distribution of the Places in the sample on the results is an interesting question which warrants further investigation. In future works, I hope to analyze these impacts at the margin, in addition to the impacts of changes in individual races or gender.

City size, density, and culture might also impact individual community bonds or relationships in a way which ultimately alters public demand for goods and services, in addition to altering williness to provide tax funds toward the provision of these goods and services. Further research into this relationship should include analysis of individual level decision making, which results in mechanisms by which race distribution might alter local level public tax and expenditure. Income per capita is likely an important factor linking race heterogeneity, tax and spending. In places with higher incomes, there is more income tax collected, in addition to higher expenditure and sales tax.

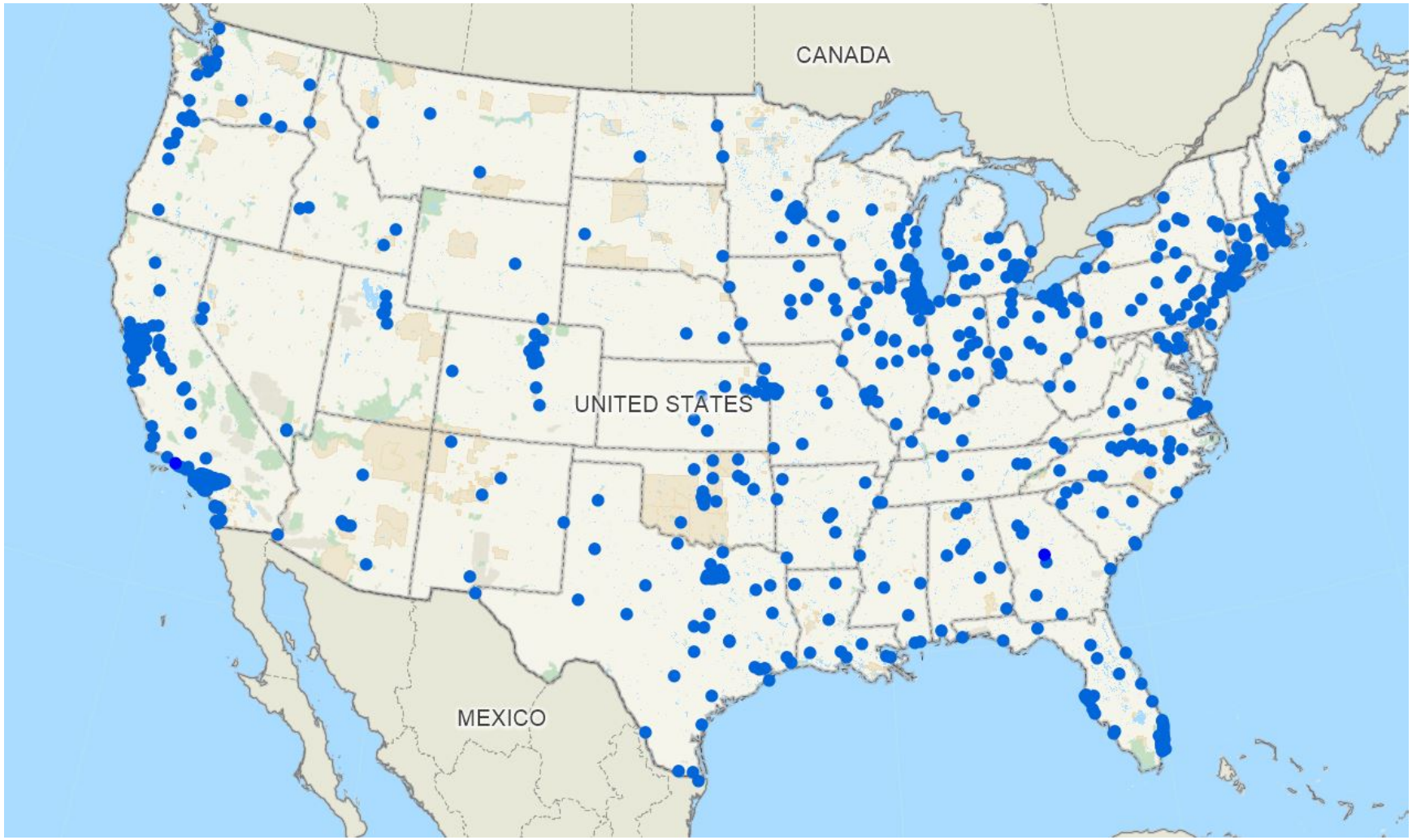


Figure 1: Geographic Distribution of US Census ‘Places’

Table 1: Selected Demographic Measures 1980-2010

Variable	year	mean	sd	min	max	N
Population						
	2010	141139	390356	24751	8336697	734
	2000	130280	373914	20681	8008278	734
	1990	118111	343740	25098	7322564	734
	1980	108881	330714	25112	7071639	734
log(Population)						
	2010	11.305	.8267	10.125	15.936	734
	2000	11.230	.8042	9.937	15.896	734
	1990	11.137	.7881	10.130	15.806	734
	1980	11.035	.7892	10.131	15.772	734
% White						
	2010	67.238	18.470	10.6	96.5	734
	2000	71.554	18.463	12.3	97.9	734
	1990	78.994	16.772	17.4	99.3	734
	1980	84.169	14.623	30.5	99.5	734
% Black						
	2010	14.974	16.753	0.30	82.7	734
	2000	13.669	16.277	0.20	81.6	734
	1990	12.205	15.018	0.08	75.7	734
	1980	10.594	14.040	0.01	66.8	734
% Asian/Pac. Islander						
	2010	6.331	9.242	0.10	66.9	734
	2000	4.847	7.455	0.20	61.8	734
	1990	3.713	5.704	0.07	57.46	734
	1980	1.922	3.039	0.03	34.76	734
% "Other"						
	2010	7.180	7.742	0.20	45.4	734
	2000	9.218	9.121	0.70	56.0	734
	1990	4.448	7.242	0.04	65.4	734
	1980	2.771	4.366	0.00	26.6	734
% Hispanic						
	2010	18.420	18.840	0.90	97.1	734
	2000	14.209	17.180	0.50	95.6	734
	1990	10.160	14.791	0.23	93.9	734
	1980	7.518	12.317	0.14	93.01	734
Race Heterogeneity h_i						
	2010	43.942	16.273	6.86	77.21	734
	2000	40.073	18.921	4.15	86.87	734
	1990	30.571	18.608	1.44	90.22	734
	1980	23.792	17.075	0.91	72.99	734

Table 2: Selected Provision Measures and Controls 1980-2010

Variable	year	mean	sd	min	max	N
Real Exp/Capita						
	2010	1713.30	1043.88	292	10907	734
	2000	1377.76	801.62	344	7106	734
	1990	1469.11	841.70	269	7652	734
	1980	1248.54	721.71	169	4914	734
Real Tax/Capita						
	2010	781.23	505.62	141	7261	734
	2000	573.16	351.92	68	3063	734
	1990	610.15	378.43	84	3654	697
	1980	512.18	338.91	73	2786	734
Real Intergov/Capita						
	2010	446.08	610.57	17	6565	734
	2000	789.25	553.14	113	3955	734
	1990	851.31	576.31	132	4246	697
	1980	441.68	402.13	15	2957	734
log(Income/Capita)						
	2010	10.15	.295	9.39	11.31	734
	2000	10.17	.278	9.28	11.36	734
	1990	10.08	.268	9.25	11.25	734
	1980	9.94	.208	9.25	10.82	734
Per Capita/Median Income Ratio						
	2010	53.01	8.67	28.42	99.22	734
	2000	51.44	8.71	26.59	101.94	734
	1990	48.36	7.83	25.71	107.78	734
	1980	44.49	6.84	25.91	104.72	734
% BA or higher						
	2010	29.72	14.12	4.6	79.4	734
	2000	26.51	13.22	4.0	74.4	734
	1990	22.92	11.61	1.7	71.2	734
	1980	10.88	5.54	1.1	37.4	734
% over 65						
	2010	12.63	3.94	4.6	27.9	734
	2000	12.64	4.01	3.2	37.7	734
	1990	12.78	4.74	2.7	47.6	734
	1980	11.38	5.20	1.7	51.7	734

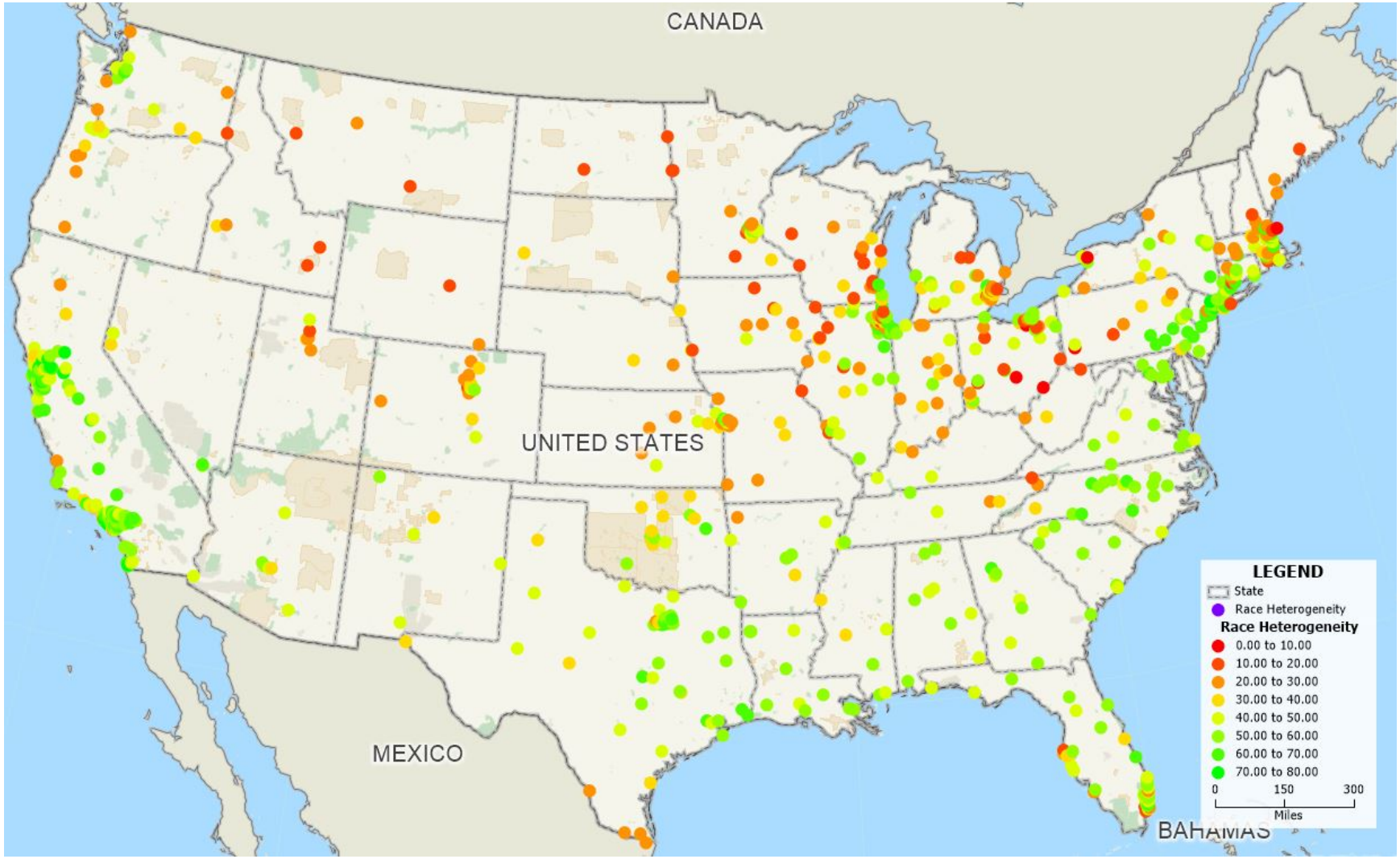


Figure 2: Race Heterogeneity by Place

Table 3: 20 Least and Most Diverse US Census Places

Name	state	Race H_i	White	Black	Hispanic	Δ non-White	Exp/Avg	Tax/Avg	Δ Exp/Avg	Δ Tax/Avg	Rank
North Tonawanda	NY	6.86	96.5	0.8	1.7	2.90	0.84	0.70	0.27	1.10	734
Bethel Park	PA	7.61	96.1	1.3	1	1.67	0.39	0.53	0.50	0.33	733
Lancaster	OH	8.01	95.9	1	1.6	2.99	0.62	0.63	1.57	0.69	732
Gloucester	MA	8.39	95.7	0.8	2.7	3.77	1.97	2.69	1.99	0.22	731
Brunswick	OH	8.77	95.5	1.2	2.3	3.56	0.38	0.44	0.45	0.63	730
Parkersburg	WV	9.90	94.9	2	1.2	3.34	1.83	0.67	-1.98	0.66	729
Pekin	IL	10.26	94.7	2.1	2.4	4.29	0.67	0.53	-0.27	-0.66	728
Lewiston	ID	11.79	93.9	0.3	2.8	4.10	0.66	0.63	0.53	0.52	727
Altoona	PA	11.90	93.8	3.3	1.3	4.24	0.39	0.50	-0.04	0.09	726
Mason City	IA	11.96	93.8	1.8	5.1	4.64	0.67	0.76	1.19	0.93	725
New Berlin	WI	12.61	93.4	0.7	2.6	5.71	0.91	0.56	-0.08	1.38	724
Park Ridge	IL	12.61	93.4	0.5	4.7	5.11	0.62	0.95	1.12	0.90	723
Cuyahoga Falls	OH	12.64	93.4	3.3	1.4	5.37	0.73	0.76	0.94	0.78	722
Cedar Falls	IA	12.66	93.4	2.1	2	4.83	1.08	0.66	0.61	1.68	721
Beverly	MA	12.87	93.3	1.6	3.5	5.80	1.62	2.50	0.99	0.99	720
Bountiful	UT	13.23	93.1	0.5	4.9	5.35	0.39	0.42	0.52	0.44	719
Bangor	ME	13.25	93.1	1.7	1.5	5.28	2.30	2.15	1.36	1.34	718
Stow	OH	13.38	93	2.7	1.5	5.28	0.52	0.77	1.10	1.00	717
Parma	OH	13.41	93	2.3	3.6	5.53	0.45	0.70	0.57	0.87	716
St Clair Shores	MI	13.90	92.7	3.9	1.7	6.13	0.65	0.68	0.38	1.03	715
New Brunswick	NJ	69.69	45.4	16	49.9	18.17	2.29	1.59	4.90	0.94	20
Antioch	CA	69.85	48.9	17.3	31.7	40.60	0.51	0.55	0.71	0.70	19
West Covina	CA	70.17	42.8	4.5	53.2	36.26	0.58	0.79	0.97	0.45	18
National City	CA	70.64	42.2	5.2	63	13.50	0.64	0.86	1.07	1.69	17
New York	NY	70.80	44	25.5	28.6	17.49	4.13	5.69	14.22	7.01	16
Long Beach	CA	70.84	46.1	13.5	40.8	29.25	1.62	0.97	-0.94	0.71	15
Newark	CA	71.17	41.3	4.7	35.2	35.82	0.64	0.86	0.68	1.39	14
Bellflower	CA	72.03	42.2	14	52.3	44.71	0.30	0.34	0.01	0.74	13
Paterson	NJ	72.08	34.7	31.7	57.6	17.13	1.59	1.13	-2.85	0.60	12
Sacramento	CA	72.21	45	14.6	26.9	23.18	1.02	1.09	2.15	1.30	11
Fairfield	CA	72.22	46	15.7	27.3	29.25	1.07	1.04	2.29	2.17	10
San Leandro	CA	73.27	37.6	12.3	27.4	49.87	0.91	1.22	0.90	1.94	9
Hawthorne	CA	74.02	32.8	27.7	52.9	37.12	0.77	0.74	1.85	0.88	8
Oakland	CA	75.35	34.5	28	25.4	4.14	1.81	1.50	3.92	3.24	7
Stockton	CA	75.64	37	12.2	40.3	29.92	0.83	0.85	-0.58	0.69	6
Hayward	CA	76.25	34.2	11.9	40.7	42.44	0.85	0.91	0.46	0.90	5
Richmond	CA	76.35	31.4	26.6	39.5	9.49	1.40	1.62	0.06	1.89	4
Pittsburg	CA	76.37	36.5	17.7	42.4	26.19	1.13	0.90	3.20	3.30	3
Vallejo	CA	76.38	32.8	22.1	22.6	31.51	0.87	0.78	3.24	1.27	2
Carson	CA	77.22	23.8	23.8	38.6	19.12	0.66	0.99	0.17	1.20	1

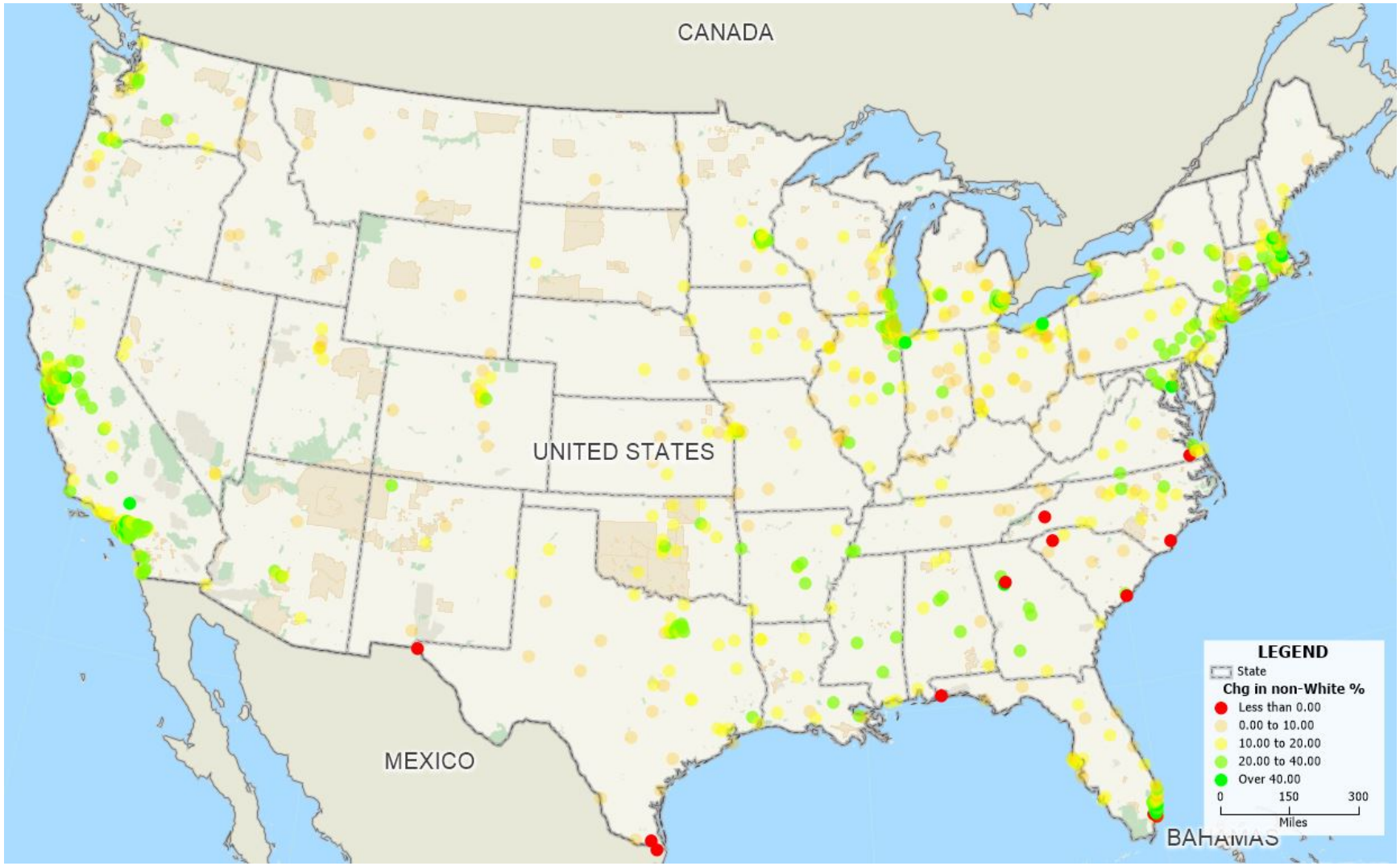


Figure 3: Percent Change in non-White Population

Table 4: 20 Places Diversifying Least Rapidly (top) and Most Rapidly (bottom)

Name	state	Race H_i	White	Black	Hispanic	Δnon-White	Exp/Avg	Tax/Avg	ΔExp/Avg	ΔTax/Avg	Rank
Charleston	SC	44.23	70.2	25.4	2.9	-17.41	1.00	1.10	1.94	0.54	734
Wilmington	NC	41.93	73.5	19.9	6.1	-13.44	0.89	0.67	1.13	0.22	733
Harlingen	TX	23.10	87.3	1	79.5	-9.21	0.74	0.65	0.41	0.96	732
El Paso	TX	33.37	80.8	3.4	80.7	-8.72	0.56	0.66	0.12	0.63	731
Brownsville	TX	21.72	88	0.4	93.2	-8.60	0.49	0.46	0.54	0.46	730
Miami	FL	43.42	72.6	19.2	70	-7.68	0.99	1.22	1.44	0.59	729
Atlanta	GA	55.95	38.4	54	5.2	-5.88	1.96	1.33	2.13	0.13	728
Hialeah	FL	14.11	92.6	2.7	94.7	-3.05	0.60	0.69	0.68	0.79	727
Pensacola	FL	48.15	66.3	28	3.3	-2.36	1.35	0.89	1.52	2.08	726
Hoboken	NJ	31.62	82.2	3.5	15.2	-2.02	1.49	0.97	2.24	1.65	725
Asheville	NC	35.21	79.3	13.4	6.5	-1.44	0.99	0.82	-0.33	0.98	724
Lynwood	CA	62.87	39.3	10.3	86.6	-0.76	0.67	0.46	2.92	0.92	723
Suffolk	VA	54.38	52.3	42.7	2.9	-0.32	1.90	1.78	4.32	4.00	722
Greenville	SC	49.95	64	30	5.9	-0.31	0.82	1.25	1.02	1.93	721
Galveston	TX	55.93	62.5	19.2	31.3	0.20	1.20	1.08	-1.04	1.55	720
Ocala	FL	45.49	70.7	20.9	11.7	0.67	0.97	0.59	1.91	1.77	719
Corpus Christi	TX	33.39	80.9	4.3	59.7	1.16	0.64	0.74	1.01	0.66	718
Victoria	TX	40.04	76.2	7.7	48.3	1.53	0.59	0.81	-0.16	0.06	717
Coral Gables	FL	17.01	91	3	53.6	1.56	1.59	2.21	3.10	4.71	716
Bethel Park	PA	7.61	96.1	1.3	1	1.67	0.39	0.53	0.50	0.33	715
Bellflower	CA	72.03	42.2	14	52.3	44.71	0.30	0.34	0.01	0.74	20
North Miami Beach	FL	60.39	47.1	41.4	36.6	44.82	0.91	0.94	1.87	1.11	19
Lawrence	MA	65.57	42.8	7.6	73.8	44.91	2.06	1.11	2.06	-0.96	18
Brockton	MA	66.83	46.7	31.2	10	45.99	1.93	1.85	1.32	-1.80	17
Euclid	OH	53.14	43.8	52.6	1.6	47.29	0.86	1.13	-0.01	0.03	16
Brooklyn Center	MN	66.81	49.1	25.9	9.6	47.53	0.92	0.58	0.85	1.62	15
Garden Grove	CA	66.99	39.9	1.3	36.9	47.67	0.56	0.64	0.31	0.91	14
Oak Park	MI	53.04	37.4	57.4	1.4	48.59	0.88	0.90	0.19	0.10	13
Westminster	CA	63.00	35.7	0.9	23.6	49.48	0.53	0.73	1.01	2.00	12
San Leandro	CA	73.27	37.6	12.3	27.4	49.87	0.91	1.22	0.90	1.94	11
Milpitas	CA	55.64	20.5	2.9	16.8	51.93	1.09	1.39	3.23	3.15	10
Merrillville	IN	58.44	46.4	44.5	12.9	52.21	0.25	0.26	1.28	0.65	9
Fremont	CA	62.61	32.8	3.3	14.8	52.30	0.65	0.86	0.80	1.87	8
Bowie	MD	58.93	41.4	48.7	5.6	52.84	0.38	0.39	0.37	0.94	7
Miramar	FL	61.87	41	45.7	36.9	56.42	0.53	0.60	1.75	1.82	6
Cupertino	CA	49.99	31.3	0.6	3.6	59.65	0.74	0.81	1.20	0.94	5
North Miami	FL	54.54	32.6	58.9	27.1	59.68	0.67	0.77	1.33	0.41	4
Arcadia	CA	54.33	32.3	1.2	12.1	61.27	0.66	0.99	0.79	0.72	3
Southfield	MI	44.35	24.9	70.3	1.3	63.61	1.02	1.33	0.11	0.14	2
Lauderhill	FL	39.03	18.2	75.9	7.4	67.42	0.41	0.53	1.14	0.69	1

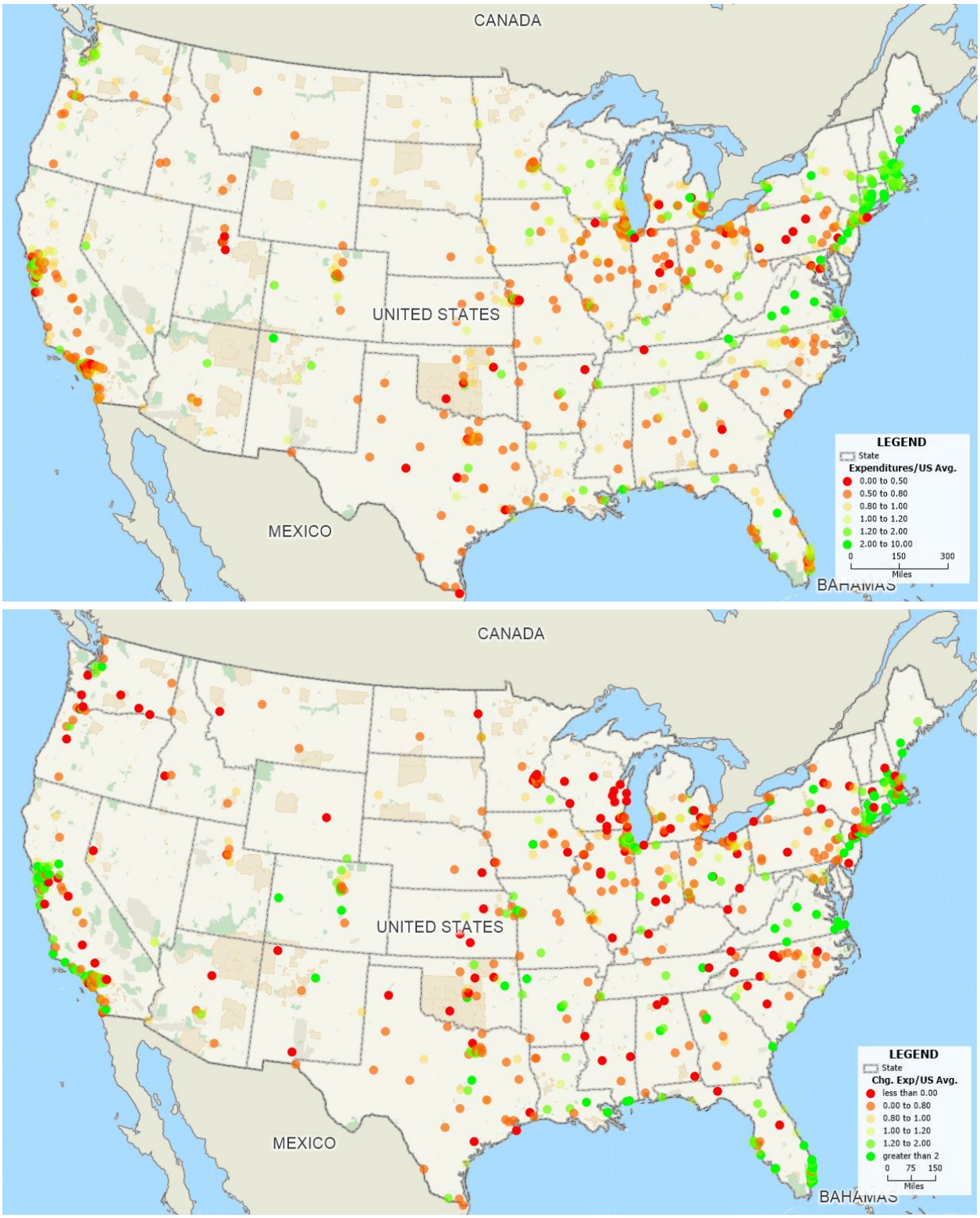


Figure 4: Expenditures (Top) and Δ Expenditures (Bottom) vs. US Average

Table 5: 20 Places with the Lowest (top) and Highest (bottom) Average Expenditures per Capita compared to US Averages

Name	state	Exp/Avg	Tax/Avg	ΔExp/Avge	Δ Tax/Avg	Race H_i	White	Black	Hispanic	Δnon-White	Rank
Merrillville	IN	0.25	0.26	1.28	0.65	58.44	46.4	44.5	12.9	52.21	734
Lindenhurst	NY	0.26	0.35	0.22	0.05	15.05	92.1	1.5	9.7	6.68	733
Bellflower	CA	0.30	0.34	0.01	0.74	72.03	42.2	14	52.3	44.71	732
Lawrence	IN	0.32	0.31	0.68	0.44	53.05	63.2	25.8	11.2	25.88	731
Baldwin Park	CA	0.33	0.40	0.22	0.52	65.77	43.9	1.2	80.1	29.87	730
Rosemead	CA	0.34	0.44	0.19	0.22	56.38	21.1	0.5	33.8	43.63	729
Raytown	MO	0.35	0.53	0.17	-0.06	47.81	67.7	25.1	5.1	30.27	728
Saratoga	CA	0.35	0.40	0.80	1.13	53.72	53.9	0.3	3.5	40.54	727
North Chicago	IL	0.36	0.31	0.82	0.56	66.19	47.9	29.9	27.2	19.61	726
Brunswick	OH	0.38	0.44	0.45	0.63	8.77	95.5	1.2	2.3	3.56	725
Blue Springs	MO	0.38	0.60	0.11	-0.10	22.84	87.6	6.2	5	9.23	724
Broken Arrow	OK	0.38	0.60	1.16	0.44	36.48	79.3	4.3	6.5	16.43	723
Bowie	MD	0.38	0.39	0.37	0.94	58.93	41.4	48.7	5.6	52.84	722
Bethel Park	PA	0.39	0.53	0.50	0.33	7.61	96.1	1.3	1	1.67	721
Bountiful	UT	0.39	0.42	0.52	0.44	13.23	93.1	0.5	4.9	5.35	720
West Jordan	UT	0.39	0.41	-0.02	0.56	31.21	82.4	1	17.7	12.67	719
Kentwood	MI	0.39	0.40	0.80	0.85	47.92	70.1	15.4	8.5	24.82	718
Altoona	PA	0.39	0.50	-0.04	0.09	11.90	93.8	3.3	1.3	4.24	717
Bell Gardens	CA	0.39	0.55	0.87	1.73	55.49	49.5	0.9	95.7	29.58	716
Lauderhill	FL	0.41	0.53	1.14	0.69	39.03	18.2	75.9	7.4	67.42	715
Chelsea	MA	2.40	1.67	0.73	-2.37	65.03	47.8	8.5	62.1	44.51	20
New London	CT	2.43	2.01	6.57	1.92	59.01	60.4	17.4	28.3	20.50	19
Bridgeport	CT	2.48	2.45	3.40	2.15	69.16	39.6	34.6	38.2	31.12	18
Portland	ME	2.48	2.82	3.19	3.19	27.11	85	7.1	3	13.46	17
Syracuse	NY	2.49	1.11	3.49	-1.49	59.55	56	29.5	8.3	25.74	16
Norfolk	VA	2.51	2.16	5.36	2.61	59.07	47.1	43.1	6.6	13.97	15
Flint	MI	2.52	0.83	2.75	-0.32	53.96	37.4	56.6	3.9	18.66	14
Holyoke	MA	2.54	1.47	3.62	0.81	50.68	66	4.7	48.4	20.23	13
Quincy	MA	2.58	2.65	-1.71	-1.24	48.71	67.3	4.6	3.3	31.33	12
Gulfport	MS	2.60	0.54	8.75	0.83	54.51	56.9	36.1	5.2	16.89	11
Buffalo	NY	2.64	1.04	3.60	-0.47	59.44	50.4	38.6	10.5	20.44	10
Baltimore	MD	2.68	2.32	1.18	1.96	50.57	29.6	63.7	4.2	14.46	9
Trenton	NJ	2.68	1.38	9.66	1.48	63.52	26.6	52	33.7	22.60	8
Stamford	CT	2.74	4.53	1.98	2.38	54.24	65	13.9	23.8	17.11	7
New Haven	CT	2.97	2.48	5.20	0.44	67.41	42.6	35.4	27.4	20.33	6
Boston	MA	3.10	3.32	1.26	-0.62	63.50	53.9	24.4	17.5	16.55	5
Richmond	VA	3.13	3.10	3.15	1.29	57.56	40.8	50.6	6.3	7.09	4
San Francisco	CA	3.67	3.39	6.73	6.51	64.31	48.5	6.1	15.1	10.73	3
Cambridge	MA	3.96	3.64	13.66	1.39	51.95	66.6	11.7	7.6	16.96	2
New York	NY	4.13	5.69	14.22	7.01	70.80	44	25.5	28.6	17.49	1

Table 6: 20 Places with the Slowest (top) and Fastest (bottom) Changes in Expenditure/Capita compared to US Averages

Name	state	Exp/Avg	Tax/Avg	ΔExp/Avg	ΔTax/Avg	Race H_i	White	Black	Hispanic	Δnon-White	Rank
Farmington	NM	2.39	0.88	-5.73	0.57	54.77	62.8	1	22.4	20.81	734
Green Bay	WI	1.30	0.89	-4.13	-1.63	38.34	77.9	3.5	13.4	18.87	733
Fond Du Lac	WI	1.15	0.90	-3.86	-1.40	17.75	90.6	2.5	6.4	8.27	732
Wichita	KS	1.09	0.66	-3.78	0.06	46.34	71.9	11.5	15.3	12.80	731
Sheboygan	WI	1.23	0.90	-3.74	-0.89	30.96	82.5	1.8	9.9	16.32	730
Eau Claire	WI	1.16	0.77	-3.56	-1.33	16.23	91.4	1.1	1.9	7.15	729
Wausau	WI	1.23	1.01	-3.45	-1.59	28.68	83.7	1.4	2.9	14.81	728
Olympia	WA	1.56	1.31	-3.42	2.08	29.45	83.7	2	6.3	9.97	727
Waukesha	WI	1.16	1.08	-3.34	-1.14	22.08	88.1	2.3	12.1	8.43	726
Appleton	WI	1.16	0.94	-3.32	-1.00	23.01	87.5	1.7	5	11.12	725
Pontiac	MI	1.86	1.34	-3.26	-0.49	60.58	34.4	52.1	16.5	23.54	724
Tallahassee	FL	1.52	0.61	-2.93	1.32	54.64	57.4	35	6.3	8.95	723
Paterson	NJ	1.59	1.13	-2.85	0.60	72.08	34.7	31.7	57.6	17.13	722
Janesville	WI	1.06	0.75	-2.66	-1.11	15.79	91.7	2.6	5.4	7.13	721
Beaverton	OR	0.73	0.84	-2.63	-1.20	44.76	73	2.6	16.3	20.35	720
Wauwatosa	WI	1.16	1.31	-2.40	-1.15	19.43	89.6	4.5	3.1	9.38	719
Decatur	AL	1.86	1.11	-2.40	0.84	50.43	66.5	21.7	12.4	17.58	718
Oshkosh	WI	1.06	0.72	-2.36	-0.63	17.89	90.5	3.1	2.7	7.73	717
Concord	NH	1.29	1.19	-2.15	1.11	15.56	91.8	2.2	2.1	7.17	716
Parkersburg	WV	1.83	0.67	-1.98	0.66	9.90	94.9	2	1.2	3.34	715
Suffolk	VA	1.90	1.78	4.32	4.00	54.38	52.3	42.7	2.9	-0.32	20
East Chicago	IN	2.16	2.08	4.59	0.96	65.71	35.5	42.9	50.9	12.48	19
Petaluma	CA	0.94	0.92	4.63	2.15	34.34	80.4	1.4	21.5	13.34	18
West New York	NJ	2.00	1.47	4.63	0.18	56.89	62	4.6	78.1	23.26	17
Oak Ridge	TN	1.90	1.02	4.78	2.45	28.85	83.9	8.1	4.6	7.05	16
New Brunswick	NJ	2.29	1.59	4.90	0.94	69.69	45.4	16	49.9	18.17	15
New Orleans	LA	1.71	1.68	4.96	3.44	52.75	33	60.2	5.2	9.72	14
El Cajon	CA	0.86	0.69	5.17	1.09	49.82	69.3	6.3	28.2	24.72	13
New Haven	CT	2.97	2.48	5.20	0.44	67.41	42.6	35.4	27.4	20.33	12
Miami Beach	FL	1.80	2.52	5.35	5.47	23.26	87.4	4.4	53	8.64	11
Norfolk	VA	2.51	2.16	5.36	2.61	59.07	47.1	43.1	6.6	13.97	10
New London	CT	2.43	2.01	6.57	1.92	59.01	60.4	17.4	28.3	20.50	9
Santa Monica	CA	1.86	2.59	6.58	9.79	38.60	77.6	3.9	13.1	9.10	8
San Francisco	CA	3.67	3.39	6.73	6.51	64.31	48.5	6.1	15.1	10.73	7
Union City	NJ	1.51	1.14	6.78	0.82	58.51	58	5.2	84.7	26.82	6
Gulfport	MS	2.60	0.54	8.75	0.83	54.51	56.9	36.1	5.2	16.89	5
Trenton	NJ	2.68	1.38	9.66	1.48	63.52	26.6	52	33.7	22.60	4
Waco	TX	1.44	0.87	10.26	0.87	58.33	59.2	21.5	29.6	12.89	3
Cambridge	MA	3.96	3.64	13.66	1.39	51.95	66.6	11.7	7.6	16.96	2
New York	NY	4.13	5.69	14.22	7.01	70.80	44	25.5	28.6	17.49	1

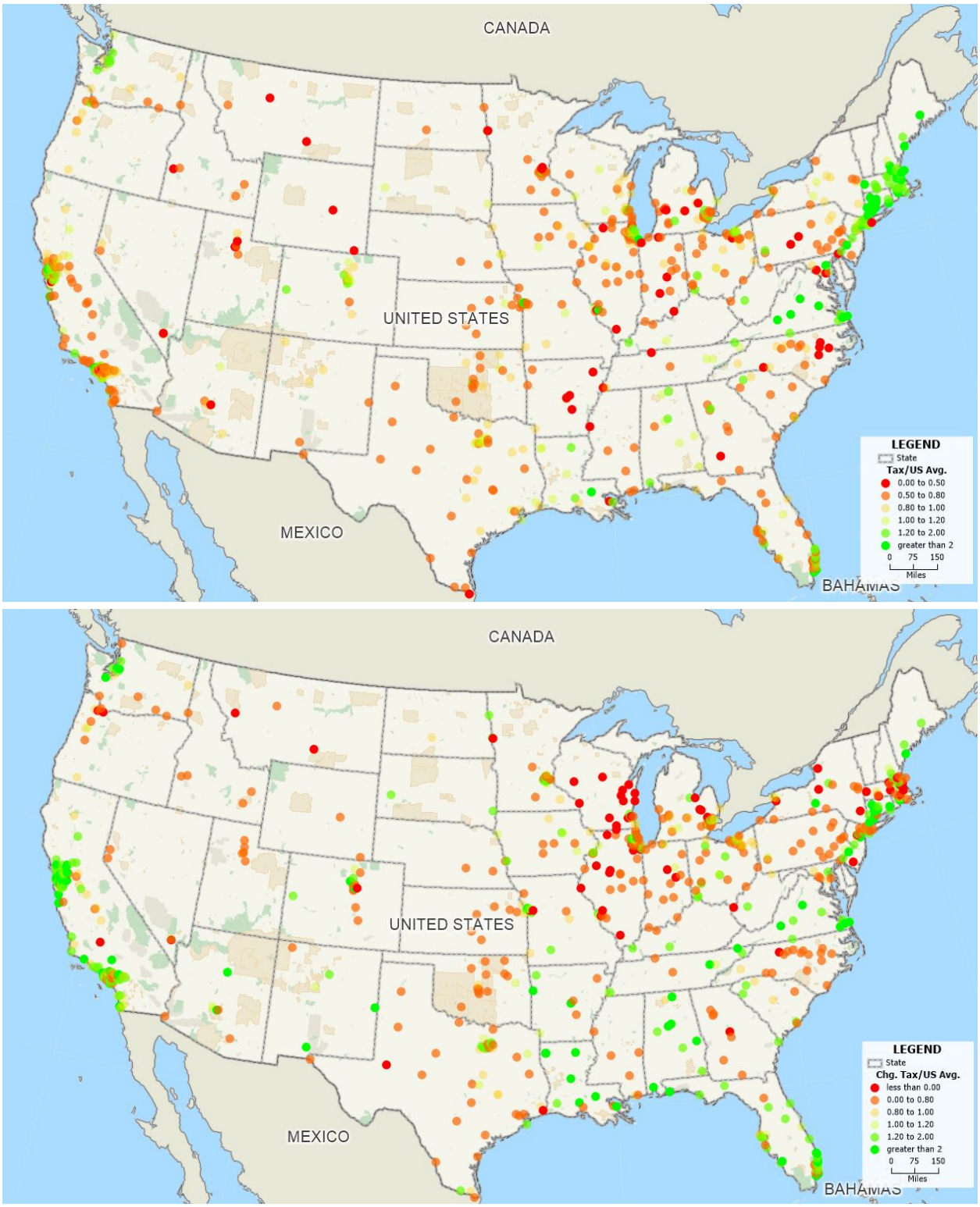


Figure 5: Tax (Top) and Δ Tax (Bottom) vs. US Average

Table 7: 20 Places with the Lowest (top) and Highest (bottom) Tax/Capita compared to US Averages

Name	state	Exp/Avg	Tax/Avg	ΔExp/Avg	ΔTax/Avg	Race H_i	White	Black	Hispanic	Δnon-White	Rank
Casper	WY	1.01	0.16	-0.83	0.20	14.73	92.3	1	7.4	4.03	734
Moorhead	MN	1.08	0.22	1.17	-0.07	17.62	90.7	2	4.1	7.44	733
Cheyenne	WY	0.77	0.25	1.31	0.18	23.34	87.4	2.9	14.5	4.52	732
Merrillville	IN	0.25	0.26	1.28	0.65	58.44	46.4	44.5	12.9	52.21	731
Jonesboro	AR	0.44	0.26	0.62	0.77	40.70	74.7	18.4	5.2	16.00	730
Jacksonville	AR	1.34	0.30	1.43	0.75	55.89	57.7	32.7	6.7	26.05	729
Burton	MI	0.47	0.31	-0.39	-0.07	21.84	88.1	7.3	3.1	9.96	728
Lawrence	IN	0.32	0.31	0.68	0.44	53.05	63.2	25.8	11.2	25.88	727
Clarksville	TN	0.48	0.31	0.18	0.37	51.42	65.6	23.2	9.3	10.57	726
North Chicago	IL	0.36	0.31	0.82	0.56	66.19	47.9	29.9	27.2	19.61	725
State College	PA	0.41	0.31	0.83	0.50	29.66	83.2	3.8	3.9	11.07	724
Newark	DE	0.55	0.32	0.48	0.33	31.13	82.4	6.7	4.8	10.80	723
Bellflower	CA	0.30	0.34	0.01	0.74	72.03	42.2	14	52.3	44.71	722
Freeport	IL	0.49	0.35	0.81	-0.01	37.89	77.1	16.2	4.1	12.28	721
Lindenhurst	NY	0.26	0.35	0.22	0.05	15.05	92.1	1.5	9.7	6.68	720
Great Falls	MT	0.53	0.38	0.15	0.21	21.40	88.5	1.1	3.4	5.91	719
Blaine	MN	0.59	0.38	-0.37	1.04	28.68	84	3.7	3.2	14.11	718
Bowie	MD	0.38	0.39	0.37	0.94	58.93	41.4	48.7	5.6	52.84	717
Kenner	LA	0.62	0.39	1.17	0.66	55.56	61.6	24	22.4	21.43	716
Greenville	MS	0.52	0.39	-0.11	0.61	35.07	20.2	78	0.9	19.56	715
Cranston	RI	1.80	2.55	3.23	2.34	32.15	81.9	5.3	10.8	16.76	20
Santa Monica	CA	1.86	2.59	6.58	9.79	38.60	77.6	3.9	13.1	9.10	19
Philadelphia	PA	2.09	2.60	3.06	2.49	63.61	41	43.4	12.3	17.54	18
Quincy	MA	2.58	2.65	-1.71	-1.24	48.71	67.3	4.6	3.3	31.33	17
Gloucester	MA	1.97	2.69	1.99	0.22	8.39	95.7	0.8	2.7	3.77	16
Danbury	CT	1.92	2.72	1.22	1.34	50.84	68.2	7.2	25	23.40	15
Woburn	MA	1.81	2.78	3.39	1.99	28.35	84.2	4.2	4.5	14.45	14
Portland	ME	2.48	2.82	3.19	3.19	27.11	85	7.1	3	13.46	13
Waltham	MA	1.86	2.86	1.80	1.98	41.46	75.4	6	13.7	21.31	12
Everett	MA	2.12	3.07	3.61	-1.49	56.38	62.8	14.3	21.1	34.75	11
Culver City	CA	1.97	3.09	3.04	4.39	59.73	60.3	9.5	23.2	16.96	10
Richmond	VA	3.13	3.10	3.15	1.29	57.56	40.8	50.6	6.3	7.09	9
Warwick	RI	1.86	3.10	3.00	3.44	13.97	92.7	1.7	3.4	6.20	8
Boston	MA	3.10	3.32	1.26	-0.62	63.50	53.9	24.4	17.5	16.55	7
San Francisco	CA	3.67	3.39	6.73	6.51	64.31	48.5	6.1	15.1	10.73	6
Cambridge	MA	3.96	3.64	13.66	1.39	51.95	66.6	11.7	7.6	16.96	5
Newton	MA	2.27	3.89	0.68	1.68	30.87	82.3	2.5	4.1	13.41	4
Norwalk	CT	2.09	3.90	1.21	3.67	49.74	68.7	14.2	24.3	14.14	3
Stamford	CT	2.74	4.53	1.98	2.38	54.24	65	13.9	23.8	17.11	2
New York	NY	4.13	5.69	14.22	7.01	70.80	44	25.5	28.6	17.49	1

Table 8: 20 Places with the Slowest (top) and Fastest (bottom) Changes in Tax/Capita compared to US Averages

Name	state	Exp/Avg	Tax/Avg	ΔExp/Avg	ΔTax/Avg	Race H_i	White	Black	Hispanic	Δnon-White	Rank
Lynn	MA	2.03	1.88	0.03	-2.46	61.85	57.6	12.8	32.1	36.67	734
Chelsea	MA	2.40	1.67	0.73	-2.37	65.03	47.8	8.5	62.1	44.51	733
Revere	MA	1.74	2.07	-0.01	-2.18	43.14	74.1	4.9	24.4	25.16	732
Brockton	MA	1.93	1.85	1.32	-1.80	66.83	46.7	31.2	10	45.99	731
Green Bay	WI	1.30	0.89	-4.13	-1.63	38.34	77.9	3.5	13.4	18.87	730
Wausau	WI	1.23	1.01	-3.45	-1.59	28.68	83.7	1.4	2.9	14.81	729
Syracuse	NY	2.49	1.11	3.49	-1.49	59.55	56	29.5	8.3	25.74	728
Everett	MA	2.12	3.07	3.61	-1.49	56.38	62.8	14.3	21.1	34.75	727
Fond Du Lac	WI	1.15	0.90	-3.86	-1.40	17.75	90.6	2.5	6.4	8.27	726
Eau Claire	WI	1.16	0.77	-3.56	-1.33	16.23	91.4	1.1	1.9	7.15	725
Madison	WI	1.17	1.18	-1.51	-1.29	36.58	78.9	7.3	6.8	15.66	724
Manitowoc	WI	1.15	0.70	-1.09	-1.24	18.91	89.9	1	5	8.40	723
Quincy	MA	2.58	2.65	-1.71	-1.24	48.71	67.3	4.6	3.3	31.33	722
Beaverton	OR	0.73	0.84	-2.63	-1.20	44.76	73	2.6	16.3	20.35	721
La Crosse	WI	1.24	1.03	-1.77	-1.17	19.06	89.8	2.3	2	8.95	720
Wauwatosa	WI	1.16	1.31	-2.40	-1.15	19.43	89.6	4.5	3.1	9.38	719
Waukesha	WI	1.16	1.08	-3.34	-1.14	22.08	88.1	2.3	12.1	8.43	718
Janesville	WI	1.06	0.75	-2.66	-1.11	15.79	91.7	2.6	5.4	7.13	717
Vineland	NJ	0.90	0.75	-1.40	-1.02	51.40	67	14.2	38	12.69	716
Appleton	WI	1.16	0.94	-3.32	-1.00	23.01	87.5	1.7	5	11.12	715
Pleasanton	CA	1.09	1.23	2.56	3.30	49.53	67	1.7	10.3	27.92	20
Pittsburg	CA	1.13	0.90	3.20	3.30	76.37	36.5	17.7	42.4	26.19	19
Rancho Cucamonga	CA	0.58	0.95	1.73	3.30	58.12	62	9.2	34.9	25.99	18
Denver	CO	2.39	1.81	2.68	3.42	49.93	68.9	10.2	31.8	7.39	17
Charlottesville	VA	2.27	2.41	4.16	3.42	48.05	69.1	19.4	5.1	10.67	16
New Orleans	LA	1.71	1.68	4.96	3.44	52.75	33	60.2	5.2	9.72	15
Warwick	RI	1.86	3.10	3.00	3.44	13.97	92.7	1.7	3.4	6.20	14
Lafayette	LA	1.17	1.23	1.71	3.55	49.57	63.8	31.1	3.8	7.11	13
Norwalk	CT	2.09	3.90	1.21	3.67	49.74	68.7	14.2	24.3	14.14	12
Birmingham	AL	1.06	1.73	1.71	3.72	41.10	22.3	73.4	3.6	21.57	11
Chesapeake	VA	2.08	2.32	3.27	3.91	51.83	62.6	29.8	4.4	8.36	10
Suffolk	VA	1.90	1.78	4.32	4.00	54.38	52.3	42.7	2.9	-0.32	9
Virginia Beach	VA	1.92	2.24	3.11	4.04	49.89	67.7	19.6	6.6	19.05	8
Shelton	CT	1.64	2.53	3.53	4.20	17.32	90.8	2.4	5.9	7.26	7
Culver City	CA	1.97	3.09	3.04	4.39	59.73	60.3	9.5	23.2	16.96	6
Coral Gables	FL	1.59	2.21	3.10	4.71	17.01	91	3	53.6	1.56	5
Miami Beach	FL	1.80	2.52	5.35	5.47	23.26	87.4	4.4	53	8.64	4
San Francisco	CA	3.67	3.39	6.73	6.51	64.31	48.5	6.1	15.1	10.73	3
New York	NY	4.13	5.69	14.22	7.01	70.80	44	25.5	28.6	17.49	2
Santa Monica	CA	1.86	2.59	6.58	9.79	38.60	77.60	3.9	13.1	9.10	1

Table 9: Coefficients on Race Heterogeneity h_i for Expenditure Shares 2010

Variable name	1 (no controls)	6 (all controls)	#obs	Adj. R^2
Share of spending on:				
Roads	-0.077^{***}	-0.057^{***}	1422	0.06
	(0.014)	(0.014)		
Sewerage	-0.065^{***}	-0.095^{***}	1422	0.08
	(0.015)	(0.016)		
Police	0.066^{***}	0.083^{***}	1422	0.05
	(0.012)	(0.014)		
Parks	-0.050^{***}	-0.024^{**}	1362	0.07
	(0.011)	(0.012)		
Housing	0.119^{***}	-0.119^{***}	1135	0.06
	(0.014)	(0.016)		
Health	-0.001	-0.001	854	0.02
	(0.013)	(0.015)		
Welfare	0.027^{**}	0.015	252	0.08
	(0.011)	(0.013)		
Totals:				
Roads Spending/Capita	-68.18^{***}	-43.41^{*}	1422	0.02
	(23.81)	(25.02)		
Intergov. Rev/Capita	362.99^{***}	134.45	1422	0.06
	(93.73)	(83.19)		
Taxes/Capita	378.76^{***}	483.72^{***}	1422	0.16
	(82.01)	(93.79)		
Expenditure/Capita	864.62^{***}	636.38^{***}	1422	0.09
	(167.93)	(167.61)		

Table 10: Coefficient on Race Heterogeneity 2010 vs Alesina 1990, adjusted for inflation

Year	exp/capita	tax/capita	hwy/capita	hwy%	police%	sewer%
1990	544.41	256.88	-63.36	-0.083	0.099	-0.079
2010	636.38	483.72	-43.41	-0.057	0.083	-0.095

Table 11: First Difference Regression Results on (real) Per Capita Outcomes

	(1) Δ Exp/Capita	(2) Δ Exp/Capita	(3) Δ Tax/Capita	(4) Δ Tax/Capita
Δ Race	-13.81***	-11.63***	-7.196***	-6.091***
	(-8.57)	(-7.23)	(-11.86)	(-9.61)
Δ log(pop)	-122.6	-121.0	-30.64	-29.82
	(-1.61)	(-1.60)	(-1.00)	(-0.99)
Δ Intergov/Cap	0.422***	0.422***	-0.0162	-0.0162
	(7.27)	(7.27)	(-1.38)	(-1.40)
Δ Inc/Cap	0.00116	0.00198	-0.00195	-0.00154
	(0.29)	(0.49)	(-1.12)	(-0.88)
Δ Inequality	-25.29***	-22.48***	-9.232***	-7.805***
	(-6.15)	(-5.57)	(-5.97)	(-4.93)
Δ % BA or higher	-1.237	0.0124	6.002***	6.636***
	(-0.49)	(0.01)	(6.32)	(6.99)
Δ % over 65	-16.60**	-13.44*	2.618	4.220
	(-3.01)	(-2.44)	(1.11)	(1.70)
Lag. Race		2.439***		1.239***
		(3.76)		(4.76)
year	0.172***	0.117***	0.0647***	0.0367***
	(11.55)	(6.80)	(15.20)	(5.35)
N	2128	2128	2128	2128

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 12: Durbin-Wu-Hausman (1978) Test for Endogeneity

	(1) Δ Exp/Capita	(2) Δ Tax/Capita
Δ Race	-7.989***	-4.217***
	(-4.70)	(-6.32)
Δ log(pop)	53.29	59.41*
	(0.72)	(1.99)
Δ Intergov/Cap	0.460***	0.00301
	(7.85)	(0.26)
Δ Income/Cap	0.00358	-0.000714
	(0.91)	(-0.42)
Δ Inequality	-32.63***	-12.99***
	(-7.93)	(-8.21)
Δ % Bachelor or higher	-1.527	5.853***
	(-0.62)	(6.61)
Δ % over 65	-26.16***	-2.277
	(-4.69)	(-0.95)
v2	-29.99***	-15.35***
	(-7.41)	(-8.55)
year	0.256***	0.108***
	(12.53)	(14.92)
N	2128	2128

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 13: XTIV Estimation with Linear Time Trend

	(1) Exp/Capita	(2) Exp/Capita	(3) Tax/Capita	(4) Tax/Capita
Race h_i	-9.358**	3.819***	-6.345***	2.161***
	(-2.83)	(6.71)	(-4.92)	(6.31)
log(pop)	-73.75	-2.709	-2.444	-6.252
	(-1.50)	(-0.34)	(-0.11)	(-1.23)
Intergov	0.666***	1.098***	0.0396**	0.262***
	(7.39)	(22.99)	(2.78)	(12.46)
Income/Capita	0.0267***	0.0108***	0.00985***	0.0113***
	(6.87)	(4.93)	(5.33)	(7.51)
Inequality	-20.29***	9.366***	-7.089***	2.208
	(-5.82)	(4.84)	(-5.10)	(1.74)
% BA or Higher	0.207	0.228	2.524**	0.547
	(0.09)	(0.16)	(2.63)	(0.67)
% over 65	-9.442*	-6.150*	2.054	3.838*
	(-2.52)	(-2.00)	(0.99)	(2.08)
N	2899	2899	2899	2899
R^2	0.425	0.890	0.430	0.790
F	56.02	3114.3	121.61	1737.8
Regression	IV	OLS	IV	OLS
Weak ID F-test	584.54	–	584.54	–
Weak ID Robust P-value	0.001	–	0.001	–
Endogeneity χ^2	8.74	–	13.15	–
Endogeneity P-value	0.003	–	0.001	–

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Table 14: IV First Stage Results

	(1) Race
$\hat{Race}$	0.835***
	(21.60)
Intergov	0.00221***
	(6.31)
log(pop)	3.907***
	(4.02)
Income/Capita	-0.000138**
	(-2.31)
Inequality	-0.749***
	(-12.19)
% over 65	-0.0452
	(-0.60)
% BA or Higher	0.102***
	(3.01)
N	2899
Weak ID F	466.48
Weak ID P	.0001
Under ID χ^2	169.5
Under ID P	.0001
Weak ID 10%	16.38
Weak ID 25%	5.53
Robust Inference F	22.64
Robust Inference P	.0001

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Table 15: Cross-correlation of main Covariates

Variables	raceh	natracehat	rpercapitaexp	rintergovpercap	logpop	rincpercap	over65	BApct
raceh	1.000							
natracehat	0.883	1.000						
rpercapitaexp	0.170	0.191	1.000					
rintergovpercap	0.109	0.129	0.743	1.000				
logpop	0.396	0.392	0.249	0.194	1.000			
rincpercap	-0.085	-0.108	0.089	-0.057	-0.019	1.000		
over65	-0.181	-0.091	0.100	0.100	-0.143	0.122	1.000	
BApct	0.070	0.092	0.128	-0.004	0.056	0.729	-0.034	1.000

Table 16: FD Model with State FE

	(1) Δ Exp/Capita	(2) Δ Tax/Capita
Δ Race	-9.540***	-5.902***
	(1.618)	(0.989)
Δ Intergov	0.573***	0.0398***
	(0.081)	(0.014)
Δ log(pop)	-51.43	-58.33*
	(83.859)	(35.037)
Δ Income/Capita	0.00572	-0.000966
	(0.004)	(0.002)
Δ Inequality	-19.50***	-6.145***
	(5.086)	(1.962)
Δ % BA or Higher	9.416***	11.20***
	(2.278)	(1.236)
Δ % over 65	1.248	8.422***
	(6.796)	(2.857)
FE	State & Year	State & Year
N	2128	2128
R^2	0.347	0.290
F	10.67	14.93

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Table 17: Reverse Causality Tests

	(1) Δ Race	(2) Δ Race
Δ Exp/Capita	-0.00309***	-0.00276***
	(0.000)	(0.000)
L.Exp/Capita		0.000843***
		(0.000)
Δ Intergov	0.00369***	0.00395***
	(0.001)	(0.001)
Δ log(pop)	9.038***	9.764***
	(1.183)	(1.210)
Δ Income/Capita	0.000118**	0.0000681
	(0.000)	(0.000)
Δ Inequality	-0.234***	-0.298***
	(0.060)	(0.061)
Δ % BA or Higher	0.131***	0.115***
	(0.027)	(0.028)
Δ % over 65	-0.386***	-0.363***
	(0.086)	(0.085)
Year	1.928***	2.566***
	(0.104)	(0.140)
L.Race		-0.0901***
		(0.009)
N	2128	2128
R^2	0.495	0.524
F	260.2	265.3

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

	(1) Δ Race	(2) Δ Race
Δ Tax/Capita	-0.00720***	-0.00632***
	(0.002)	(0.002)
L.Tax/Capita		0.00247***
		(0.000)
Δ Intergov	0.00217***	0.00240***
	(0.000)	(0.000)
Δ log(pop)	9.078***	10.27***
	(1.175)	(1.197)
Δ Income/Capita	0.0000981**	0.0000150
	(0.000)	(0.000)
Δ Inequality	-0.228***	-0.264***
	(0.058)	(0.059)
Δ % BA or Higher	0.181***	0.160***
	(0.028)	(0.028)
Δ % over 65	-0.310***	-0.291***
	(0.086)	(0.084)
Year	1.868***	2.332***
	(0.104)	(0.130)
L.Race		-0.0829***
		(0.008)
N	2128	2128
R^2	0.502	0.531
F	267.3	273.4

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Table 18: FD Results with Censored Raceh (compare to Table 11)

	(1) Δ Exp/Capita	(2) Δ Tax/Capita
Δ Race	-14.55***	-7.205***
	(1.683)	(0.587)
Δ Intergov	0.517***	0.0195
	(0.0717)	(0.0130)
Δ log(pop)	-186.1**	-41.41
	(76.06)	(30.32)
Δ Income/Capita	0.00676	-0.000369
	(0.00412)	(0.00174)
Δ Inequality	-29.65***	-9.897***
	(4.422)	(1.511)
Δ % over 65	-7.671	5.653**
	(5.819)	(2.577)
Δ % BA or Higher	0.260	6.645***
	(2.568)	(0.929)
Year	121.2***	43.13***
	(10.74)	(2.451)
N	2020	2020
R^2	0.295	0.303
F	35.64	102.0

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Table 19: FD Expenditure Results for Individual Races (compare to Table 11)

	(1) Δ Exp/Capita	(2) Δ Exp/Capita	(3) Δ Exp/Capita
Δ % White	17.62***		
	(2.297)		
Δ % Black		-8.401**	
		(3.050)	
Δ % Hispanic			-12.44***
			(3.383)
Δ Intergov	0.524***	0.497***	0.507***
	(0.0696)	(0.0675)	(0.0685)
Δ log(pop)	-243.8**	-330.1***	-242.6**
	(74.02)	(75.41)	(74.57)
Δ Income/Capita	0.00485	0.00396	0.00546
	(0.00405)	(0.00411)	(0.00407)
Δ Inequality	-31.77***	-26.81***	-30.67***
	(4.467)	(4.144)	(4.687)
Δ % BA or Higher	-0.0808	-1.462	-2.646
	(2.482)	(2.472)	(2.600)
Δ % over 65	-7.610	-5.365	-6.215
	(5.604)	(5.714)	(5.779)
Year	126.8***	100.5***	113.9***
	(11.25)	(9.279)	(11.69)
N	2128	2128	2128
R^2	0.292	0.266	0.270

Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 20: FD Tax Results for Individual Races (compare to Table 11)

	(1) Δ Tax/Capita	(2) Δ Tax/Capita	(3) Δ Tax/Capita
Δ % White	7.672***		
	(0.787)		
Δ % Black		-2.833**	
		(1.073)	
Δ % Hispanic			-3.928**
			(1.202)
Δ Intergov	0.0167	0.00403	0.00682
	(0.0128)	(0.0127)	(0.0126)
Δ log(pop)	-82.27**	-119.2***	-91.38**
	(29.70)	(30.05)	(31.30)
Δ Income/Capita	-0.00109	-0.00132	-0.000805
	(0.00174)	(0.00180)	(0.00178)
Δ Inequality	-11.03***	-8.967***	-10.21***
	(1.541)	(1.517)	(1.598)
Δ % BA or Higher	6.555***	5.913***	5.530***
	(0.933)	(0.919)	(0.913)
Δ % over 65	6.112*	7.333**	7.118**
	(2.448)	(2.520)	(2.570)
Year	44.29***	32.50***	36.64***
	(2.644)	(2.256)	(2.771)
N	2128	2128	2128
R^2	0.272	0.237	0.239

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 21: Coefficients using three instruments: Predicted Race, Lagged Race, Lagged Income

	(1) Exp/Capita	(2) Tax/Capita
Race	-5.573	-4.346***
	(-1.83)	(-3.56)
Income/Capita	-0.109***	-0.0485***
	(-6.31)	(-7.18)
Intergov	0.387***	-0.0443**
	(3.97)	(-2.87)
log(pop)	206.3*	61.70
	(2.02)	(1.50)
Inequality	19.08**	5.925*
	(3.22)	(2.35)
% BA or Higher	75.01***	35.19***
	(7.34)	(10.85)
% over 65	-14.60*	5.869*
	(-2.08)	(2.18)
N	2165	2165
R^2	.0623	.1575
Weak ID F-Test	64.466	64.466

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Chapter 3- Demographic Transition and Economic Opportunity: A Study of Colorado

I Introduction

The most recent decades of United States history have been defined by rapid demographic transition. In the past 40 years, the White non-Hispanic population has diminished from over 80% in 1980 to just over 60% today (US Census). Recent literature has demonstrated using experimental and quasi-experimental methods that the neighborhood which a child grows up in has substantial causal effects on upward mobility and the shaping of children's outcomes into adulthood. Family and neighborhood environment characteristics are closely intertwined, combining to influence the developmental trajectories of individuals in ways which extend across generations (Sharkey and Elwert, 2011). Salient social processes which operate within an individual's residential choices with influences which accumulate and persist over long periods of time (Sharkey and Faber 2014).

Exposure to neighborhood effects over time is associated with a wide range of adulthood economic outcomes. Moving to a lower poverty neighborhood during adolescence increases college attendance, adulthood earnings, and reduces single parenthood rates (Chetty, et al, 2016). The neighborhood effects are also associated with higher rates of employment and lower violent crime arrests and high school dropout rate (Chyn 2018). Better schools which exist in the higher income areas strongly explain the differences in adulthood outcomes (Laliberte 2021).

In the United States, these adulthood outcomes such as income/poverty (Akee, et al, 2019) , employment (Emeka 2018) , education (Kelly 2010) , incarceration (Western 2005) and mortality rates (Deaton 2003) are also highly correlated with race. Even among households with identical annual income, there are large and persistent racial differences in the neighborhood context. In particular, non-Whites live in lower income neighborhoods on average than their White counterparts earning equal incomes (Reardon 2015) . Race in combination with neighborhood is also an important factor in intergenerational mobility (Chetty, et al. 2020).

These important findings stem from a broad literature on the question of whether neighborhoods matter in terms of adulthood economic outcomes (Ellen and Turner 1997; Ludwig, et al. 2008). Within this literature, the primary emphasis has been placed on selection bias which presents challenges to causal inference (Sampson 2008; Sharkey and Faber 2014) as well as adjudicating between different definitions of a 'neighborhood' (Chaskin 1997; Galster 2008). The focus on methodological issues may distract attention from the larger question of how residential context which may operate at multiple geographic and social scales, becomes salient in the lives of individuals and families (Sharkey and Faber 2014). Children from low-income families are more likely to succeed in areas with less concentrated

poverty, less income inequality, better schools, a larger share of two-parent families, and lower crime rates (Chetty and Hendren 2018).

I expand upon the existing literature by exploring Census Tract level spatial variation of demographic characteristics. Since the neighborhood of one's upbringing matters at a very granular level for later life economic outcomes, it is important to understand how neighborhoods form, and the endogeneity due to selection inherent in this process. Harding, et al. (2011) and Sharkey and Faber (2014) argue that "the effect of the neighborhood should be thought of as a multiplicative function of neighborhood characteristics, the timing and duration of individuals' exposure to the neighborhood, and individuals' vulnerability to the effects of the neighborhood" (see also Galster 2012; Small and Feldman 2012). Previous economic literature estimates the local and neighborhood level effects of residential segregation. Localization of poverty, especially along racial or ethnic lines is problematic because the residents of these areas are subject to significantly worse economic outcomes for schooling, employment and single parenthood (Cutler and Glaeser 1997). Additionally, these areas, commonly known as "ghettos" are associated with reduced health outcomes (Kramer and Hogue 2009) as well as reduced human capital formation and increased violent crime (Steil, et al. 2015; Duncan and Kawachi 2018). with estimates suggesting that decentralization of poverty could reduce Black-White and Black-Hispanic inequality across these outcomes significantly.

Tracts with the fastest growing minority populations are frequently the most affordable, containing high densities of renters, relatively lower income and fewer businesses. Conversely, "Growing parts of stagnant, slow-growth metropolitan areas see less integration occurring, and many of these places could be extending segregation through selective entry to growing areas" (Bellman 2018). I argue that using publicly available data, policymakers may be able to identify at-risk Tracts to preemptively combat negative economic outcomes such as poverty and inequality. Revenue sharing and other tax diversion may be warranted to promote business formation and combat urban blight and reduced economic opportunity associated with high-density, low-income areas.

II Economic Opportunity

The question of interest to this paper is why some Census Tracts are better than others to grow up in, and why sometimes "good" and "bad" Tracts to grow up in are located geographically very close together. In other words, what are the mechanisms by which some Tracts become better than others in terms of the adulthood outcomes produced therein? This is a different question to quantify. For data availability reasons, many studies of inequality are undertaken at the County, Metropolitan Statistical Area, or Commuting Zone level. However, we also know that there is significant variation in adulthood economic outcomes within these larger areas.

The study of Census Tracts introduces the possibility to measure differences in economic outcomes within a very fine geographic space, especially in urban areas. But it is not without cost, as the data available to the public covering

smaller geographic denominations such as Tracts are limited, and often suffer from estimation errors. In order to study the problem of differences in economic outcomes at the Census Tract level, the researcher should consider at least three issues:

- What is Economic Opportunity? Given the data we have, how can we measure it?
- Within smaller geographic areas, people often do not live in the same place as they work. Further, over time people migrate into and out of tracts. Publicly available data often does not have the disaggregation required to track these types of individual outcomes.
- How does the geographic unit of measurement relate to the scale at which decisions are made regarding public finance and expenditure?

I discuss these issues in turn. Opportunity Insights' Opportunity Atlas (opportunityatlas.org) define opportunity across a wide range of both "Children's outcomes in adulthood by neighborhood where they grew up" and "Neighborhood characteristics and characteristics of current residents in each area." The two classes of indicators are clearly linked. However, we are missing a scientific conception of the mechanisms which link the neighborhood characteristics of the *past* and changes in these characteristics to changes in the adulthood outcomes observed.

In a recent address to the United States Senate's Joint Economic Committee, Jared Bernstein, senior fellow from the Center for Budget and Policy Priorities, notes that despite general economic growth over the past few years, barriers to opportunity and mobility still remain. These include inequality, access to education, investment into children's programs, and residential segregation by income. Further, there was slower employment recovery in rural areas post-2008 housing market collapse (Hertz, et al. 2014) and in rural areas with higher COVID infection rates (Cho et al. 2021) .

This testimony demonstrates that the link between neighborhood, or Census Tract opportunity and adulthood outcomes is not only a static snapshot of economic indicators at any one time, but rather an evolution of these indicators throughout childhood and into adulthood. To develop coherent policy designed to combat inequality of economic opportunity, policymakers should consider how changes in the neighborhood characteristics of a Tract alter the adulthood outcomes observed there over time. Since there is significant research at this point indicating that neighborhood characteristics such as income, demographic composition, housing and employment availability all significantly influence children's adulthood outcomes, policymakers should seek to understand how their policies impact the neighborhood characteristics.

Returning to the issue of measurement and data, there is probably no singular measure which economists agree best measures economic opportunity. Among the 24 adulthood outcomes listed on the Opportunity Atlas, 16 (2/3) measure either income, work hours, or employment. Personal income, or income per capita is an important indicator of

economic health and will be used extensively in the sections of this paper to follow. However, income per capita is not a complete measure of economic opportunity. Income inequality and percent in poverty are also important indicators of economic opportunity. In addition to these measures, I use seven more Economic Opportunity outcomes which are intended to closely mirror those found in the Opportunity Atlas. Those measures are the employment/population ratio, % with a bachelor degree or higher as a measure of education, % living in the same tract as the year before as a measure of mobility into and out of the area, average household size, married to unmarried homeowner ratio, teen birth rate per thousand, and the median homeowner value in the tract.

Migration and employment sorting in Tracts complicates analysis of economic opportunity at the Census Tract level, especially in urban areas where the size of Tracts is small. Most people are not employed in the Tract in which they live. The Census Longitudinal Employer-Household dynamics dataset presents a potential control for this problem. By comparing jobs which exist in the Tract to the jobs held by people living there, one can gain a sense, albeit estimated, of whether the labor market composition of a Tract matches the demographic composition.

Consider, for example, rapidly growing Front Range university towns in Colorado such as Boulder and Fort Collins. In these places, local policymakers face the challenge that many individuals working at jobs in the town (especially service and trade jobs) cannot afford to live there. In this case, we might expect to find that for certain Tracts, the average pay of the jobs in the tract is lower than the average income of the residents. Conversely, we may also find Tracts where the average pay is reasonably high, but income per capitas are relatively low. We might expect to find these Tracts in or near industrial areas. Other tracts yet will feature both high paying jobs and high earning residents, or on the opposite end of the spectrum both low paying jobs and low earning residents. Classification along this axis of salaries and earnings in a Tract is potentially insightful in terms of highlighting disparities in economic opportunity between Tracts.

As an additional issue related to migration and residential location choice, individuals are able to enjoy amenities outside of their residential Tract. For this reason, lower-income Tracts in and near urban areas tend to be more attractive than cheaper alternatives further from hubs for employment and business activity. The US Department of Agriculture Economic Research Service publishes a natural amenity index which may be used to address this concern. Use of the natural amenities scale at the county level assumes that individuals residing in *all* Tracts within the county would have equal access to these amenities. That assumption may not be fully accurate, however it is probably not overly restrictive. For example, the relatively inexpensive neighborhoods of Larimer County (Fort Collins/Loveland MSA) are usually less directly connected to natural amenities such as parks and trails. But these amenities are still easily accessible by car to any resident of the county.

More generally, it might also be useful to use County or Commuting Zone fixed effects to account for the fact that while inequality and residential segregation occur at a fine geographic level, the economic activity associated with these areas is not limited to the Tract of interest. In following sections, I use both the fixed effects method, as well

as spatial econometric methods to account for the geographic proximity of a Tract to natural amenities, jobs, and the same set of characteristics from nearby Tracts.

A final note of concern is that while we know within larger geographic areas such as Counties or MSAs there is still a high degree of inequality which we would like to measure. Study at the Census Tract allows the researcher to quantify some of this inequality. However the Census Tract is not, generally speaking, a denomination relevant to public policy considerations such as tax, expenditure, and budgeting for important public services such as education, road maintenance and sewage. The State of Colorado's legislative budget website notes that about a quarter of the state budget, or approximately $9B of the state's $36.5B budget for fiscal year 2020-2021 is allocated to local governments including school districts, cities and counties to help fund K-12 education, local roads, and public assistance programs. Policies which seek to address inequality economic opportunity should begin by understanding how State and Federally appointed funds are allocated at the Local level.

As an example of how understanding the geographic nature of inequality can be important for local economic policy, consider the example of educational funding in Colorado. Public schools in Colorado receive funding based on a formula specified by the state's Public School Finance Act of 1994. The formula starts with a base amount per student and then adds weights based on student factors such as poverty and district factors, including size and cost of living. Because this formula had the tendency to potentially steer money to expensive school districts with fewer impoverished students, State lawmakers recently voted to adjust the formula. The new adjustments count students who qualify for free and reduced lunch programs as at-risk, diverting extra money to districts with at-risk populations as well as bonuses for English learners. Identification of the geographic distribution and dispersion of at-risk learners was essential to promote this type of program.

The purpose of the remainder of this paper is to identify and characterize demographic change as it relates to issues of income and economic opportunity in the State of Colorado. By identifying rapidly changing areas of demographics and income, state and local policymakers can continue to allocate funding to at-need areas. Economic policymakers may seek to reduce inequality into the future by identifying areas which either are presently, or are at risk of becoming'opportunity deserts characterized by high poverty, unemployment, and crime. The residential context of certain places, is described as "[...] some of the most basic features of the environment surrounding children when they leave the home: the air they breathe, the water they drink, and the sounds they hear. The impact of the physical environment surrounding children is an understudied dimension of neighborhood effects, but an expanding literature provides persuasive evidence that exposure to air, water, and noise pollution may have substantively larger effects on children's health, cognitive development, and academic achievement (Evans and Krantowitz 2002; Evans 2006; Entwisle 2007; Currie, et al. 2011)" (Sharkey and Faber 2014 pg. 564). Understanding how policymakers can influence this residential context is important if economic policy is to be impactful in terms of reducing inequalities which are present.

To demonstrate the potential use of understanding geospatial residential patterns and the impact on adulthood economic outcomes via childhood tract-level indicators, I present a short case study on schools in the Central Denver area. Policymakers might be interested in understanding whether there is a geographic relationship between income, demographics, and school quality. As a measure of school quality, I use the Colorado Department of Education's School Performance Framework Ratings. Schools are categorized into four general types: Performance, Improvement, Priority and Turnaround. Priority categorized schools undergo state-level programs in an attempt to improve measureables such as dropout rate, graduation rate, and standardized test performance. Turnaround schools are on a similar track as the Priority, but may be closed or subject to alterations in funding or student allocation if performance doesn't improve. Improvement schools were formerly in the Priority or Turnaround categories, while Performance should be considered the highest quality categorization. In general, the Priority and Turnaround categories might be considered "at risk".

Figure 10 demonstrates the spatial distribution of schools in the Central Denver area for which the SPF rating is publicly available, categorized into the four groups described above and highlighting the two "at risk" classifications. Figures 11 and 12 map the Priority and Turnaround "at risk" groups with the background layer of median household income, and demographics (White NonHispanic %) respectively. Figure 11 demonstrates the spatial pattern of at risk schools compared to median household income. These types of schools tend to be located in lower income areas shown in red: North of downtown toward Commerce City, West in the Aurora area, and in Tracts East and Southeast of downtown. There are a few exceptions, such as in the Park Hill neighborhoods East and Northeast of downtown and the University neighborhoods to the South.

However, the spatial pattern appears to be even stronger for the relationship between White Non Hispanic population and at risk schools in Figure 12. Most of the at risk schools are located in Census Tracts shaded lighter, indicating lower densities of White Non Hispanic population. These geospatial patterns make Census Tracts an important unit of study, despite the critique that they may not directly be units of policy. Policymakers should understand the relationship between race, income, and quality of public goods such as schools, as they consider local level distribution of funding. Quality of schooling is a measurable outcome which is likely to affect the quality of the Census Tract in terms of future economic outcomes. While school districts may not have the power to individually reallocate funds, state and local lawmakers should be aware of the spatial distribution of certain important public goods and services ranging from education to roads, sewage and public parks, in order to avoid residential segregation along income, race, and economic opportunity lines.

III Data

Race groups are defined using the one-race categorizations found in the US Census: White, Black, Asian/Pacific Islander, Native, in addition to the non-mutually exclusive ethnicity choice: Hispanic or Non-Hispanic. The US Census defines race categorizations which may be arbitrary or socially constructed. Nonetheless, these classifications broadly represent groups which are politically salient in the U.S. economy (Alesina 1999) and the one-race data is representative of about 97% of the population (US Census 2010). I use all Non-Hispanic categorizations, and consider Hispanic as a separate subgroup. Due to their predominance in the population distribution of Colorado, the main subgroups considered are: White Non-Hispanic, Black Non-Hispanic, and Hispanic. On average, Asian non-Hispanic income trends in Colorado mirror White non-Hispanic. Additional research could decompose the Asian sub-group by origin to determine whether White and Asian income trends are similar across all origins.

Panel data on demographic composition and demographic change at the Census tract level is drawn from the American Community Survey (ACS) 5-year estimates for years 2010-2019. 5-year are selected over 1-year estimates due to data suppression in the 1-year estimates. Use of ACS estimates introduces some problems with estimation including potential variance in the accuracy of the estimates, in addition to potential mismeasurement of demographics due to surveying at the household rather than individual level. Nonetheless, the ACS estimates are generally precise and broadly representative of the Colorado population.

The panel ACS data are combined with cross sectional tract level indicators from the Opportunity Insights dataset and the Census Longitudinal Employer-Household Dynamics Survey (LEHD), in addition to three county level cross sectional variables. County level tax and spending are taken from the Census of Governments and published by Willamette University in The Government Finance Database, and at the County level I also use the U.S. Department of Agriculture Economic Research Service's County Natural Amenities Scale. At the Tract level, binary urbanization, percent of total land area developed, and change in the total number of Housing Units are taken from LEHD, while Grade 3 math test scores rating and mail return rate from the 2010 Census are taken from Opportunity Insights' publicly available data sets.

Summary statistics for the main outcome, demographic, and independent variables are presented in Tables 22, 23 and 24. Table 24 demonstrates that overall, population proportions are remaining relatively constant over the sample period in Colorado. Despite this fact, the variation in demographic composition at the tract level is significant, indicating that demographic sorting is occuring within the state more than overall variation in demograhpic composition. In particular, while the Black population has only grown by about 0.2% and Hispanic population 1.3% over the ten year observation sample, in certain tracts these densities have increased by up to 28% and 48%, respectively, of the total population in the tract.

Further, demographic change within the state of Colorado has not occurred evenly across all geographic Tracts.

Figures 6- 9 depict demographic change for Black Non-Hispanic (Figures 6 and 7) and Hispanic (Figures 8 and 9) populations for all of Colorado, and the greater Denver area. The fastest growing Black population tracts, indicated by the darkest green areas, are most frequently found in and near urban areas, especially rapidly expanding urban areas such as Aurora. Meanwhile, growth in the Hispanic population has been relatively more widespread, and is much greater than growth of the Black population in rural areas. Figures 8 and 9 demonstrate that both urban and rural Tracts of Colorado have experienced spots of rapid population increase and rapid population decline among the Hispanic population.

As policymakers consider policy that is designed to combat residential segregation along income and economic opportunity lines, it is important to understand that the growth of minority (non-White) populations and the small declines of White populations in Colorado have not occurred uniformly. For this reason, state level blanket policies designed to promote economic opportunity may be unsuccessful if they are unable to account for disparities in economic growth and opportunity by race and income group at the local level. Instead, place-based policies at the local level could be an effective target. These policies should aim to either combat residential segregation and urban blight which is already forming, or proactively avoid ghetto formation by evenly disbursing important public goods and services of high quality to all Census Tracts. Policies aimed at combating ghetto formation also must consider individual residential preferences. People-based policies such as Moving to Opportunity (see Katz, et al. 2001, Chetty et al. 2016) , have the potential to improve individual outcomes but may not improve impoverished Tracts in doing so. I argue that effective policies to combat inequality of economic opportunity would be aimed at equalizing access to public goods and services spatially across Census Tracts within governing bodies.

IV Results

Linear OLS Model

I begin by testing the relationship between demographic change and wealth in a tract as measured by income per capita and median household income. All measures are drawn from the ACS. I present a variety of estimates of the form (for tracts j in year t):

$$Y_{jt} = \beta_n \chi_{jt} + \theta \, \text{Year}_t + u_{jt}$$

$$Y_{jt} = \text{Set of Panel Economic Health Indicators}$$

$$\chi_{jt} = \text{Set of Tract Covariates}$$

Table 22 provides the summary statistics for 10 economic opportunity measures used, in addition to changes in income, population and employment for a Carlino-Mills model specification. The economic opportunity measures Y_{jt} are: Income per capita, Poverty %, Inequality as measured by the mean/median household income, employment/population ratio, % Bachelor graduates or higher, % living in the same Census tract as last year, household size, the ratio of married/unmarried households, teen birth rate per thousand, and median homeowner value.

Tables 23 and 24 present summary statistics for the main demographic measures: % White non-Hispanic, % Black non-Hispanic, and % Hispanic, in addition to percentage and level changes for these measures. While none of these groups are monolithic, they broadly represent the majority shares of the Colorado resident population. Place level characteristics in the matrix χ_{jt} are broken into tract panel, tract cross-sectional, and county cross sectional variables.

The tract panel variables used are total population (thousands), population density, jobs per capita, labor force participation rate, median age, and the ratio of owners to renters in a community. I also include tract cross sectional variables urbanized: from Markley 2022, I include an indicator for whether the tract is urbanized, change in number of housing units, and % of total land area developed. From the Opportunity Insights data, I also include an index of 3rd grade math scores, and Census mail return rate as a proxy for culture. At the county level, I include expenditures and tax per capita from 2010, in addition to the county level amenity scale devleoped by the Economic Research Service at the US Department of Agriculture.

The main testable hypothesis is that increases in Black and Hispanic population densities correspond to lower levels of Tract wealth over time. Tables 25a- 27b, present results of the linear model. Changes in the White Non-Hispanic population density are positively related to changes in per capita income, while changes in the Black and Hispanic populations are negatively related. In this specification, income per capita is measured in (thousands $). A percent increase in the White Non-Hispanic, Black, and Hispanic populations are associated with $205, -$105 and -$231 changes in income per capita, respectively.

For small changes in population densities, these results may be somewhat small economically. However, for tracts with rapidly changing demographic compositions, these effects can become large. For example, these results suggest that if the Black or Hispanic populations increase by more than 5-10%, the income per capita could decrease by $1000 or more.

Policymakers could use income and earnings disparities as justification to promote racial segregation to improve tax and public expenditure outcomes, but should not do so. Following Cutler and Glaeser 1997, the localization of poverty into segregated communities is problematic socially and in terms of individual outcomes in the low-income areas. For this reason, promotion of residential segregation should not be taken as a policy solution.

Tables 25-30 are each broken down into subtables a and b for ease of viewing. For each of Table 25-30, Table a contains the countcome variables: Income per capita, Poverty %, Mean/Median household income as a measure of inequality, employment/population ratio, and % Bachelor or higher. While Table b contains the results for outcome

variables: % living in the same Tract, average household size, ratio of married to unmarried households, teen birth rate, and median homeowner value.

The general hypothesis being tested is that Tracts which diversify (become more non-White) perform relatively worse in measures similar to those found in the Opportunity Atlas. Due to some combination of preference, necessity, and institutions, Black and Hispanic residents of Colorado are sorting into communities which feature lower economic opportunity.

In the first panels of results, we can see that in addition to a positive relationship between White population and income per capita at the Tract level, increases in White % are also associated with statistically significant decreases in poverty, increases in inequality as measured by the mean/median income, increases in employment, and increases in % educated. Conversely, increases in Black % are associated with statistically significant reductions in income inequality, employment, and education, in addition to the decline in income per capita noted. The same patterns hold for increases in Hispanic % with decreases in income per capita, inequality, employment and education, alongside increases in poverty.

Looking at the second panels, the economic intuition is that increases in White % correspond to decreases in teen birth rate per thousand and increase median homeowner value, while increases in Black and Hispanic % do the opposite. However, it is not clear what the hypothesized relationship should be between changes in race density and the mobility measure (% living in same Tract), household size measure, or ratio of married to unmarried homeowners. Nonetheless, these measures are included to model the Opportunity Atlas as closely as possible using non-classified data.

The linear model results support the hypothesis that Tracts with higher White populations in Colorado feature a higher degree of opportunity. Because individuals will often work and participate in economic activities outside of the Census Tract they live in, I also include Tables 31a- 31c which feature the same model with commuting zone fixed effects. In these models, the same relationships described above hold, and in fact the positive (negative) relationship between White % (Non White %) and income per capita is slightly stronger.

However, because we do not observe characteristics about individuals moving into and out of the tracts, it is difficult to justify any true causal conclusion. Instead, this paper will focus on identifying patterns in the relationship between changes in race and economic outcomes, and the geospatial nature of these changes.

Linear First Difference Model

Results presented in the previous section may suffer from bias due to omitted variables in the regression, such as bargaining power, culture, and political representation. If these omitted variables are time invariant, first differencing will remove the bias created by time invariant unobservables. In this section, I present results from the previous two

tables in first differences of the form:

$$\Delta Y_{jt} = \beta \Delta \chi_{jt} + \theta_t \text{ Year}_t + u_{jt}$$

Tables 28a- 30b present results of the Linear First Difference model for White, Black, and Hispanic, respectively. Results from the difference model display the same pattern as in the previous section. In this model, the coefficients can be interpreted as annual changes. As a result, while the coefficients are less significant than previous models, we might expect this if demographic change impact tract level economic health in the long run than more than in the short run.

In this specification, one percent increases in White Non-Hispanic, Black Non-Hispanic and Hispanic populations are associated with changes in income per capita of $71, -$41 and -$65, respectively, per year. In interpreting and applying these results, it is important again to understand the geospatial distribution of demographic change in Colorado. In the average Colorado Tract White % declined by 2.3%, Hispanic % grew by 1.53% and Black % remained nearly constant *over 10 years*. So for the average Colorado Tract, these results may be economically small. However, we also observe certain tracts for which White, Black and/or Hispanic populations increased or decreased by over 20% and in these Tracts the results could be economically quite significant over a 10 year period.

Similar to the linear model, increases in White % reduce poverty while increasing employment and education rates. Conversely, increases in Black % are associated with statistically significant reductions in employment and education rates, while increases in Hispanic % are associated with increases in poverty and decreases in education rates. While the results of the first difference model are categorically similar to the results in the linear model, it may be useful to employ the first difference model because we are likely to experience the impact of changes in demographic composition on changes in economic outcomes over time. The 10-year sample period of observations may not be a complete picture of this intertemporal relationship. Still, as economists and public policymakers continue research moving forward, it will be important to use models which can incorporate the time dynamic which exists between demographic transition and economic outcomes.

Panel Fixed Effects Model

In this vein I turn to a Panel Fixed Effects model at the Census Tract level which can better incorporate time dynamics in the relationship between demographics and economic opportunity. Since observations in this model are grouped at the Tract level, the time-invariant independent variables used in the previous specifications will need to be dropped. Hausman testing confirms the use of Fixed rather than Random effects modeling for this section.

Tables 32a- 34b present the results. In this specification, White, Black and Hispanic % are all once again statisti-

cally significantly related to income per capita in the same way as before. Increases in White % are associated with changes in income per capita of $119 while increases in Black and Hispanic % are associated with decreases in income per capita of -$97 and -$116 respectively. Similar patterns emerge in the Panel model as both the Linear and First Difference models with regards to the set of economic opportunity variables: increases in White % are associated with increases in education and median homeowner value, and with decreases in poverty and teenage birth rate. Increases in Black % are associated with lower employment, while increase in Hispanic % are associated with higher poverty and teen birth rate in addition to lower education and median homeowner value.

Instrumental Variables

If all omitted variables in the model were time invariant, the first difference model would be unbiased. Naturally, it is likely that these omitted variables are actually time variant, and so will continue to cause endogeneity bias in the parameters, even after differencing. In an attempt to correct this endogeneity, I instrument the race heterogeneity measure using predicted values from US national trends.

To create the instrument, I use race composition of each Census 'Place' in the balanced panel in 2010 as the starting point. From 2010, I predict 2011 values using the national trends for each race/ethnicity. Predictions for years 2012-2019 are computed using the previous years' prediction and national trends for that decade. Ideally, the national trends will not be influenced by local policy or institutional decisions which influence local community composition.

While this instrument is theoretically endogenous and closely matches the mean of the true population proportions, this Bartik IV technique creates a variable with a variance which is much smaller than the true population. This is due to the fact that in this IV approach *all* tracts grow and decline at the national population proportions- meaning that in all tracts, White % is predicted to slowly decline, while Black and Hispanic % are predicted to slowly increase.

To minimize this issue, I classify each tract as increasing/decreasing in White Non-Hispanic, Black Non-Hispanic and Hispanic populations. Given that designation, I then predict population proportions in each tract based on the starting point in 2010, and national averages for tracts which are increasing/decreasing.

Table 36 demonstrates that the instrumental variable created in this way both matches in the mean of the true population and the variance very closely. However, this definition may cloud the true exogeneity of the IV. Whether demographic proportions in a tract increased or decreased is potentially correlated with the same omitted variables as before. Since whether a tract grew or decreased in its non-White proportions is not itself truly exogenous, creating an instrument based on this same definition may be problematic. Still, this approach is an improvement over the standard Bartik procedure, from which predicted variances of population proportions are a mere fraction of the variance of the population. In addition to the Bartik shock instrument, Alesina et al. (1999) also suggests using lagged values of the potentially endogenous variables as instruments.

Provided that we have a trustworthy instrument, the Durbin-Wu-Hausman (1978) test, as suggested by Wooldridge (2010), can identify whether instrumental variable analysis would be beneficial due to endogeneity bias in the linear and panel models. The endogeneity test is run as a two stage regression. In the first stage, the potentially endogenous variable, in this case each race composition, is regressed on all exogenous variables and the proposed instruments. The residuals from the first stage are stored and used as a right hand side variable in the standard linear model proposed. If the coefficient on the residuals is significant in the original model, it is likely that sound instrumental variables could correct the problem.

Table 35 presents the results for the Durbin-Wu-Hausman testing. $\hat{vw}$ $\hat{vb}$ and $\hat{vh}$ are the residuals from the first stages of the endogeneity test. The leftmost three specifications on the table present endogeneity testing for the single Bartik shock instrument, while the rightmost three specifications present models with three instruments: the Bartik shock, lagged race, and lagged dependent variable. We would expect a priori that this relationship is strongly endogenous. However, the results are mixed. The D-W-H test suggests that some variables but not others are endogenous, presented here for Income, Poverty and Inequality measures.

This results calls into question the true exogeneity of the instrumental variable. To create it, each Tract was characterized into growth or decline by race group. Whether that race group was growing or declining was potentially correlated with the error term to begin with. A potential solution to this problem would be to construct a Herfindahl index over all races to create an index of race heterogeneity as in the literature following from Alesina, et al. (1999). Since the demographic composition of Tracts are in general changing to be more non-White, as measured by the US Census, using a race heterogeneity index which is in general increasing over time is a reasonably accurate representation of the demographic change occurring over time. However, policies created based on this combined index measure would not be able to account for differences in demographic change over time. As noted in previous sections, in Colorado, Black and Hispanic populations are growing differently and in different areas, so the particular policy prescriptions may vary dependent on location. For this reason, I present instrumental variables estimates of the disaggregated race measures used before, despite concerns about the quality of the Bartik shock instrument.

As a test to determine whether the choice of instruments is potentially valid, I include an overidentification test. Wooldridge (2010) suggests that when there are more instruments than are required to identify an equation, we can implement a Sargan-Hausman test to determine whether the additional instruments are valid, in the sense that they are uncorrelated with the error term. Under the null hypothesis, the potential instruments are uncorrelated. Rejection of the null hypothesis would be cause to reevaluate the choice of IVs. However, the test does not indicate which of the IVs fail the exogoeneity requirement. It could be one or all of them. Using the Bartik shock race instrument as well as the lagged value of the main race variable used in each model, we fail to reject the null hypothesis, indicating that these are potentially valid instruments to use in the model.

The IV model using the Bartik shock instrument is a two stage specification using the predicted values:

$$\hat{r_{it}} = \sigma Z_{it} + \gamma X_{it} + \theta Year_t + \varepsilon_{it}$$

$$Y_{it} = \beta \hat{r_{it}} + \Gamma X_{it} + \theta Year_t + u_{it}$$

Where the instrument Z_{it} is the local predicted values from the national trend and $\hat{r_{it}}$ are the first stage residuals. Using this approach allows for a additional testing of endogeneity in the relationship between race composition and local income.

Tables 37- 39 present the results of the panel instrumental variables regression with year fixed effects suppressed. The results for income per capita correspond directly to the previous models. Percent changes in White non-Hispanic, Black non-Hispanic and Hispanic populations change income per capita in the tract by \$107, -\$248, and -\$189 respectively. Although the signficance of the coefficients in the household median income specifications has fallen compared to the previous models, the direction of the coefficients still hold with changes to the White population increasing household median income, and the opposite effect for changes to Black and Hispanic populations.

Endogeneity testing is performed from the instrumental variables model as a difference between Sargan-Hansen statistics (see Hayashi 2000). From these models, Black and Hispanic densities are determined to be endogenous at the $< 1\%$ confidence level, but we fail to reject the exogeneity of White %, which is again somewhat counter to intuition. While the instrumental variables specification may not be a complete analysis on its own, the combination of linear, first difference, panel, and instrumental variables regressions, which all arrive at similar direction and magnitude of coefficients confirms that the results are robust across a variety of possible model specification choices.

Spatial Durbin Model

Bias in the results of the models from previous sections may not be limited to omitted variables within the Tract. There is also a possibility for a spillover effect from neighboring Tracts. To account for this possibility, in this section I introduce a spatial econometric specification. This approach allows that outcomes in each Census Tract may be influenced by:

- Spatial Lags of Outcomes (Outcomes in Neighboring Tracts)
- Spatial Lags of Covariates (Covariates in Neighboring Tracts)
- Spatially Autoregressive Errors (Errors from Neighboring Tracts)

These spillovers are likely when working at small geographic levels because, especially within cities, Census tracts are geographically small in area and many people living in the Census track work and conduct economic activities in

nearby tracts. Further, the relationship between economic conditions in between tracts could be in part responsible for explaining patterns of demographic transition and income. In particular, it is possible that increases of income in a Tract could have the effect of pushing lower income residents out of that Tract over time, and into neighboring, lower-income tracts. This negative externality of gentrification in a Census tract may be partially responsible for explaining demographic patterns, in addition to preference-based location choice and economic necessity. However, forced displacement of this type is endemic to poor communities and not confined to gentrifying neighborhoods (Desmond and Shollenberger 2015; Zuk, et al. 2018). For this reason, study of either a larger geographic area, or a comparative study of places is warranted.

Using Caliper's Maptitude program, I export a shapefile of Colorado tracts, create a weighting matrix W based on tract inverse distance. There are many small tracts in urban areas, and there are likely to be spillovers from multiple Tracts within those areas, not just contiguous Tracts, so inverse distance is chosen over contiguity. The equation of interest becomes:

$$Y_{jt} = \beta\chi_{jt} + \gamma\mathbf{W}\chi_{jt} + \Theta\mathbf{W}Y_{jt} + +\varphi\,\text{Year}_t\text{*Tract}_j + (\mathbf{I} - \rho\mathbf{W})^{-1}u_{jt}$$

Where $\mathbf{W}$ is the inverse distance weighting matrix, Y_{jt} are the outcomes in tract j at time t, and χ_{jt} are tract covariates. β, γ, Θ, and φ are parameters estimated in the model.

For this section, I hypothesize that there are structural differences in spillovers between urban and rural tracts. These differences in spillover effects would arise due to the fact that in urban areas, Census Tracts are generally small land denominations, with many tracts per county. In rural areas, Census Tracts are geographically much larger, and in some cases compose entire counties. As a result, spillover effects which exist in the smaller urban tracts may not hold in rural areas.

In the base model, the direction and magnitude of the coefficients match previous specifications. Changes in White population increases income per capita in both urban and rural tracts, while changes in Black and Hispanic populations have the opposite effect.

Tables 40a and 40b present the results of a Spatial Durbin Model with spatial weighting matrix defined by inverse distance. Aligning with literature on negative externalities related to 'gentrification', there are spillover effects in neighboring urban tracts when the density of White population in a tract increases. A unitary change to White % would increase income per capita in the tract in this model, but decrease income per capita in neighboring tracts. This suggests that as a Tract becomes more White (usually corresponding to increases in income), that non-White residents, especially lower income earners, may be pushed out of residence into the tract and into neighboring tracts. This type of spillover would have negative effects on Tract level economic health, evidenced by problems associated with ghetto formation.

Spatial Carlino-Mills Model

Regional literature frequently employs Carlino-Mills type models following the approach of Deller (2001). The original literature surrounds the question of whether people follow jobs, or jobs follow people (Steinnes 1982). In this case, do people, income, and employment change based on demographic compositions, or do demographic compositions change based on people, income, and employment? A commonly used framework for these questions is the partial lagged adjustment model (Carlino and Mills 1987). The adjustment model assumes that population and employment changes are adjustments toward an equilibrium determined by local characteristics and are thus the basis of H2. Deller et al. (2001) and Deller and Lledo (2007) add income to the structural model, arguing that the three-equation system better captures the growth process because people migrate to higher income earning opportunities and businesses may avoid higher wage areas. This type of model is formulated off of a set of four hypotheses regarding initial conditions of a Census Tract and its geographic neighbors.

1. The economic outcome variables Income per Capita, Employment/Population, and Total Population have positive impacts on economic growth.

2. Growth is conditional upon neighboring economic shocks.

3. Growth is conditional upon neighboring initial conditions.

4. Growth is conditional upon initial conditions in the Tract.

The empirical model is specified as a linear expression of partial equilibrium conditions on Population (P*), Employment (E*) and Income (I*). Following Carpenter and Loveridge (2019) and using Deller (2001) partial adjustment equations, the linear model can be expressed as:

$$\begin{aligned}
\Delta P &= \alpha_{0p} + \beta_{1p}\log P_0 + \beta_{2p}\log E_0 + \beta_{3p}\log I_0 + \sum \delta_{1p}\Omega_0 \\
&\quad + \beta_{4p}\mathbf{W}\log P_0 + \beta_{5p}\mathbf{W}\log E_0 + \beta_{6p}\mathbf{W}\log I_0 + \sum \delta_{2p}\mathbf{W}\Omega_0 + U_P \\
\Delta E &= \alpha_{0e} + \beta_{1e}\log P_0 + \beta_{2e}\log E_0 + \beta_{3e}\log I_0 + \sum \delta_{1e}\Omega_0 \\
&\quad + \beta_{4e}\mathbf{W}\log P_0 + \beta_{5e}\mathbf{W}\log E_0 + \beta_{6e}\mathbf{W}\log I_0 + \sum \delta_{2e}\mathbf{W}\Omega_0 + U_E \\
\Delta I &= \alpha_{0i} + \beta_{1i}\log P_0 + \beta_{2i}\log E_0 + \beta_{3i}\log I_0 + \sum \delta_{1i}\Omega_0 \\
&\quad + \beta_{4i}\mathbf{W}\log P_0 + \beta_{5i}\mathbf{W}\log E_0 + \beta_{6i}\mathbf{W}\log I_0 + \sum \delta_{2i}\mathbf{W}\Omega_0 + U_I
\end{aligned}$$

Where $\mathbf{W}$ is an inverse distance weighting matrix, the $_0$ matrices refer to initial conditions on population, employment and income in the year 2010, and Ω is the matrix of Tract covariates at time 0.

The Ω vector is the subject of considerable debate within the regional literature. Human capital and local fiscal

policy variables matter, but it is not always clear which policy variables to include (Deller and Lledo 2007, Carpenter and Loveridge 2019). Given limitations on data availability at the Tract level, and in the spirit of Deller's (2021) Presidental Plenary Address at the North American Regional Science Association's 68th annual conference in Denver, I include the full set of economic opportunity variables at the Tract level, along with Tract panel variables to estimate the linear spatial presented in Tables 41a and 41b.

In these models the relationship between initial White % and changes in income per capita, along with changes in population and employment are all non-negative. The same relationship holds for Black % and Hispanic %. On the surface, the results for Black and Hispanic might seem to contradict those of the previous models, but that is not the case. The Carlino-Mills model specification is modeling changes in these outcomes as functions of the initial conditions in the tract, and in tracts located in close geographic proximity. Many of the Tracts which grew the most in measurables such as income per capita were located in urban areas, as were many of the Tracts which had the largest non-White populations in 2010. These facts could help explain the results observed from the model.

V Conclusion

Prior economic research suggests that one's place of birth is an important determinant of economic outcomes at adulthood. Work remains to explain why communities differ so starkly, and how the composition of individuals in the community impact the observed differences. One direct explanation is income and the access to economic opportunity which accompanies higher income areas as compared to lower income areas. I demonstrate that Census Tracts wither higher Minority populations have in general lower income, and that as Tracts become less White it correlates with reductions in per capita and median income in the Tract over time. Additionally, Colorado Census Tracts which grew in their Black Non-Hispanic and Hispanic compositions performed generally worse across a wide range of measures mirroring those found in Opportunity Insights' Opportunity Atlas website. Census Tracts which increased their minority densities were associated with higher rates of poverty, and of teenage birthrate and lower rates of employment to population and education.

This negative relationship holds across a variety of model specifications, and after accounting for bias which may arise from time invariant or variant omitted variables and geographic spillovers. Statistical results demonstrate that there is a time variant relationship between demographic composition and economic opportunity such that, for the state of Colorado, non-White residents are moving into lower income neighborhoods and/or income is declining in the neighborhoods as they become more diverse. Scholars and policymakers who are interested in addressing poverty and inequality should conduct further research into the demographic composition of small scale areas such as Census Tracts to understand why and how demographic transformation is occuring.

Chetty, et al. suggest "[. . .]efforts that cut within neighborhoods and schools and improve environments for

specific racial subgroups, such as black boys, may be more effective in reducing the black-white gap. Examples include mentoring programs for black boys, efforts to reduce racial bias among whites, or efforts to facilitate social interaction across racial groups within a given area (e.g., Devine et al. 2012; Heller et al. 2017)" (Chetty, et al. 2020 pg. 778). If this is the case, policymakers will need to understand the exact areas needing targeted policy intervention at very fine geographic levels. Study of Census tracts is a step in the direction of identifying at need areas for policymakers to focus on.

Table 22: Summary Statistics of Outcome Variables

	mean	sd	min	max	count
Income/Capita	33.0799	14.690	0.014	141	12411
Poverty %	12.0040	9.522	0.000	80	12413
Inequality	1.2650	0.194	0.790	5	12326
Employment/Pop	62.9789	10.825	0.000	97	12413
Bachelor %	37.2498	19.414	0.000	100	12413
Same Tract %	81.0028	10.541	9.216	100	12413
HH Size	2.5543	0.450	1.190	5	12348
Married/Unmarried	2.0878	7.161	0.000	184	12314
Teen Birthrate	21.4337	74.770	0.000	1000	12157
Owner Value	281.5382	152.794	10.300	1868	12160
Δ Income	28.2183	25.353	-99.639	235	12390
Δ Population	19.9131	72.766	-75.439	1645	12410
Δ Employment	0.9114	15.524	-100.000	278	12360

Table 23: Demographic Summary Statistics

	mean	sd	min	max	count
White	70.0562	20.443	2.606	100.000	12413
Black	3.5184	6.381	0.000	59.042	12413
Hispanic	20.6702	17.899	0.000	87.610	12413
% Δ White	-0.0110	0.212	-0.601	1.720	12410
% Δ Black	0.6772	3.473	-1.000	68.180	8410
% Δ Hispanic	0.4146	1.208	-1.000	17.149	12320
Δ White	-2.3281	8.591	-48.454	42.271	12410
Δ Black	0.0014	0.038	-0.235	0.280	12410
Δ Hispanic	1.5322	7.508	-40.346	48.005	12410

Table 24: Summary Statistics of Explanatory Variables

	mean	sd	min	max	count
Tract Panel					
Population	4.1977	1.940	0.000	17.875	12490
Pop. Density	3.4413	3.435	0.000	37.537	12490
Jobs/Capita	0.4882	1.183	0.001	34.656	12387
LFPR	68.1618	10.141	0.000	100.000	12413
Median Age	38.0533	7.453	14.600	76.900	12413
Owners/Renters	1.1973	7.540	0.000	263.900	12266
Tract Cross Section					
Urbanized %	0.6805	0.466	0.000	1.000	12490
Chg. Housing %	0.0960	0.205	0.000	2.535	12350
Developed %	0.6323	0.388	0.002	1.000	12490
3rd Gr. Math	3.7510	0.704	1.751	5.857	12380
Census Return	78.9760	6.657	26.500	94.100	12320
County Cross Section					
Exp/Capita	1.5235	1.524	0.455	6.182	12490
Tax/Capita	0.6370	0.552	0.178	2.868	12490
Amenity Scale	3.8558	1.658	-0.710	8.520	12490

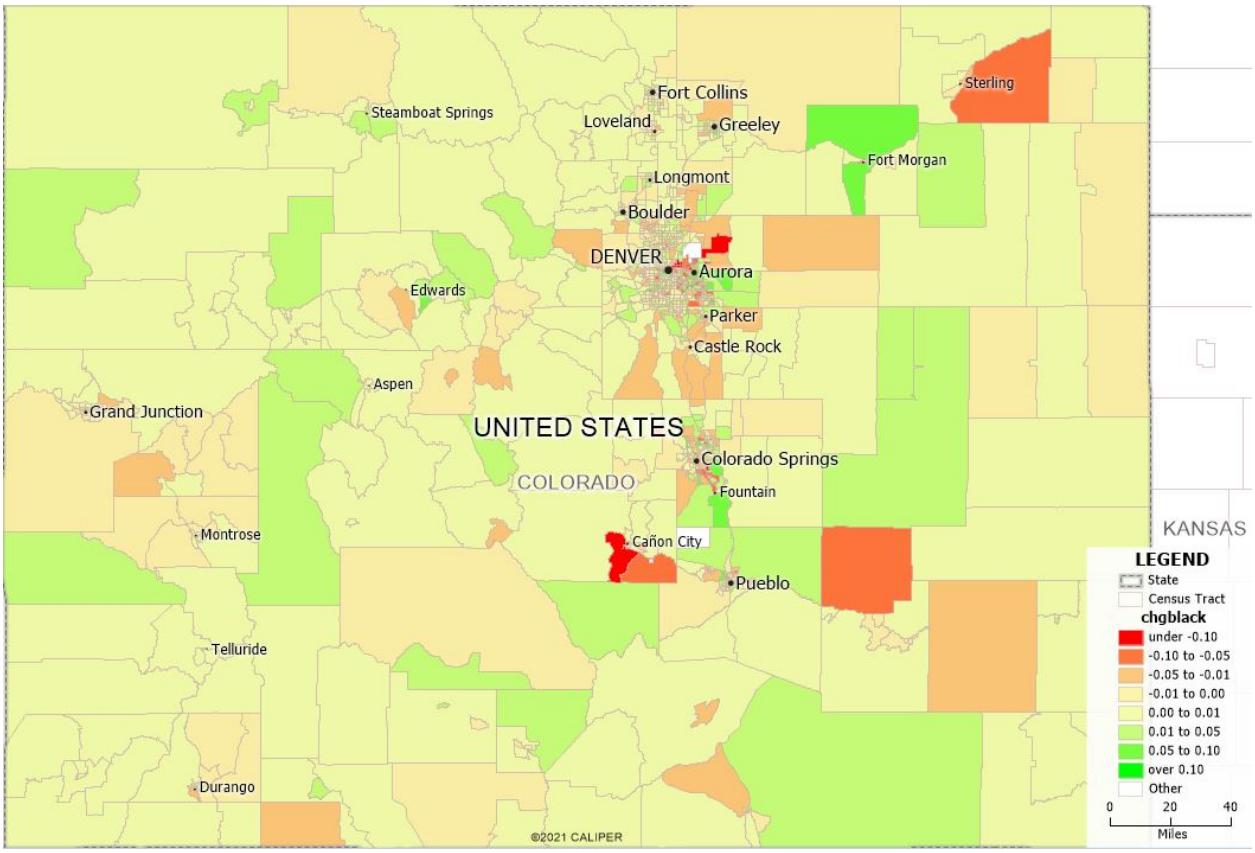


Figure 6: Statewide Changes in Black Population Density

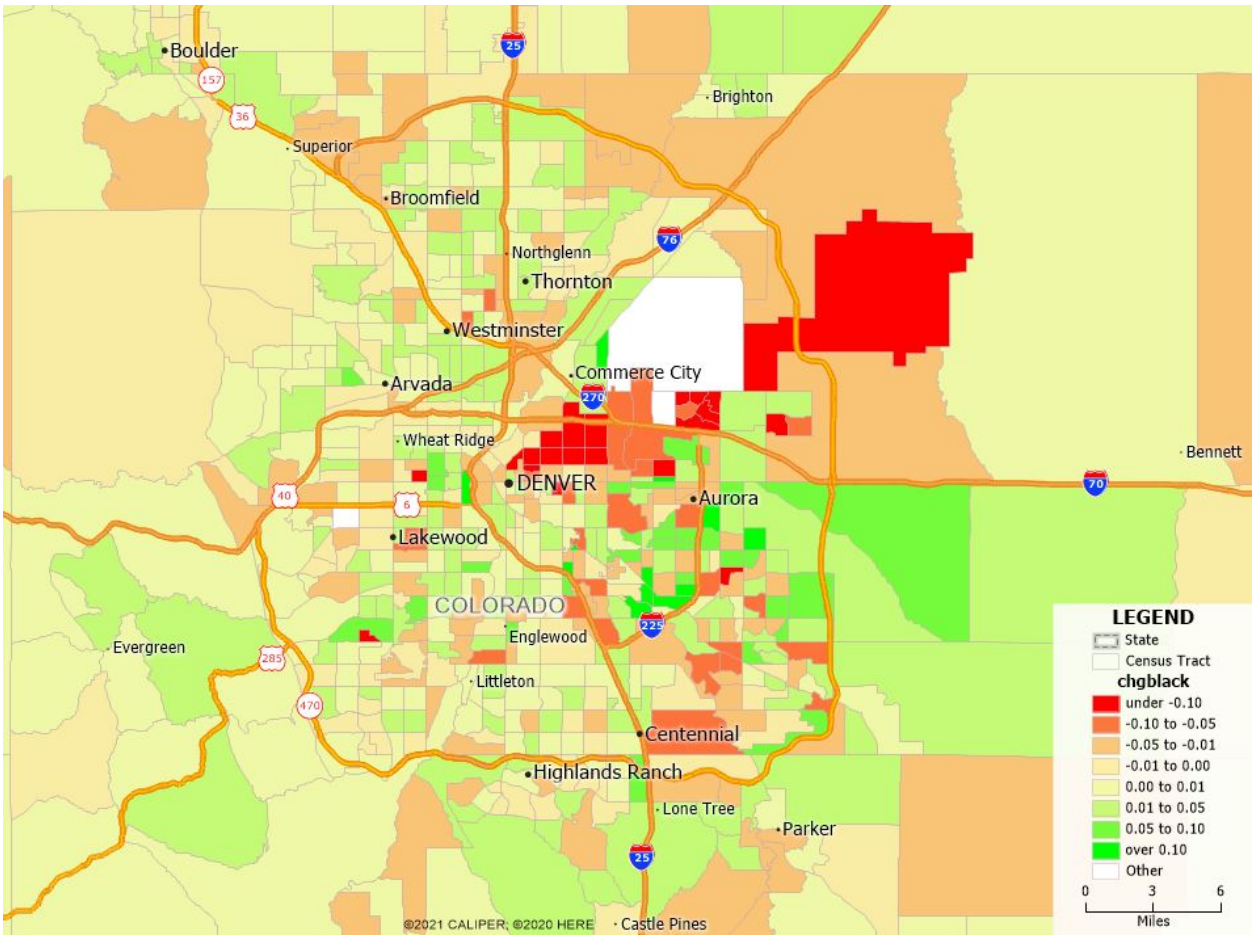


Figure 7: Changes in Black Population of Greater Denver Area

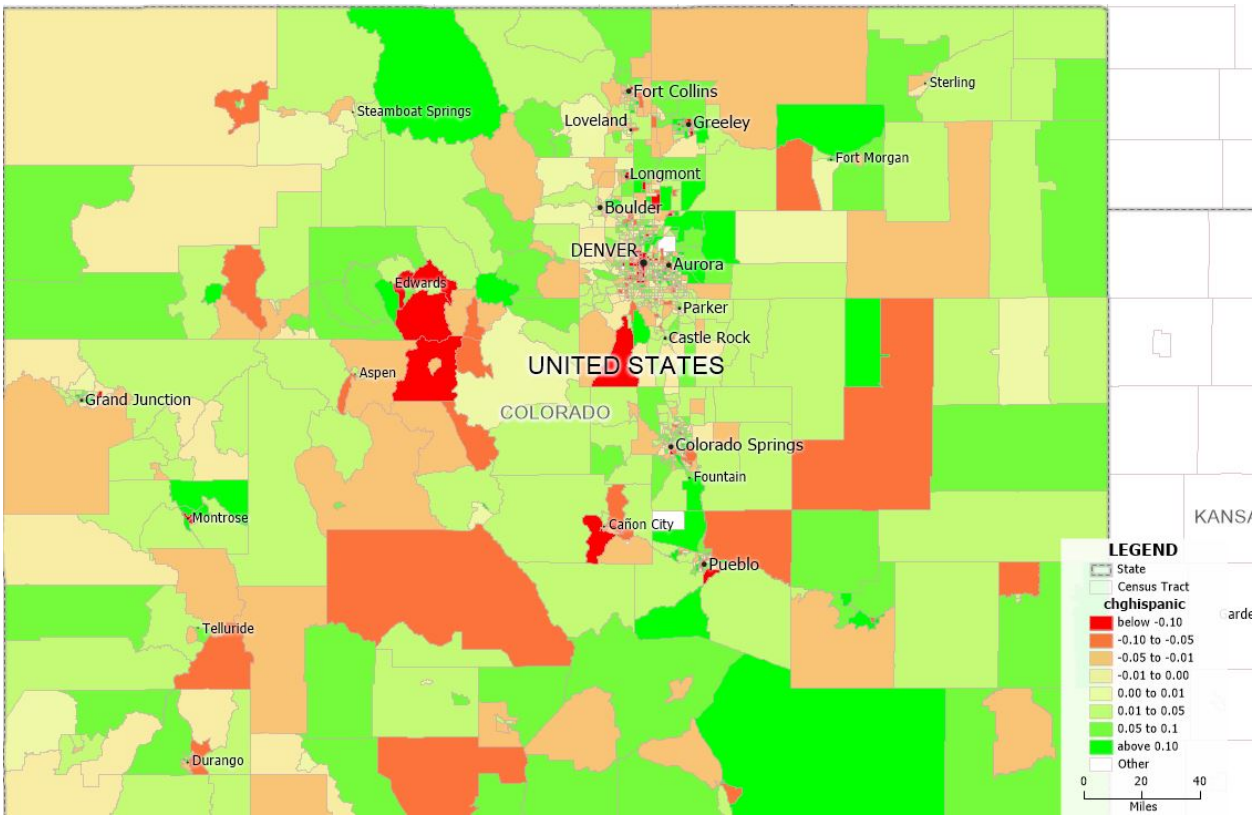


Figure 8: Statewide Changes in Hispanic Population Density

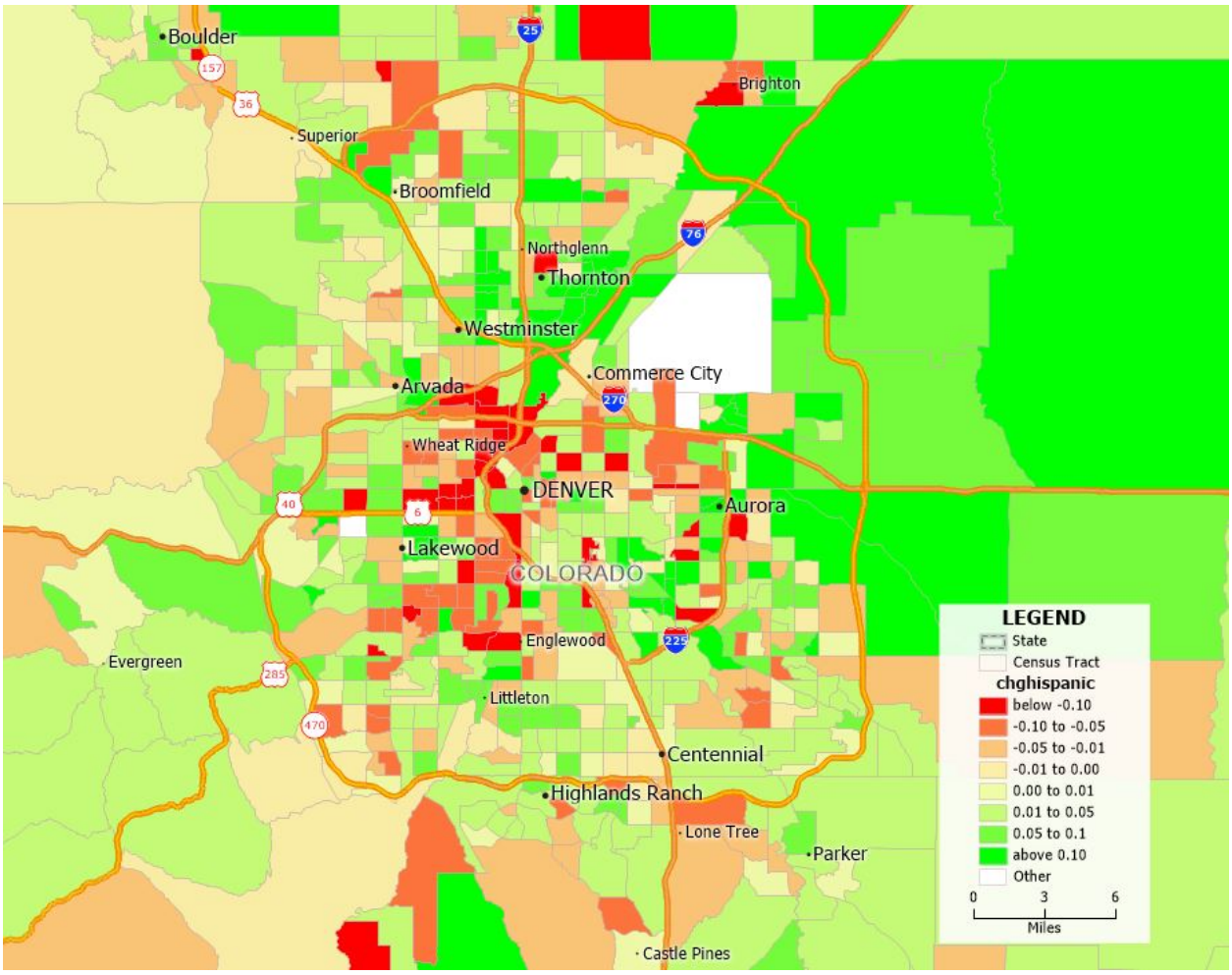


Figure 9: Changes in Hispanic Population of Greater Denver Area

Table 25a: White Non-Hispanic on Economic Opportunity Measures

	(1) Income/Capita	(2) Poverty %	(3) Inequality	(4) Employment/Pop	(5) Bachelor %
White	0.205***	-0.091***	0.002***	0.035***	0.439***
	(0.007)	(0.006)	(0.000)	(0.002)	(0.009)
Population	0.292***	-0.678***	-0.006***	-0.047**	0.134*
	(0.045)	(0.034)	(0.001)	(0.016)	(0.061)
Pop. Density	-0.060	0.333***	0.001	0.037***	0.626***
	(0.044)	(0.038)	(0.001)	(0.011)	(0.053)
Jobs/Capita	1.204***	0.292***	0.020***	0.092***	1.463***
	(0.159)	(0.073)	(0.003)	(0.023)	(0.148)
LFPR	0.457***	-0.380***	-0.005***	1.000***	0.398***
	(0.013)	(0.015)	(0.000)	(0.004)	(0.020)
Median Age	0.716***	-0.401***	0.000	0.049***	0.082**
	(0.021)	(0.021)	(0.000)	(0.006)	(0.029)
Owners/Renters	0.005	-0.017	-0.001***	-0.110***	0.062**
	(0.007)	(0.011)	(0.000)	(0.017)	(0.021)
Exp/Capita	-0.096	0.684***	0.009**	-0.187***	1.293***
	(0.180)	(0.101)	(0.003)	(0.043)	(0.244)
Tax/Capita	5.411***	-1.192***	0.055***	1.507***	5.152***
	(0.503)	(0.243)	(0.010)	(0.126)	(0.701)
Amenity Scale	-0.300***	0.472***	0.000	-0.257***	1.189***
	(0.069)	(0.038)	(0.001)	(0.017)	(0.083)
Urbanized %	1.614***	1.596***	0.041***	-0.557***	1.157*
	(0.394)	(0.240)	(0.007)	(0.095)	(0.501)
Chg. Housing %	6.177***	-1.512***	-0.014	-0.029	6.710***
	(0.513)	(0.284)	(0.009)	(0.150)	(0.679)
Developed %	2.242***	-0.911**	-0.001	-0.038	3.259***
	(0.610)	(0.352)	(0.010)	(0.125)	(0.696)
3rd Gr. Math	1.972***	-0.041	0.024***	0.253***	5.461***
	(0.161)	(0.105)	(0.003)	(0.044)	(0.209)
Census Return	0.385***	-0.437***	-0.009***	0.060***	0.555***
	(0.025)	(0.016)	(0.001)	(0.007)	(0.030)
Year	0.855***	-0.203***	0.001	0.286***	0.663***
	(0.033)	(0.020)	(0.001)	(0.008)	(0.040)
Constant	-1.8e+03***	502.738***	0.823	-590.357***	-1.4e+03***
	(65.651)	(41.205)	(1.150)	(16.141)	(79.751)
Observations	12125	12126	12109	12126	12126
R^2	0.551	0.566	0.187	0.928	0.605
F	942.441	579.373	98.394	8963.283	1315.214

Robust Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 25b: White Non-Hispanic on Economic Opportunity Measures (continued)

	(1) Same Tract %	(2) HH Size	(3) Married/Unmarried	(4) Teen Birthrate	(5) Owner Value
White	-0.204***	-0.013***	0.002	-0.412***	2.031***
	(0.006)	(0.000)	(0.004)	(0.067)	(0.098)
Population	0.262***	0.031***	0.093*	-1.059***	2.521***
	(0.037)	(0.002)	(0.043)	(0.322)	(0.549)
Pop. Density	-0.662***	-0.019***	0.026	-0.103	-1.333*
	(0.038)	(0.002)	(0.018)	(0.527)	(0.609)
Jobs/Capita	-1.463***	-0.060***	0.084*	0.082	8.624***
	(0.138)	(0.008)	(0.038)	(0.821)	(2.094)
LFPR	0.324***	0.006***	-0.009	-0.480***	2.821***
	(0.013)	(0.000)	(0.007)	(0.096)	(0.200)
Median Age	0.770***	-0.017***	0.050***	-0.205	2.425***
	(0.021)	(0.001)	(0.010)	(0.140)	(0.320)
Owners/Renters	-0.145***	-0.000	0.001	0.029	1.334
	(0.028)	(0.001)	(0.003)	(0.063)	(0.748)
Exp/Capita	0.073	-0.075***	-0.027	2.659**	-9.218***
	(0.115)	(0.005)	(0.119)	(1.019)	(2.442)
Tax/Capita	-0.105	0.085***	0.047	-10.355***	89.904***
	(0.288)	(0.014)	(0.322)	(2.284)	(7.326)
Amenity Scale	-0.371***	-0.018***	-0.086*	1.167*	7.696***
	(0.043)	(0.002)	(0.040)	(0.475)	(0.805)
Urbanized %	0.276	-0.150***	-0.108	1.688	-21.779***
	(0.284)	(0.012)	(0.331)	(2.262)	(5.059)
Chg. Housing %	-4.595***	-0.045*	0.041	-8.640***	51.492***
	(0.461)	(0.020)	(0.440)	(2.292)	(5.925)
Developed %	-2.827***	-0.164***	-0.796*	-0.446	22.085**
	(0.395)	(0.019)	(0.403)	(4.271)	(7.682)
3rd Gr. Math	0.352**	0.022***	0.195	-4.311***	24.832***
	(0.118)	(0.006)	(0.108)	(1.102)	(2.013)
Census Return	0.447***	0.031***	0.080***	-0.323*	2.371***
	(0.018)	(0.001)	(0.013)	(0.138)	(0.349)
Year	0.071**	0.006***	0.693***	-2.094***	11.156***
	(0.022)	(0.001)	(0.032)	(0.254)	(0.403)
Constant	-129.735**	-9.825***	-1.4e+03***	4354.564***	-2.3e+04***
	(44.559)	(2.039)	(65.004)	(511.819)	(811.132)
Observations	12126	12124	12102	11927	12020
R^2	0.523	0.500	0.096	0.040	0.388
F	417.376	561.589	43.489	27.788	576.283

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 26a: Black Non-Hispanic on Economic Opportunity Measures

	(1) Income/Capita	(2) Poverty %	(3) Inequality	(4) Employment/Pop	(5) Bachelor %
Black	-0.105***	0.012	-0.002***	-0.082***	-0.110***
	(0.014)	(0.013)	(0.000)	(0.005)	(0.023)
Population	0.221***	-0.634***	-0.006***	-0.036*	-0.059
	(0.047)	(0.034)	(0.001)	(0.016)	(0.067)
Pop. Density	-0.035	0.333***	0.002*	0.063***	0.642***
	(0.048)	(0.039)	(0.001)	(0.011)	(0.068)
Jobs/Capita	1.396***	0.214**	0.022***	0.140***	1.849***
	(0.175)	(0.068)	(0.004)	(0.024)	(0.182)
LFPR	0.560***	-0.426***	-0.004***	1.017***	0.621***
	(0.013)	(0.014)	(0.000)	(0.004)	(0.022)
Median Age	0.916***	-0.493***	0.002***	0.080***	0.519***
	(0.022)	(0.019)	(0.000)	(0.006)	(0.032)
Owners/Renters	0.042***	-0.034**	-0.001***	-0.103***	0.141***
	(0.009)	(0.011)	(0.000)	(0.016)	(0.028)
Exp/Capita	-0.065	0.699***	0.010**	-0.130**	1.261***
	(0.183)	(0.105)	(0.003)	(0.043)	(0.258)
Tax/Capita	5.494***	-1.286***	0.055***	1.418***	5.522***
	(0.497)	(0.253)	(0.010)	(0.123)	(0.709)
Amenity Scale	0.063	0.301***	0.004***	-0.212***	1.999***
	(0.065)	(0.039)	(0.001)	(0.017)	(0.084)
Urbanized %	1.406***	1.689***	0.039***	-0.592***	0.709
	(0.401)	(0.248)	(0.007)	(0.095)	(0.528)
Chg. Housing %	5.831***	-1.307***	-0.016	0.007	5.798***
	(0.528)	(0.286)	(0.009)	(0.150)	(0.712)
Developed %	0.699	-0.177	-0.016	-0.220	-0.208
	(0.615)	(0.360)	(0.010)	(0.125)	(0.760)
3rd Gr. Math	3.353***	-0.692***	0.037***	0.426***	8.547***
	(0.164)	(0.108)	(0.003)	(0.044)	(0.219)
Census Return	0.551***	-0.516***	-0.008***	0.079***	0.926***
	(0.025)	(0.016)	(0.000)	(0.006)	(0.032)
Year	0.803***	-0.181***	0.000	0.276***	0.554***
	(0.033)	(0.021)	(0.001)	(0.008)	(0.043)
Constant	-1.7e+03***	466.692***	1.744	-571.317***	-1.3e+03***
	(67.517)	(41.691)	(1.166)	(16.220)	(87.758)
Observations	12125	12126	12109	12126	12126
R^2	0.520	0.550	0.171	0.928	0.520
F	804.623	499.410	95.718	8447.883	938.160

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 26b: Black Non-Hispanic on Economic Opportunity Measures (continued)

	(1) Same Tract %	(2) HH Size	(3) Married/Unmarried	(4) Teen Birthrate	(5) Owner Value
Black	0.046**	0.007***	-0.008	-0.335*	-0.869***
	(0.014)	(0.001)	(0.005)	(0.138)	(0.155)
Population	0.353***	0.036***	0.095*	-0.744*	1.866**
	(0.040)	(0.002)	(0.043)	(0.318)	(0.569)
Pop. Density	-0.668***	-0.021***	0.029	0.086	-1.381*
	(0.044)	(0.002)	(0.018)	(0.537)	(0.649)
Jobs/Capita	-1.641***	-0.073***	0.088*	-0.153	10.263***
	(0.157)	(0.010)	(0.038)	(0.835)	(2.102)
LFPR	0.221***	-0.000	-0.008	-0.689***	3.930***
	(0.014)	(0.001)	(0.007)	(0.098)	(0.192)
Median Age	0.567***	-0.030***	0.052***	-0.635***	4.508***
	(0.021)	(0.001)	(0.010)	(0.129)	(0.315)
Owners/Renters	-0.182***	-0.002	0.001	-0.044	2.806**
	(0.030)	(0.001)	(0.003)	(0.066)	(1.018)
Exp/Capita	0.091	-0.077***	-0.021	3.099**	-8.801***
	(0.123)	(0.005)	(0.120)	(1.031)	(2.481)
Tax/Capita	-0.284	0.080***	0.037	-11.464***	90.356***
	(0.299)	(0.013)	(0.322)	(2.300)	(7.350)
Amenity Scale	-0.748***	-0.041***	-0.084*	0.285	11.281***
	(0.045)	(0.002)	(0.039)	(0.470)	(0.796)
Urbanized %	0.484	-0.137***	-0.110	2.238	-23.584***
	(0.294)	(0.013)	(0.332)	(2.268)	(5.198)
Chg. Housing %	-4.165***	-0.023	0.047	-6.596**	47.273***
	(0.476)	(0.022)	(0.439)	(2.350)	(6.021)
Developed %	-1.210**	-0.065**	-0.804*	3.019	6.592
	(0.414)	(0.020)	(0.398)	(4.310)	(7.714)
3rd Gr. Math	-1.086***	-0.067***	0.203*	-7.668***	38.419***
	(0.118)	(0.006)	(0.098)	(0.984)	(2.113)
Census Return	0.274***	0.021***	0.080***	-0.730***	4.134***
	(0.019)	(0.001)	(0.012)	(0.136)	(0.335)
Year	0.121***	0.009***	0.693***	-2.009***	10.642***
	(0.024)	(0.001)	(0.032)	(0.251)	(0.408)
Constant	-211.589***	-15.376***	-1.4e+03***	4229.357***	-2.2e+04***
	(47.449)	(2.278)	(65.118)	(507.041)	(823.040)
Observations	12126	12124	12102	11927	12020
R^2	0.455	0.360	0.096	0.036	0.360
F	316.443	413.016	43.451	26.560	499.183

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 27a: Hispanic on Economic Opportunity Measures

	(1) Income/Capita	(2) Poverty %	(3) Inequality	(4) Employment/Pop	(5) Bachelor %
Hispanic	-0.231***	0.124***	-0.002***	-0.022***	-0.518***
	(0.006)	(0.006)	(0.000)	(0.002)	(0.009)
Population	0.189***	-0.632***	-0.007***	-0.065***	-0.087
	(0.045)	(0.033)	(0.001)	(0.016)	(0.058)
Pop. Density	-0.159***	0.385***	0.001	0.027*	0.407***
	(0.046)	(0.038)	(0.001)	(0.011)	(0.050)
Jobs/Capita	1.086***	0.371***	0.019***	0.093***	1.184***
	(0.160)	(0.076)	(0.003)	(0.023)	(0.148)
LFPR	0.437***	-0.360***	-0.005***	1.006***	0.344***
	(0.013)	(0.015)	(0.000)	(0.004)	(0.019)
Median Age	0.709***	-0.379***	0.001*	0.064***	0.049
	(0.021)	(0.021)	(0.000)	(0.006)	(0.028)
Owners/Renters	-0.004	-0.009	-0.001***	-0.108***	0.038*
	(0.007)	(0.011)	(0.000)	(0.017)	(0.018)
Exp/Capita	-0.303	0.790***	0.007*	-0.211***	0.834***
	(0.180)	(0.099)	(0.003)	(0.044)	(0.246)
Tax/Capita	5.959***	-1.463***	0.060***	1.579***	6.353***
	(0.507)	(0.239)	(0.010)	(0.127)	(0.716)
Amenity Scale	-0.306***	0.511***	0.002	-0.228***	1.140***
	(0.068)	(0.037)	(0.001)	(0.017)	(0.080)
Urbanized %	1.775***	1.490***	0.041***	-0.558***	1.535***
	(0.383)	(0.230)	(0.007)	(0.096)	(0.459)
Chg. Housing %	5.206***	-1.036***	-0.022*	-0.160	4.584***
	(0.502)	(0.275)	(0.009)	(0.153)	(0.612)
Developed %	1.607**	-0.724*	-0.011	-0.227	1.992**
	(0.590)	(0.341)	(0.010)	(0.126)	(0.639)
3rd Gr. Math	1.882***	0.144	0.028***	0.357***	5.125***
	(0.155)	(0.104)	(0.003)	(0.046)	(0.190)
Census Return	0.416***	-0.437***	-0.009***	0.076***	0.608***
	(0.023)	(0.014)	(0.001)	(0.007)	(0.026)
Year	0.847***	-0.204***	0.000	0.282***	0.651***
	(0.032)	(0.020)	(0.001)	(0.008)	(0.038)
Constant	-1.8e+03***	491.268***	1.317	-581.014***	-1.4e+03***
	(64.984)	(40.595)	(1.157)	(16.319)	(77.010)
Observations	12125	12126	12109	12126	12126
R^2	0.558	0.577	0.179	0.927	0.633
F	1079.154	680.427	95.809	9013.779	1569.373

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 27b: Hispanic on Economic Opportunity Measures (continued)

	(1) Same Tract %	(2) HH Size	(3) Married/Unmarried	(4) Teen Birthrate	(5) Owner Value
Hispanic	0.206***	0.012***	-0.006	0.640***	-2.320***
	(0.008)	(0.000)	(0.003)	(0.072)	(0.091)
Population	0.365***	0.038***	0.092*	-0.853**	1.464**
	(0.037)	(0.002)	(0.043)	(0.313)	(0.546)
Pop. Density	-0.573***	-0.014***	0.024	0.175	-2.324***
	(0.039)	(0.002)	(0.018)	(0.522)	(0.586)
Jobs/Capita	-1.375***	-0.056***	0.078*	0.598	7.434***
	(0.133)	(0.008)	(0.038)	(0.837)	(2.128)
LFPR	0.331***	0.006***	-0.011	-0.346***	2.581***
	(0.014)	(0.001)	(0.007)	(0.097)	(0.201)
Median Age	0.754***	-0.019***	0.047***	-0.030	2.297***
	(0.021)	(0.001)	(0.010)	(0.140)	(0.313)
Owners/Renters	-0.141***	-0.000	0.000	0.081	1.115
	(0.027)	(0.001)	(0.003)	(0.061)	(0.679)
Exp/Capita	0.264*	-0.064***	-0.031	3.157**	-11.212***
	(0.116)	(0.005)	(0.119)	(1.010)	(2.465)
Tax/Capita	-0.620*	0.054***	0.058	-11.655***	95.368***
	(0.291)	(0.013)	(0.321)	(2.263)	(7.454)
Amenity Scale	-0.406***	-0.023***	-0.092*	1.468**	7.618***
	(0.042)	(0.002)	(0.040)	(0.467)	(0.797)
Urbanized %	0.155	-0.156***	-0.102	1.088	-20.377***
	(0.275)	(0.012)	(0.332)	(2.247)	(4.932)
Chg. Housing %	-3.676***	0.011	0.024	-6.196**	41.651***
	(0.466)	(0.020)	(0.440)	(2.257)	(5.903)
Developed %	-2.084***	-0.110***	-0.787*	-0.048	16.264*
	(0.389)	(0.020)	(0.400)	(4.291)	(7.419)
3rd Gr. Math	0.276*	0.007	0.172	-2.942**	23.845***
	(0.121)	(0.006)	(0.103)	(1.112)	(1.954)
Census Return	0.400***	0.028***	0.078***	-0.274*	2.672***
	(0.022)	(0.001)	(0.013)	(0.130)	(0.329)
Year	0.083***	0.007***	0.694***	-2.114***	11.092***
	(0.022)	(0.001)	(0.032)	(0.253)	(0.400)
Constant	-169.094***	-12.655***	-1.4e+03***	4322.769***	-2.3e+04***
	(44.766)	(2.092)	(65.149)	(507.063)	(803.497)
Observations	12126	12124	12102	11927	12020
R^2	0.522	0.467	0.096	0.047	0.395
F	369.906	508.076	43.442	29.435	624.958

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 28a: Differenced White Non-Hispanic on Economic Opportunity Measures

	(1) D.Income/Capita	(2) D.Poverty %	(3) D.Inequality	(4) D.Employment/Pop	(5) D.Bachelor %
D.White	0.071***	-0.066***	-0.000	0.011*	0.148***
	(0.008)	(0.010)	(0.000)	(0.005)	(0.010)
D.Population	-0.981***	-0.015	-0.012	-0.138	-0.603**
	(0.195)	(0.177)	(0.006)	(0.078)	(0.211)
D.Pop. Density	-0.150	0.015	0.003	-0.069	-0.442**
	(0.139)	(0.176)	(0.005)	(0.076)	(0.168)
D.Jobs/Capita	0.270*	0.094	-0.003	-0.110	-0.361
	(0.122)	(0.345)	(0.004)	(0.070)	(0.220)
D.LFPR	0.184***	-0.198***	-0.003***	0.914***	0.079***
	(0.019)	(0.014)	(0.001)	(0.007)	(0.020)
D.Median Age	0.301***	-0.243***	0.001	0.005	-0.072**
	(0.026)	(0.021)	(0.001)	(0.009)	(0.025)
D.Owners/Renters	0.000	0.006	-0.000	0.013*	-0.012
	(0.007)	(0.012)	(0.000)	(0.006)	(0.018)
Exp/Capita	0.025	-0.012	-0.001	0.001	0.017
	(0.047)	(0.045)	(0.002)	(0.021)	(0.050)
Tax/Capita	0.253	-0.039	-0.001	0.032	0.221
	(0.149)	(0.118)	(0.005)	(0.056)	(0.137)
Amenity Scale	0.010	0.014	0.000	0.006	0.040*
	(0.015)	(0.017)	(0.001)	(0.008)	(0.019)
Urbanized %	0.033	-0.136	-0.001	0.029	0.080
	(0.134)	(0.097)	(0.004)	(0.051)	(0.131)
Chg. Housing %	0.807*	-0.139	0.008	0.098	0.771*
	(0.330)	(0.129)	(0.008)	(0.083)	(0.318)
Developed %	0.228	-0.182	0.003	0.144*	0.230
	(0.159)	(0.116)	(0.005)	(0.061)	(0.151)
3rd Gr. Math	0.082*	0.097*	-0.001	-0.035	0.014
	(0.039)	(0.046)	(0.002)	(0.023)	(0.047)
Census Return	0.025***	0.015***	0.000	-0.006*	-0.003
	(0.006)	(0.004)	(0.000)	(0.002)	(0.005)
Year	0.205***	-0.130***	0.000	0.117***	0.060***
	(0.010)	(0.010)	(0.000)	(0.005)	(0.011)
Constant	-413.986***	259.691***	-0.518	-235.365***	-120.157***
	(20.045)	(20.067)	(0.787)	(10.025)	(21.770)
Observations	10906	10907	10888	10907	10907
R^2	0.146	0.088	0.011	0.779	0.054
F	92.941	42.484	2.260	1479.108	27.012

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 28b: Differenced White Non-Hispanic on Economic Opportunity Measures (continued)

	(1) D.Same Tract %	(2) D.HH Size	(3) D.Married/Unmarried	(4) D.Teen Birthrate	(5) D.Owner Value
D.White	-0.002	-0.003***	-0.024	-0.588**	0.215**
	(0.012)	(0.000)	(0.020)	(0.195)	(0.070)
D.Population	-0.686**	0.153***	0.089	-1.806	3.914*
	(0.238)	(0.012)	(0.447)	(2.042)	(1.776)
D.Pop. Density	-0.044	0.099***	-0.386	3.517	0.265
	(0.203)	(0.010)	(0.264)	(2.283)	(1.338)
D.Jobs/Capita	0.593	0.023*	-0.179	3.925	-4.229*
	(0.786)	(0.009)	(0.150)	(4.273)	(1.948)
D.LFPR	-0.015	-0.002*	-0.010	-0.139	-0.188
	(0.019)	(0.001)	(0.024)	(0.233)	(0.188)
D.Median Age	0.256***	-0.013***	0.017	-0.496	0.496**
	(0.030)	(0.002)	(0.037)	(0.331)	(0.179)
D.Owners/Renters	-0.015	0.000	0.012*	0.104	-0.704
	(0.010)	(0.000)	(0.006)	(0.103)	(0.714)
Exp/Capita	0.105*	-0.002	-0.048	0.309	0.671
	(0.053)	(0.002)	(0.130)	(0.647)	(0.482)
Tax/Capita	-0.257	0.001	-0.016	0.973	1.774
	(0.138)	(0.004)	(0.355)	(1.405)	(1.507)
Amenity Scale	0.032	-0.001	-0.106*	-0.031	0.462***
	(0.022)	(0.001)	(0.043)	(0.316)	(0.122)
Urbanized %	-0.137	0.012**	-0.127	-0.036	0.499
	(0.142)	(0.005)	(0.368)	(1.495)	(0.944)
Chg. Housing %	0.243	-0.056***	-0.320	0.016	2.753
	(0.295)	(0.011)	(0.411)	(1.699)	(3.542)
Developed %	0.201	-0.018***	-0.857*	-0.341	5.599***
	(0.163)	(0.005)	(0.408)	(1.845)	(1.109)
3rd Gr. Math	-0.071	-0.001	0.183	1.237	1.814***
	(0.057)	(0.001)	(0.106)	(0.728)	(0.342)
Census Return	-0.015**	-0.000	0.107***	0.114	0.314***
	(0.005)	(0.000)	(0.013)	(0.069)	(0.053)
Year	0.053***	-0.002***	0.873***	0.038	4.456***
	(0.012)	(0.000)	(0.040)	(0.179)	(0.079)
Constant	-105.374***	3.827***	-1.8e+03***	-92.966	-9.0e+03***
	(25.151)	(0.697)	(81.698)	(360.892)	(159.700)
Observations	10907	10905	10886	10679	10793
R^2	0.039	0.369	0.102	0.004	0.251
F	13.863	154.466	48.963	1.605	232.757

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 29a: Differenced Black Non-Hispanic on Economic Opportunity Measures

	(1) D.Income/Capita	(2) D.Poverty %	(3) D.Inequality	(4) D.Employment/Pop	(5) D.Bachelor %
D.Black	-0.041**	0.031	-0.001	-0.053***	-0.046*
	(0.016)	(0.024)	(0.001)	(0.013)	(0.022)
D.Population	-1.092***	0.092	-0.011	-0.142	-0.849***
	(0.193)	(0.175)	(0.006)	(0.078)	(0.215)
D.Pop. Density	-0.224	0.084	0.004	-0.083	-0.596***
	(0.140)	(0.176)	(0.005)	(0.075)	(0.174)
D.Jobs/Capita	0.258*	0.108	-0.003	-0.105	-0.397
	(0.113)	(0.355)	(0.004)	(0.072)	(0.206)
D.LFPR	0.185***	-0.199***	-0.003***	0.914***	0.083***
	(0.019)	(0.014)	(0.001)	(0.007)	(0.020)
D.Median Age	0.319***	-0.260***	0.001	0.007	-0.034
	(0.026)	(0.021)	(0.001)	(0.009)	(0.025)
D.Owners/Renters	0.000	0.005	-0.000	0.013*	-0.011
	(0.007)	(0.012)	(0.000)	(0.005)	(0.019)
Exp/Capita	0.038	-0.025	-0.001	0.001	0.046
	(0.047)	(0.046)	(0.002)	(0.021)	(0.051)
Tax/Capita	0.241	-0.027	-0.001	0.033	0.194
	(0.149)	(0.119)	(0.005)	(0.056)	(0.138)
Amenity Scale	0.013	0.012	0.000	0.006	0.046*
	(0.015)	(0.017)	(0.001)	(0.008)	(0.019)
Urbanized %	0.030	-0.133	-0.001	0.031	0.071
	(0.134)	(0.097)	(0.004)	(0.051)	(0.131)
Chg. Housing %	0.856*	-0.186	0.008	0.101	0.880**
	(0.333)	(0.128)	(0.008)	(0.083)	(0.327)
Developed %	0.247	-0.199	0.003	0.145*	0.270
	(0.159)	(0.117)	(0.005)	(0.061)	(0.152)
3rd Gr. Math	0.087*	0.092*	-0.001	-0.035	0.026
	(0.039)	(0.046)	(0.002)	(0.023)	(0.047)
Census Return	0.024***	0.016***	0.000	-0.006*	-0.004
	(0.006)	(0.004)	(0.000)	(0.002)	(0.005)
Year	0.205***	-0.130***	0.000	0.117***	0.060***
	(0.010)	(0.010)	(0.000)	(0.005)	(0.011)
Constant	-414.260***	259.871***	-0.515	-235.304***	-120.606***
	(20.114)	(20.091)	(0.786)	(10.007)	(22.112)
Observations	10906	10907	10888	10907	10907
R^2	0.140	0.082	0.010	0.780	0.027
F	85.325	40.479	1.960	1476.442	13.540

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 29b: Differenced Black Non-Hispanic on Economic Opportunity Measures (continued)

	(1) D.Same Tract %	(2) D.HH Size	(3) D.Married/Unmarried	(4) D.Teen Birthrate	(5) D.Owner Value
D.Black	-0.024	-0.000	-0.033	0.104	0.117
	(0.027)	(0.001)	(0.031)	(0.374)	(0.121)
D.Population	-0.676**	0.158***	0.137	-0.866	3.526*
	(0.236)	(0.012)	(0.442)	(2.026)	(1.745)
D.Pop. Density	-0.043	0.102***	-0.365	4.130	0.056
	(0.203)	(0.010)	(0.262)	(2.271)	(1.342)
D.Jobs/Capita	0.597	0.024*	-0.185	3.436	-4.171*
	(0.789)	(0.009)	(0.151)	(4.216)	(1.958)
D.LFPR	-0.016	-0.002*	-0.012	-0.157	-0.176
	(0.019)	(0.001)	(0.024)	(0.233)	(0.188)
D.Median Age	0.255***	-0.014***	0.010	-0.656	0.558**
	(0.030)	(0.002)	(0.037)	(0.340)	(0.180)
D.Owners/Renters	-0.015	0.000	0.012*	0.103	-0.711
	(0.010)	(0.000)	(0.006)	(0.102)	(0.716)
Exp/Capita	0.103*	-0.003	-0.054	0.187	0.724
	(0.053)	(0.002)	(0.130)	(0.650)	(0.483)
Tax/Capita	-0.256	0.002	-0.010	1.100	1.722
	(0.138)	(0.004)	(0.355)	(1.409)	(1.508)
Amenity Scale	0.032	-0.001*	-0.107*	-0.053	0.472***
	(0.022)	(0.001)	(0.043)	(0.317)	(0.122)
Urbanized %	-0.136	0.012**	-0.125	0.003	0.481
	(0.142)	(0.005)	(0.368)	(1.494)	(0.944)
Chg. Housing %	0.239	-0.058***	-0.344	-0.497	2.947
	(0.294)	(0.011)	(0.411)	(1.697)	(3.527)
Developed %	0.200	-0.019***	-0.863*	-0.522	5.664***
	(0.163)	(0.005)	(0.408)	(1.850)	(1.111)
3rd Gr. Math	-0.072	-0.002	0.180	1.189	1.832***
	(0.057)	(0.001)	(0.105)	(0.731)	(0.342)
Census Return	-0.015**	-0.000	0.107***	0.117	0.314***
	(0.005)	(0.000)	(0.013)	(0.069)	(0.053)
Year	0.053***	-0.002***	0.873***	0.037	4.456***
	(0.012)	(0.000)	(0.040)	(0.179)	(0.079)
Constant	-105.320***	3.836***	-1.8e+03***	-89.372	-9.0e+03***
	(25.149)	(0.702)	(81.692)	(361.002)	(159.817)
Observations	10907	10905	10886	10679	10793
R^2	0.039	0.360	0.102	0.002	0.251
F	13.868	155.901	48.534	1.089	234.940

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 30a: Differenced Hispanic on Economic Opportunity Measures

	(1) D.Income/Capita	(2) D.Poverty %	(3) D.Inequality	(4) D.Employment/Pop	(5) D.Bachelor %
D.Hispanic	-0.065***	0.071***	0.000	-0.002	-0.167***
	(0.010)	(0.011)	(0.000)	(0.006)	(0.011)
D.Population	-1.009***	-0.002	-0.011	-0.154*	-0.620**
	(0.193)	(0.173)	(0.006)	(0.078)	(0.211)
D.Pop. Density	-0.158	0.014	0.003	-0.078	-0.430*
	(0.137)	(0.175)	(0.005)	(0.076)	(0.173)
D.Jobs/Capita	0.303*	0.056	-0.003	-0.112	-0.270
	(0.130)	(0.329)	(0.004)	(0.069)	(0.253)
D.LFPR	0.186***	-0.200***	-0.003***	0.915***	0.084***
	(0.019)	(0.014)	(0.001)	(0.007)	(0.020)
D.Median Age	0.306***	-0.246***	0.001	0.007	-0.067**
	(0.026)	(0.021)	(0.001)	(0.009)	(0.025)
D.Owners/Renters	-0.001	0.006	-0.000	0.013*	-0.014
	(0.006)	(0.012)	(0.000)	(0.006)	(0.018)
Exp/Capita	0.033	-0.019	-0.001	0.003	0.030
	(0.047)	(0.045)	(0.002)	(0.021)	(0.050)
Tax/Capita	0.243	-0.030	-0.001	0.030	0.200
	(0.149)	(0.118)	(0.005)	(0.056)	(0.137)
Amenity Scale	0.011	0.014	0.000	0.006	0.040*
	(0.015)	(0.017)	(0.001)	(0.008)	(0.019)
Urbanized %	0.028	-0.132	-0.001	0.028	0.070
	(0.134)	(0.097)	(0.004)	(0.051)	(0.131)
Chg. Housing %	0.814*	-0.139	0.008	0.105	0.765*
	(0.330)	(0.127)	(0.008)	(0.083)	(0.315)
Developed %	0.231	-0.182	0.003	0.147*	0.228
	(0.159)	(0.117)	(0.005)	(0.061)	(0.151)
3rd Gr. Math	0.084*	0.096*	-0.001	-0.034	0.015
	(0.039)	(0.046)	(0.002)	(0.023)	(0.047)
Census Return	0.025***	0.015***	0.000	-0.006*	-0.002
	(0.006)	(0.004)	(0.000)	(0.002)	(0.005)
Year	0.204***	-0.129***	0.000	0.117***	0.057***
	(0.010)	(0.010)	(0.000)	(0.005)	(0.011)
Constant	-412.274***	257.787***	-0.528	-235.342***	-115.620***
	(20.106)	(20.053)	(0.786)	(10.030)	(21.753)
Observations	10906	10907	10888	10907	10907
R^2	0.145	0.088	0.011	0.779	0.057
F	92.722	43.259	2.113	1473.546	29.154

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 30b: Differenced Hispanic on Economic Opportunity Measures (continued)

	(1) D.Same Tract %	(2) D.HH Size	(3) D.Married/Unmarried	(4) D.Teen Birthrate	(5) D.Owner Value
D.Hispanic	0.023	0.003***	0.027	0.649**	-0.329***
	(0.014)	(0.000)	(0.023)	(0.232)	(0.075)
D.Population	-0.716**	0.153***	0.092	-1.763	4.017*
	(0.237)	(0.012)	(0.445)	(2.050)	(1.773)
D.Pop. Density	-0.065	0.099***	-0.388	3.569	0.346
	(0.204)	(0.010)	(0.264)	(2.289)	(1.332)
D.Jobs/Capita	0.574	0.021*	-0.181	3.730	-4.234*
	(0.777)	(0.008)	(0.152)	(4.321)	(1.930)
D.LFPR	-0.015	-0.002*	-0.011	-0.160	-0.182
	(0.019)	(0.001)	(0.024)	(0.233)	(0.188)
D.Median Age	0.260***	-0.014***	0.016	-0.521	0.486**
	(0.030)	(0.002)	(0.038)	(0.331)	(0.179)
D.Owners/Renters	-0.014	0.000	0.013*	0.114	-0.704
	(0.010)	(0.000)	(0.006)	(0.102)	(0.714)
Exp/Capita	0.107*	-0.003	-0.050	0.253	0.680
	(0.053)	(0.002)	(0.130)	(0.647)	(0.482)
Tax/Capita	-0.258	0.001	-0.013	1.057	1.751
	(0.138)	(0.004)	(0.355)	(1.407)	(1.507)
Amenity Scale	0.033	-0.001	-0.106*	-0.030	0.459***
	(0.022)	(0.001)	(0.043)	(0.316)	(0.122)
Urbanized %	-0.137	0.012**	-0.126	0.020	0.474
	(0.142)	(0.005)	(0.368)	(1.495)	(0.945)
Chg. Housing %	0.259	-0.056***	-0.318	0.078	2.661
	(0.295)	(0.011)	(0.411)	(1.694)	(3.543)
Developed %	0.207	-0.018***	-0.856*	-0.361	5.582***
	(0.163)	(0.005)	(0.408)	(1.847)	(1.109)
3rd Gr. Math	-0.070	-0.001	0.183	1.226	1.812***
	(0.057)	(0.001)	(0.105)	(0.727)	(0.342)
Census Return	-0.016**	-0.000	0.107***	0.109	0.318***
	(0.005)	(0.000)	(0.013)	(0.069)	(0.053)
Year	0.053***	-0.002***	0.874***	0.045	4.451***
	(0.012)	(0.000)	(0.040)	(0.179)	(0.079)
Constant	-106.076***	3.733***	-1.8e+03***	-106.641	-9.0e+03***
	(25.166)	(0.697)	(81.765)	(361.149)	(159.459)
Observations	10907	10905	10886	10679	10793
R^2	0.039	0.370	0.102	0.004	0.252
F	14.048	162.210	49.315	1.561	235.239

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 31a: White Non-Hispanic on Economic Opportunity Measures with CZ Fixed Effects

	(1) Income/Capita	(2) Poverty %	(3) Inequality	(4) Employment/Pop	(5) Bachelor %
White	0.279***	-0.113***	0.002***	0.039***	0.532***
	(0.007)	(0.005)	(0.000)	(0.002)	(0.009)
Population	0.162**	-0.605***	-0.006***	0.000	0.076
	(0.049)	(0.033)	(0.001)	(0.013)	(0.061)
Pop. Density	-0.247***	0.390***	0.001	0.031**	0.464***
	(0.041)	(0.027)	(0.001)	(0.011)	(0.051)
Jobs/Capita	0.899***	0.383***	0.018***	0.070***	1.179***
	(0.076)	(0.050)	(0.001)	(0.020)	(0.093)
LFPR	0.299***	-0.323***	-0.006***	0.972***	0.244***
	(0.012)	(0.008)	(0.000)	(0.003)	(0.015)
Median Age	0.563***	-0.344***	-0.000	0.043***	-0.109***
	(0.019)	(0.012)	(0.000)	(0.005)	(0.023)
Owners/Renters	-0.009	-0.010	-0.001***	-0.107***	0.055***
	(0.012)	(0.008)	(0.000)	(0.003)	(0.014)
Exp/Capita	1.428***	1.115***	0.034***	0.084	3.117***
	(0.186)	(0.123)	(0.004)	(0.049)	(0.229)
Tax/Capita	0.802	-1.947***	-0.013	0.262*	-0.174
	(0.499)	(0.329)	(0.009)	(0.130)	(0.613)
Amenity Scale	-0.919***	1.025***	0.004**	-0.163***	0.548***
	(0.072)	(0.048)	(0.001)	(0.019)	(0.089)
Urbanized %	1.635***	1.606***	0.041***	-0.342***	0.990*
	(0.362)	(0.239)	(0.007)	(0.095)	(0.444)
Chg. Housing %	5.130***	-1.316***	-0.013	0.073	5.380***
	(0.463)	(0.306)	(0.009)	(0.121)	(0.569)
Developed %	-0.062	-0.430	-0.002	-0.060	1.512*
	(0.525)	(0.347)	(0.010)	(0.137)	(0.645)
3rd Gr. Math	2.475***	-0.141	0.028***	0.302***	6.387***
	(0.162)	(0.107)	(0.003)	(0.042)	(0.199)
Census Return	0.282***	-0.428***	-0.010***	0.044***	0.485***
	(0.020)	(0.013)	(0.000)	(0.005)	(0.024)
Year	0.874***	-0.210***	0.001	0.279***	0.688***
	(0.030)	(0.020)	(0.001)	(0.008)	(0.036)
Constant	-1.8e+03***	509.242***	0.728	-572.760***	-1.5e+03***
	(59.815)	(39.502)	(1.125)	(15.630)	(73.480)
Observations	12125	12126	12109	12126	12126
R^2	0.605	0.593	0.207	0.937	0.658
F	937.781	998.563	172.267	8093.049	1163.653

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 31b: Black Non-Hispanic on Economic Opportunity Measures with CZ Fixed Effects

	(1) Income/Capita	(2) Poverty %	(3) Inequality	(4) Employment/Pop	(5) Bachelor %
Black	-0.179***	0.064***	-0.002***	-0.068***	-0.106***
	(0.017)	(0.011)	(0.000)	(0.004)	(0.022)
Population	0.040	-0.553***	-0.007***	-0.007	-0.212**
	(0.052)	(0.033)	(0.001)	(0.013)	(0.069)
Pop. Density	-0.152***	0.353***	0.002	0.054***	0.596***
	(0.044)	(0.028)	(0.001)	(0.011)	(0.058)
Jobs/Capita	1.172***	0.273***	0.020***	0.114***	1.670***
	(0.080)	(0.051)	(0.001)	(0.020)	(0.106)
LFPR	0.440***	-0.380***	-0.005***	0.990***	0.521***
	(0.012)	(0.008)	(0.000)	(0.003)	(0.016)
Median Age	0.843***	-0.458***	0.002***	0.079***	0.441***
	(0.018)	(0.012)	(0.000)	(0.005)	(0.024)
Owners/Renters	0.039**	-0.029***	-0.001***	-0.101***	0.148***
	(0.012)	(0.008)	(0.000)	(0.003)	(0.016)
Exp/Capita	1.162***	1.228***	0.032***	0.072	2.476***
	(0.197)	(0.126)	(0.004)	(0.049)	(0.262)
Tax/Capita	1.836***	-2.371***	-0.004	0.377**	1.951**
	(0.527)	(0.336)	(0.009)	(0.131)	(0.700)
Amenity Scale	-0.492***	0.847***	0.007***	-0.131***	1.515***
	(0.076)	(0.048)	(0.001)	(0.019)	(0.101)
Urbanized %	1.309***	1.737***	0.039***	-0.390***	0.383
	(0.382)	(0.244)	(0.007)	(0.095)	(0.509)
Chg. Housing %	4.901***	-1.217***	-0.014	0.073	4.777***
	(0.490)	(0.313)	(0.009)	(0.122)	(0.651)
Developed %	-1.436**	0.125	-0.014	-0.255	-1.084
	(0.554)	(0.354)	(0.010)	(0.138)	(0.736)
3rd Gr. Math	4.318***	-0.895***	0.044***	0.515***	10.130***
	(0.163)	(0.104)	(0.003)	(0.041)	(0.217)
Census Return	0.508***	-0.521***	-0.008***	0.066***	0.962***
	(0.020)	(0.013)	(0.000)	(0.005)	(0.027)
Year	0.802***	-0.181***	0.000	0.268***	0.553***
	(0.031)	(0.020)	(0.001)	(0.008)	(0.042)
Constant	-1.7e+03***	460.955***	1.759	-553.484***	-1.3e+03***
	(63.221)	(40.354)	(1.137)	(15.725)	(84.022)
Observations	12125	12126	12109	12126	12126
R^2	0.558	0.575	0.189	0.936	0.552
F	757.409	922.140	150.883	7970.175	709.462

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 31c: Hispanic on Economic Opportunity Measures with CZ Fixed Effects

	(1) Income/Capita	(2) Poverty %	(3) Inequality	(4) Employment/Pop	(5) Bachelor %
Hispanic	-0.284***	0.133***	-0.002***	-0.028***	-0.616***
	(0.007)	(0.005)	(0.000)	(0.002)	(0.008)
Population	0.077	-0.576***	-0.007***	-0.015	-0.065
	(0.049)	(0.032)	(0.001)	(0.013)	(0.058)
Pop. Density	-0.311***	0.424***	0.000	0.027*	0.311***
	(0.041)	(0.027)	(0.001)	(0.011)	(0.049)
Jobs/Capita	0.823***	0.435***	0.018***	0.072***	0.950***
	(0.076)	(0.050)	(0.001)	(0.020)	(0.089)
LFPR	0.302***	-0.315***	-0.006***	0.977***	0.213***
	(0.012)	(0.008)	(0.000)	(0.003)	(0.014)
Median Age	0.597***	-0.341***	0.001	0.058***	-0.111***
	(0.018)	(0.012)	(0.000)	(0.005)	(0.022)
Owners/Renters	-0.010	-0.006	-0.001***	-0.106***	0.039**
	(0.012)	(0.008)	(0.000)	(0.003)	(0.014)
Exp/Capita	1.407***	1.102***	0.033***	0.068	3.166***
	(0.186)	(0.122)	(0.004)	(0.049)	(0.219)
Tax/Capita	0.751	-1.848***	-0.012	0.301*	-0.583
	(0.499)	(0.327)	(0.009)	(0.131)	(0.586)
Amenity Scale	-0.662***	0.940***	0.007***	-0.116***	0.964***
	(0.071)	(0.047)	(0.001)	(0.019)	(0.084)
Urbanized %	1.830***	1.494***	0.042***	-0.335***	1.494***
	(0.362)	(0.237)	(0.007)	(0.095)	(0.425)
Chg. Housing %	4.243***	-0.923**	-0.019*	-0.029	3.552***
	(0.463)	(0.303)	(0.009)	(0.122)	(0.543)
Developed %	-0.430	-0.346	-0.006	-0.149	1.067
	(0.524)	(0.343)	(0.010)	(0.138)	(0.615)
3rd Gr. Math	2.438***	0.008	0.031***	0.375***	5.782***
	(0.162)	(0.106)	(0.003)	(0.043)	(0.191)
Census Return	0.370***	-0.451***	-0.009***	0.062***	0.605***
	(0.019)	(0.013)	(0.000)	(0.005)	(0.023)
Year	0.854***	-0.205***	0.000	0.274***	0.662***
	(0.030)	(0.019)	(0.001)	(0.008)	(0.035)
Constant	-1.8e+03***	488.849***	1.306	-562.678***	-1.4e+03***
	(59.805)	(39.147)	(1.129)	(15.753)	(70.159)
Observations	12125	12126	12109	12126	12126
R^2	0.604	0.600	0.200	0.936	0.688
F	935.513	1027.602	164.119	7940.885	1346.156

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 32a: Panel Fixed Effects White Non-Hispanic on Economic Opportunity Measures

	(1) Income/Capita	(2) Poverty %	(3) Inequality	(4) Employment/Pop	(5) Bachelor %
White	0.119***	-0.068***	-0.000	0.015	0.175***
	(0.015)	(0.017)	(0.001)	(0.008)	(0.018)
Population	0.027	0.029	-0.002	-0.170*	-0.055
	(0.178)	(0.170)	(0.005)	(0.082)	(0.203)
Pop. Density	0.343	-0.645**	-0.001	0.233*	-0.015
	(0.217)	(0.249)	(0.007)	(0.109)	(0.228)
Jobs/Capita	0.403	0.204	0.001	0.151	-0.477
	(0.293)	(0.365)	(0.008)	(0.092)	(0.541)
LFPR	0.236***	-0.241***	-0.003***	0.928***	0.103**
	(0.020)	(0.031)	(0.001)	(0.010)	(0.036)
Median Age	0.349***	-0.296***	-0.001	0.006	-0.039
	(0.040)	(0.038)	(0.001)	(0.014)	(0.045)
Owners/Renters	0.005	0.017	-0.000	0.011	0.013
	(0.014)	(0.018)	(0.000)	(0.008)	(0.018)
Year	0.820***	-0.180***	0.000	0.271***	0.567***
	(0.029)	(0.032)	(0.001)	(0.013)	(0.036)
Constant	-1.7e+03***	408.296***	0.644	-547.271***	-1.1e+03***
	(58.729)	(64.656)	(1.702)	(25.967)	(72.554)
Observations	12265	12266	12249	12266	12266
R^2	0.392	0.104	0.007	0.770	0.188
F	216.611	24.785	3.294	1211.753	71.037

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 32b: Panel Fixed Effects White Non-Hispanic on Economic Opportunity Measures (continued)

	(1) Same Tract %	(2) HH Size	(3) Married/Unmarried	(4) Teen Birthrate	(5) Owner Value
White	0.017	-0.005***	-0.042*	-0.854**	0.390*
	(0.018)	(0.001)	(0.017)	(0.266)	(0.169)
Population	-0.317	0.061***	0.952***	-0.287	7.434***
	(0.229)	(0.011)	(0.288)	(1.874)	(1.894)
Pop. Density	-0.216	0.091***	-1.861***	-2.964	4.761*
	(0.282)	(0.012)	(0.210)	(4.211)	(2.176)
Jobs/Capita	0.258	0.055***	0.355	-1.256	1.579
	(0.476)	(0.014)	(0.292)	(2.790)	(1.276)
LFPR	-0.006	-0.002*	-0.012	0.002	0.894***
	(0.024)	(0.001)	(0.022)	(0.299)	(0.234)
Median Age	0.356***	-0.020***	0.067*	-0.664	0.636*
	(0.041)	(0.002)	(0.034)	(0.549)	(0.294)
Owners/Renters	-0.031	-0.000	0.005	0.023	-0.820
	(0.017)	(0.001)	(0.009)	(0.067)	(0.623)
Year	0.151***	0.000	0.717***	-1.874***	9.189***
	(0.032)	(0.001)	(0.033)	(0.474)	(0.285)
Constant	-235.894***	3.099	-1.4e+03***	3893.408***	-1.8e+04***
	(64.001)	(2.246)	(65.256)	(948.050)	(573.247)
Observations	12266	12264	12242	12051	12160
R^2	0.064	0.335	0.095	0.014	0.397
F	20.468	76.992	80.133	5.746	239.068

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 33a: Panel Fixed Effects Black Non-Hispanic on Economic Opportunity Measures

	(1) Income/Capita	(2) Poverty %	(3) Inequality	(4) Employment/Pop	(5) Bachelor %
Black	-0.097***	0.017	-0.001	-0.049*	-0.062
	(0.028)	(0.037)	(0.001)	(0.023)	(0.037)
Population	-0.065	0.082	-0.002	-0.183*	-0.189
	(0.175)	(0.169)	(0.005)	(0.083)	(0.202)
Pop. Density	0.277	-0.603*	-0.001	0.229*	-0.121
	(0.222)	(0.253)	(0.007)	(0.108)	(0.233)
Jobs/Capita	0.303	0.267	0.001	0.144	-0.636
	(0.293)	(0.372)	(0.008)	(0.095)	(0.534)
LFPR	0.242***	-0.246***	-0.003***	0.927***	0.115**
	(0.020)	(0.031)	(0.001)	(0.010)	(0.037)
Median Age	0.387***	-0.320***	-0.002	0.009	0.022
	(0.039)	(0.038)	(0.002)	(0.014)	(0.044)
Owners/Renters	0.006	0.017	-0.000	0.012	0.015
	(0.014)	(0.018)	(0.000)	(0.008)	(0.018)
Year	0.794***	-0.164***	0.000	0.268***	0.529***
	(0.029)	(0.031)	(0.001)	(0.013)	(0.036)
Constant	-1.6e+03***	373.620***	0.548	-539.939***	-1.0e+03***
	(57.680)	(62.943)	(1.647)	(25.440)	(72.718)
Observations	12265	12266	12249	12266	12266
R^2	0.381	0.098	0.007	0.770	0.156
F	209.108	25.342	3.405	1203.881	56.886

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 33b: Panel Fixed Effects Black Non-Hispanic on Economic Opportunity Measures (continued)

	(1) Same Tract %	(2) HH Size	(3) Married/Unmarried	(4) Teen Birthrate	(5) Owner Value
Black	-0.085*	0.001	-0.001	-0.243	-0.012
	(0.042)	(0.001)	(0.027)	(0.568)	(0.292)
Population	-0.332	0.065***	0.982***	0.249	7.146***
	(0.229)	(0.011)	(0.286)	(1.866)	(1.877)
Pop. Density	-0.218	0.094***	-1.835***	-2.263	4.506*
	(0.279)	(0.013)	(0.204)	(4.226)	(2.156)
Jobs/Capita	0.255	0.059***	0.384	-0.739	1.221
	(0.476)	(0.015)	(0.289)	(2.717)	(1.201)
LFPR	-0.007	-0.002**	-0.016	-0.089	0.926***
	(0.023)	(0.001)	(0.022)	(0.295)	(0.234)
Median Age	0.357***	-0.022***	0.051	-1.006	0.779**
	(0.041)	(0.002)	(0.034)	(0.530)	(0.292)
Owners/Renters	-0.031	-0.000	0.005	0.027	-0.828
	(0.017)	(0.000)	(0.009)	(0.066)	(0.629)
Year	0.148***	0.001	0.727***	-1.681***	9.101***
	(0.032)	(0.001)	(0.034)	(0.455)	(0.282)
Constant	-227.976***	0.571	-1.5e+03***	3459.442***	-1.8e+04***
	(63.831)	(2.162)	(67.000)	(902.745)	(565.537)
Observations	12266	12264	12242	12051	12160
R^2	0.065	0.314	0.094	0.011	0.396
F	20.758	73.705	79.217	5.305	236.559

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 34a: Panel Fixed Effects Hispanic on Economic Opportunity Measures

	(1) Income/Capita	(2) Poverty %	(3) Inequality	(4) Employment/Pop	(5) Bachelor %
Hispanic	-0.116***	0.094***	0.001	-0.008	-0.203***
	(0.016)	(0.018)	(0.001)	(0.009)	(0.020)
Population	0.015	0.018	-0.002	-0.176*	-0.050
	(0.178)	(0.167)	(0.005)	(0.082)	(0.201)
Pop. Density	0.308	-0.634**	-0.001	0.227*	-0.055
	(0.221)	(0.243)	(0.007)	(0.109)	(0.231)
Jobs/Capita	0.389	0.189	0.000	0.144	-0.469
	(0.313)	(0.345)	(0.009)	(0.094)	(0.585)
LFPR	0.241***	-0.243***	-0.003***	0.928***	0.109**
	(0.020)	(0.031)	(0.001)	(0.010)	(0.036)
Median Age	0.361***	-0.295***	-0.001	0.010	-0.031
	(0.040)	(0.038)	(0.001)	(0.013)	(0.044)
Owners/Renters	0.002	0.020	-0.000	0.011	0.007
	(0.015)	(0.019)	(0.000)	(0.008)	(0.018)
Year	0.811***	-0.178***	0.000	0.269***	0.558***
	(0.029)	(0.031)	(0.001)	(0.013)	(0.036)
Constant	-1.6e+03***	398.656***	0.704	-541.878***	-1.1e+03***
	(58.255)	(63.040)	(1.683)	(25.500)	(71.754)
Observations	12265	12266	12249	12266	12266
R^2	0.390	0.107	0.007	0.769	0.192
F	215.417	26.325	3.322	1214.538	68.424

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 34b: Panel Fixed Effects Hispanic on Economic Opportunity Measures (continued)

	(1) Same Tract %	(2) HH Size	(3) Married/Unmarried	(4) Teen Birthrate	(5) Owner Value
Hispanic	0.025	0.006***	0.035*	1.229***	-0.712***
	(0.021)	(0.001)	(0.018)	(0.328)	(0.163)
Population	-0.347	0.061***	0.960***	-0.413	7.629***
	(0.230)	(0.011)	(0.287)	(1.859)	(1.890)
Pop. Density	-0.236	0.092***	-1.845***	-2.858	4.767*
	(0.278)	(0.012)	(0.209)	(4.221)	(2.201)
Jobs/Capita	0.220	0.054***	0.374	-1.010	1.845
	(0.464)	(0.013)	(0.292)	(2.930)	(1.411)
LFPR	-0.004	-0.002*	-0.014	-0.013	0.897***
	(0.024)	(0.001)	(0.022)	(0.297)	(0.233)
Median Age	0.369***	-0.020***	0.061	-0.636	0.587*
	(0.041)	(0.002)	(0.034)	(0.538)	(0.296)
Owners/Renters	-0.030	-0.000	0.006	0.060	-0.849
	(0.017)	(0.000)	(0.009)	(0.079)	(0.627)
Year	0.144***	0.000	0.722***	-1.865***	9.208***
	(0.032)	(0.001)	(0.033)	(0.462)	(0.284)
Constant	-220.568***	2.135	-1.5e+03***	3790.122***	-1.8e+04***
	(63.582)	(2.173)	(65.996)	(915.685)	(567.828)
Observations	12266	12264	12242	12051	12160
R^2	0.064	0.337	0.094	0.017	0.399
F	20.443	83.757	79.884	6.528	238.985

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 35: Tests for Endogeneity

	(1 inst) Income	(1 inst.) Income	(1 inst.) Income	(3 inst.) Income	(3 inst.) Income	(3 inst.) Income
$\hat{vw}$	0.021			0.074**		
	(0.016)			(0.027)		
$\hat{vb}$		-0.132***			-0.044	
		(0.033)			(0.058)	
$\hat{vh}$			-0.021			-0.124***
			(0.015)			(0.027)
N	12125	12125	12125	10913	10913	10913
R^2	0.550	0.520	0.557	0.529	0.525	0.562
F	931.802	774.825	1068.535	851.426	709.766	982.871

	(1 inst) Poverty	(1 inst.) Poverty	(1 inst.) Poverty	(3 inst.) Poverty	(3 inst.) Poverty	(3 inst.) Poverty
$\hat{vw}$	-0.021			-0.028		
	(0.014)			(0.021)		
$\hat{vb}$		-0.039			-0.080	
		(0.029)			(0.054)	
$\hat{vh}$			0.036*			0.071**
			(0.015)			(0.023)
N	12126	12126	12126	10913	10913	10913
R^2	0.561	0.548	0.572	0.555	0.549	0.572
F	571.598	499.647	660.025	521.585	447.062	591.347

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

	(1 inst.) Inequality	(1 inst.) Inequality	(1 inst.) Inequality	(3 inst.) Inequality	(3 inst.) Inequality	(3 inst.) Inequality
$\hat{vw}$	0.001***			0.001*		
	(0.000)			(0.001)		
$\hat{vb}$		-0.000			-0.001	
		(0.001)			(0.001)	
$\hat{vh}$			-0.001***			-0.001*
			(0.000)			(0.001)
N	12109	12109	12109	10899	10899	10899
R^2	0.188	0.170	0.180	0.189	0.172	0.180
F	98.065	96.509	95.350	104.431	96.934	95.975

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 36: IV Mean and Variance vs. True Population

	mean	N	Var	min	max
White	70.05617	12413	417.9332	2.605753	100
White IV	70.06523	12410	405.9666	3.508477	101.7452
Black	3.518432	12413	40.71707	0	59.04173
Black IV	3.442004	12410	44.5284	0	59.04173
Hispanic	20.67022	12413	320.3727	0	87.61008
Hispanic IV	19.91068	12410	328.6637	0	87.57423

Table 37: Instrumental Variable Results for White Non Hispanic on Economic Opportunity

	(1) Income/Capita	(2) Poverty %	(3) Inequality	(4) Employment/Pop	(5) Bachelor %
White	0.107***	-0.125***	0.001	0.038***	0.148***
	(0.021)	(0.018)	(0.001)	(0.009)	(0.022)
Population	-0.074	0.035	-0.001	-0.189***	-0.097
	(0.098)	(0.095)	(0.003)	(0.044)	(0.118)
Pop. Density	0.498***	-0.763***	-0.000	0.306***	0.004
	(0.120)	(0.144)	(0.004)	(0.064)	(0.138)
Jobs/Capita	0.347	0.192	0.002	0.126	-0.521
	(0.196)	(0.301)	(0.006)	(0.070)	(0.395)
LFPR	0.220***	-0.229***	-0.003***	0.921***	0.102***
	(0.014)	(0.018)	(0.001)	(0.006)	(0.022)
Median Age	0.357***	-0.277***	-0.002*	0.000	-0.028
	(0.023)	(0.025)	(0.001)	(0.009)	(0.031)
Owners/Renters	0.014	0.013	-0.000	0.015*	0.015
	(0.010)	(0.016)	(0.000)	(0.007)	(0.021)
Observations	12263	12264	12248	12264	12264
R^2	0.436	0.125	0.006	0.795	0.191
F	420.578	63.627	2.232	1717.003	112.209

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 38: Instrumental Variable Results for Black Non Hispanic on Economic Opportunity

	(1) Income/Capita	(2) Poverty %	(3) Inequality	(4) Employment/Pop	(5) Bachelor %
Black	-0.248***	0.063	-0.003**	-0.123***	-0.161***
	(0.033)	(0.050)	(0.001)	(0.022)	(0.042)
Population	-0.161	0.132	-0.002	-0.221***	-0.213
	(0.097)	(0.093)	(0.003)	(0.045)	(0.119)
Pop. Density	0.455***	-0.689***	-0.000	0.294***	-0.074
	(0.122)	(0.145)	(0.004)	(0.064)	(0.140)
Jobs/Capita	0.280	0.303	0.001	0.107	-0.641
	(0.201)	(0.307)	(0.006)	(0.074)	(0.394)
LFPR	0.220***	-0.236***	-0.003***	0.920***	0.108***
	(0.014)	(0.018)	(0.001)	(0.006)	(0.022)
Median Age	0.381***	-0.320***	-0.002*	0.006	0.017
	(0.023)	(0.024)	(0.001)	(0.009)	(0.031)
Owners/Renters	0.017	0.012	-0.000	0.016*	0.017
	(0.011)	(0.015)	(0.000)	(0.007)	(0.022)
Observations	12263	12264	12248	12264	12264
R^2	0.421	0.122	0.006	0.795	0.158
F	408.779	63.085	2.434	1737.776	103.359

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 39: Instrumental Variable Results for Hispanic on Economic Opportunity

	(1) Income/Capita	(2) Poverty %	(3) Inequality	(4) Employment/Pop	(5) Bachelor %
Hispanic	-0.189***	0.051	0.001	0.020	-0.267***
	(0.019)	(0.033)	(0.001)	(0.014)	(0.023)
Population	-0.026	0.096	-0.003	-0.231***	-0.027
	(0.099)	(0.094)	(0.003)	(0.046)	(0.117)
Pop. Density	0.495***	-0.700***	-0.001	0.274***	0.002
	(0.121)	(0.143)	(0.004)	(0.063)	(0.139)
Jobs/Capita	0.408	0.268	-0.000	0.071	-0.431
	(0.232)	(0.298)	(0.006)	(0.066)	(0.452)
LFPR	0.221***	-0.236***	-0.003***	0.924***	0.103***
	(0.014)	(0.018)	(0.001)	(0.006)	(0.021)
Median Age	0.344***	-0.309***	-0.001	0.020*	-0.048
	(0.023)	(0.026)	(0.001)	(0.009)	(0.032)
Owners/Renters	0.008	0.014	-0.000	0.016*	0.007
	(0.009)	(0.016)	(0.000)	(0.007)	(0.018)
Observations	12263	12264	12248	12264	12264
R^2	0.429	0.130	0.007	0.795	0.192
F	417.614	63.899	2.067	1722.731	110.831

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 10: Schools in Central Denver by SPF Rating

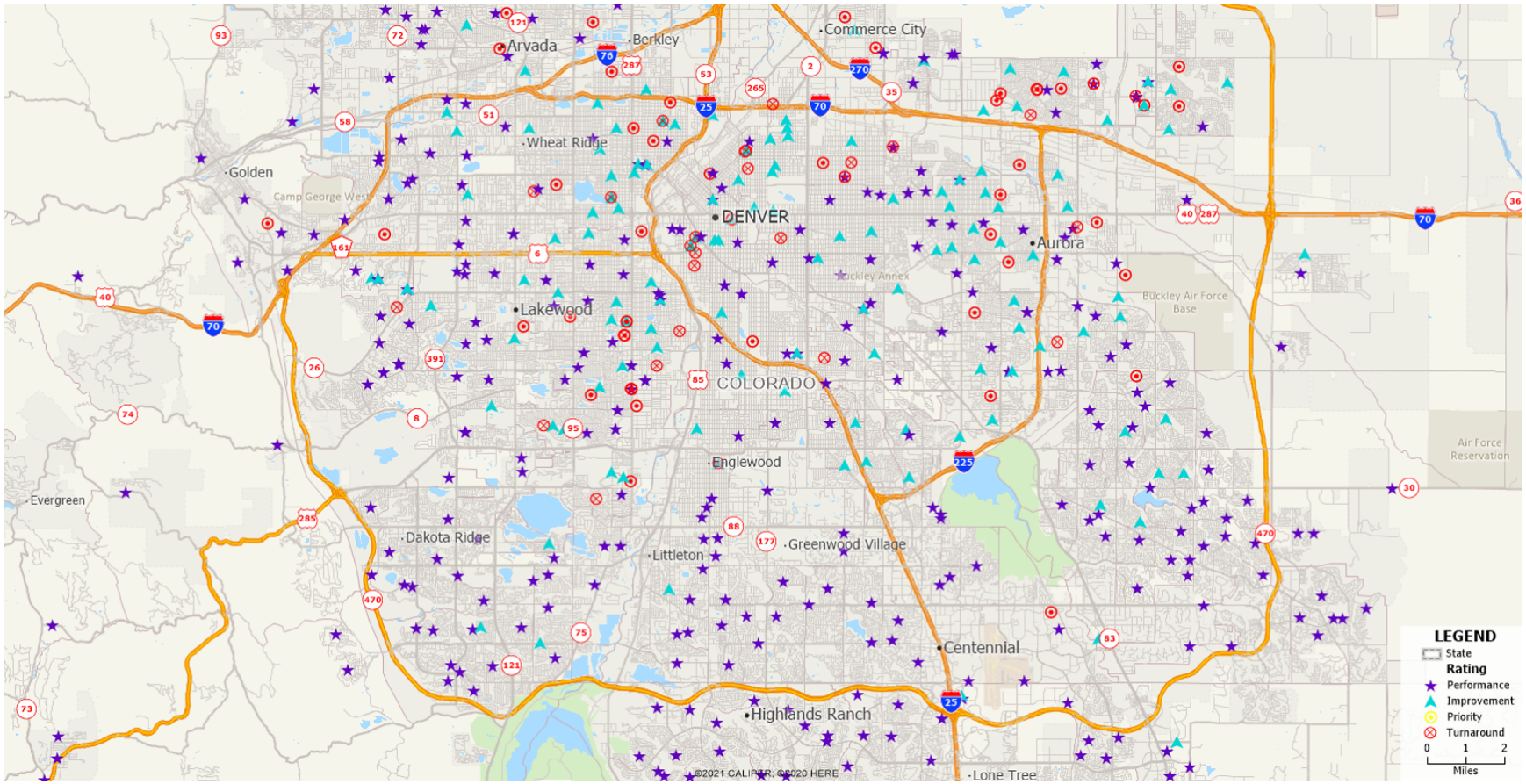


Figure 11: “At Risk” Categorizations Mapped onto Median Household Income

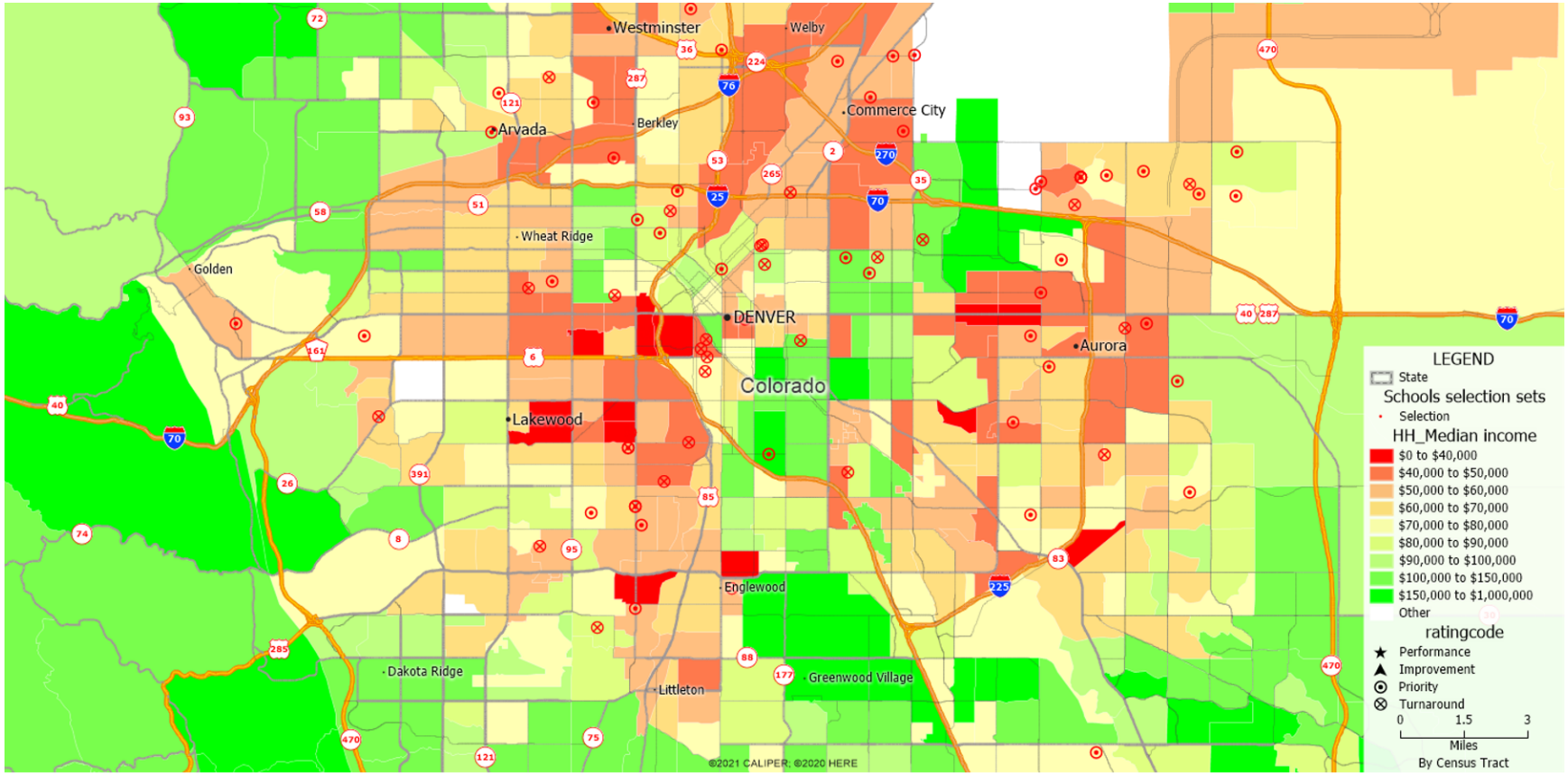


Figure 12: “At Risk” Categorizations Mapped onto White Non Hispanic Density

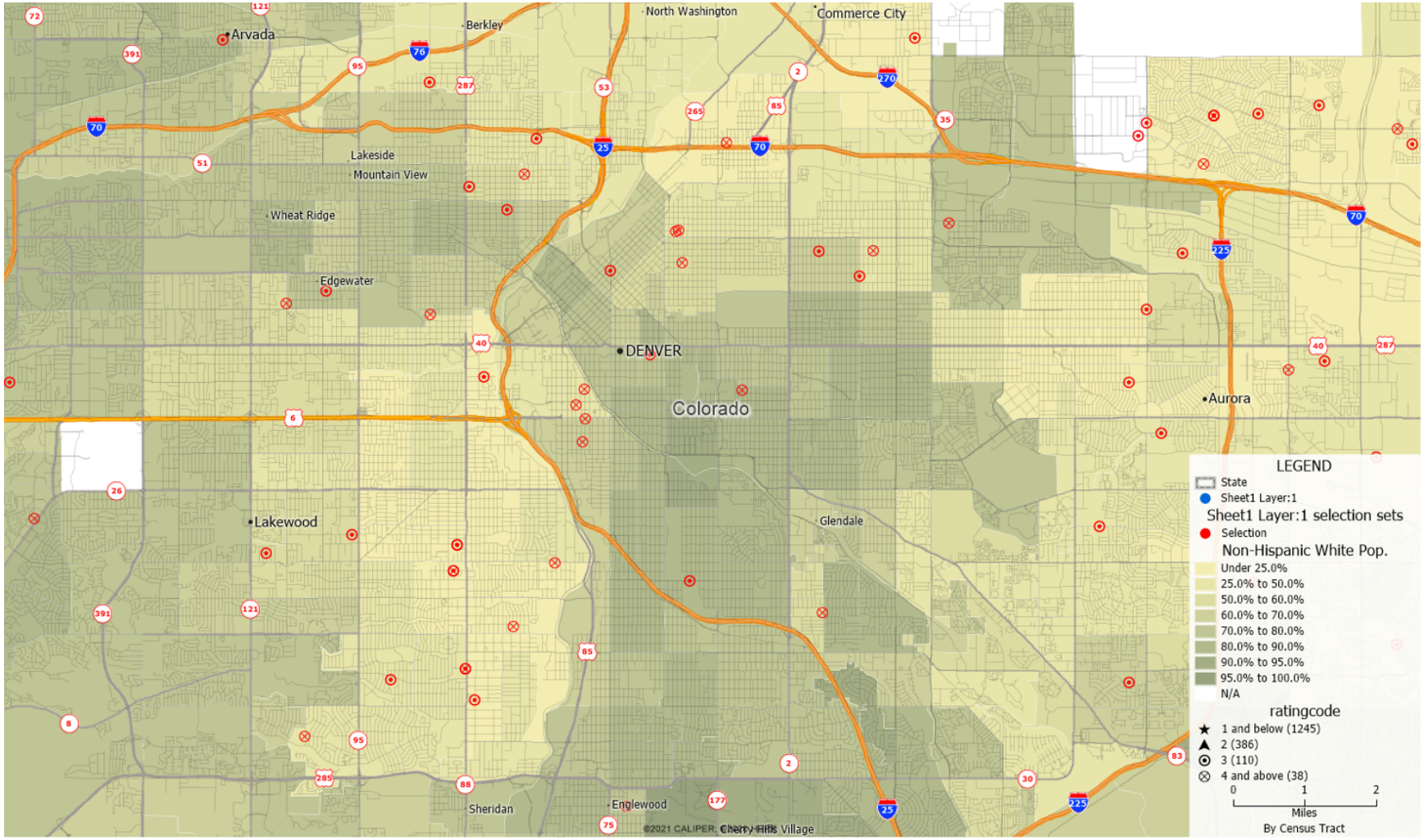


Table 40a: Spatial Durbin Model for White, Black and Hispanic on Income

	(1) Income/Capita	(2) Income/Capita	(3) Income/Capita
Tract Effects			
White	0.035***		
	(0.007)		
Black		-0.055***	
		(0.015)	
Hispanic			-0.017*
			(0.007)
Population	0.527***	0.504***	0.532***
	(0.079)	(0.080)	(0.079)
Pop. Density	-0.118	-0.144	-0.149
	(0.095)	(0.094)	(0.095)
Jobs/Capita	0.339***	0.344***	0.332***
	(0.097)	(0.097)	(0.098)
LFPR	0.057***	0.069***	0.059***
	(0.016)	(0.016)	(0.016)
Median Age	0.326***	0.330***	0.334***
	(0.014)	(0.014)	(0.014)
Poverty %	-0.134***	-0.138***	-0.135***
	(0.008)	(0.008)	(0.008)
Inequality	11.292***	11.264***	11.288***
	(0.233)	(0.233)	(0.234)
Employment/Pop	0.096***	0.086***	0.095***
	(0.016)	(0.015)	(0.016)
Bachelor %	0.193***	0.197***	0.196***
	(0.007)	(0.007)	(0.007)
Same Tract %	-0.020**	-0.017**	-0.021**
	(0.007)	(0.007)	(0.007)
HH Size	-3.345***	-3.482***	-3.404***
	(0.228)	(0.227)	(0.229)

Tract Spillover Effects Continued in Table b

Table 40b: Spatial Durbin Model for White, Black and Hispanic on Income (continued)

	(1) incomepercapita	(2) incomepercapita	(3) incomepercapita
Spillover Effects			
White	-0.261*		
	(0.112)		
Black		-0.021	
		(0.387)	
Hispanic			0.035
			(0.146)
Income/Capita	2.102***	0.775***	2.131***
	(0.077)	(0.012)	(0.074)
error	1.023***	2.266***	0.978***
	(0.006)	(0.062)	(0.005)
σ_e	2.697***	2.699***	2.701***
	(0.018)	(0.018)	(0.018)
N	12280	12280	12280
chi^2	6462.348	20926.42	6514.232
$P > \chi^2$	0.001	0.001	0.001

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 41a: Carlino-Mills Model Tract Effects

	(1) Δ Income/Capita	(2) Δ Population	(3) Δ Employment/Pop
Tract Values 2010			
ln(Income/Capita)	-0.515***	0.332*	0.096***
	(0.045)	(0.140)	(0.025)
ln(Population)	-0.029*	-0.591***	-0.009
	(0.013)	(0.040)	(0.007)
ln(Employment/Pop)	0.120	0.172	-0.700***
	(0.062)	(0.193)	(0.035)
Pop. Density	-0.009**	-0.017	0.001
	(0.003)	(0.010)	(0.002)
Jobs/Capita	0.000	0.033**	-0.001
	(0.004)	(0.013)	(0.002)
LFPR	-0.002	-0.010*	0.002**
	(0.001)	(0.004)	(0.001)
Median Age	0.003	-0.032***	-0.008***
	(0.002)	(0.005)	(0.001)
Poverty %	0.002	-0.002	0.002**
	(0.001)	(0.003)	(0.001)
Inequality	-0.080*	-0.473***	-0.077***
	(0.031)	(0.097)	(0.017)
Bachelor %	0.006***	0.003	-0.000
	(0.001)	(0.002)	(0.000)
Same Tract %	0.001	0.004	0.003***
	(0.001)	(0.003)	(0.000)
HH Size	0.044*	-0.244***	-0.052***
	(0.021)	(0.066)	(0.012)
White	0.003*	0.003	0.002*
	(0.001)	(0.004)	(0.001)
Black	0.006**	0.002	0.003**
	(0.002)	(0.006)	(0.001)
Hispanic	0.004**	0.001	0.001
	(0.001)	(0.004)	(0.001)
RUCC	-0.022***	-0.051**	-0.001
	(0.006)	(0.019)	(0.003)
Amenity Scale	0.008	-0.019	0.004
	(0.006)	(0.018)	(0.003)
Constant	0.937***	1.914*	2.552***
	(0.246)	(0.771)	(0.138)

Tract Spillover Effects Continued in Table b

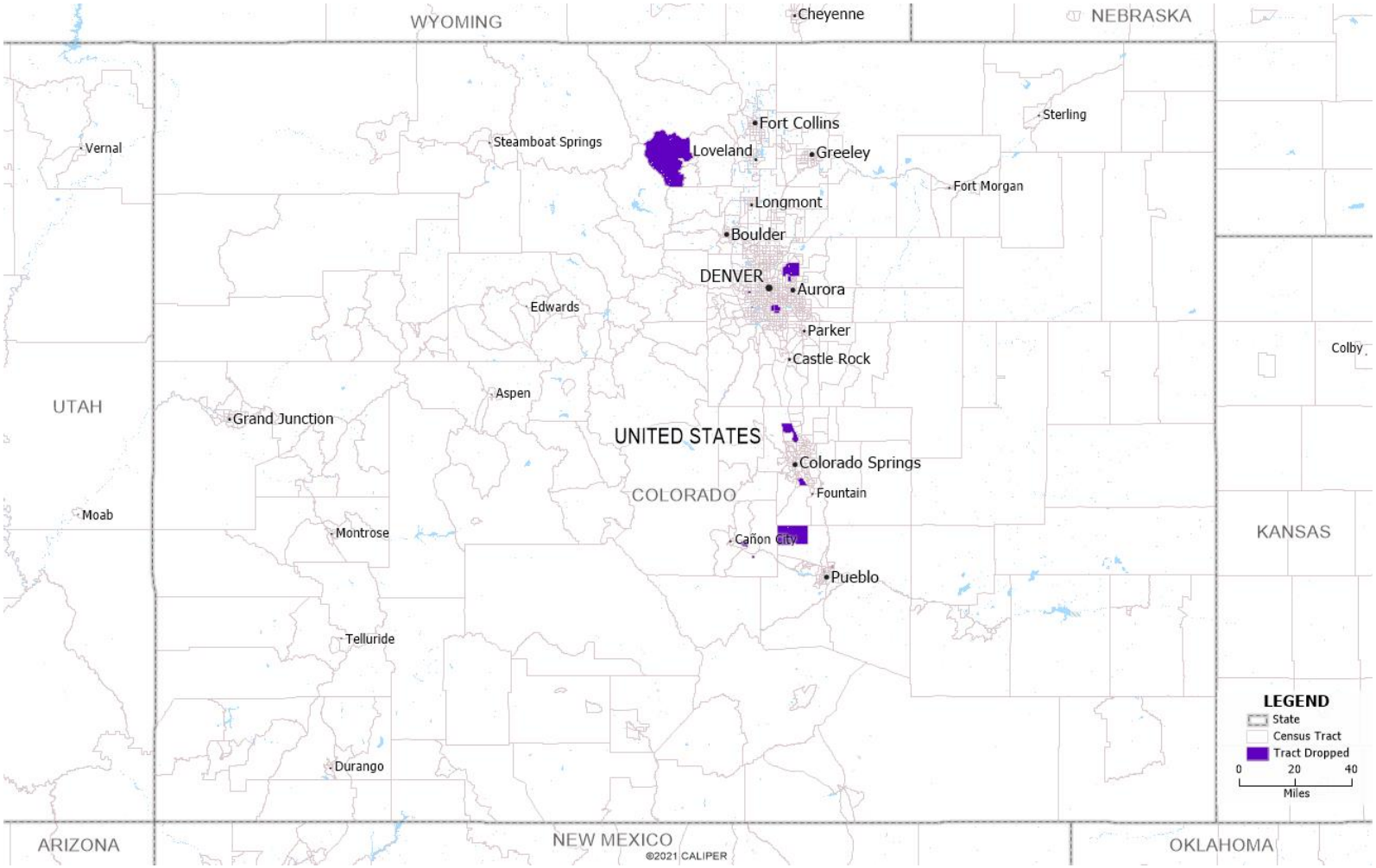
Table 41b: Carlino-Mills Model Spillover Effects

	chgincomepercapita	chgpopk	chgemppop
Spillover Effects 2010			
ln(Income/Capita)	1.629	5.595	-0.378
	(1.685)	(4.413)	(0.841)
ln(Population)	-0.151	0.841	-0.235
	(0.511)	(1.336)	(0.256)
ln(Employment/Pop)	-4.982*	-6.590	0.817
	(2.000)	(4.785)	(0.936)
Pop. Density	-0.199**	-0.117	-0.063
	(0.070)	(0.194)	(0.036)
Jobs/Capita	-0.060	-0.246	-0.024
	(0.158)	(0.437)	(0.082)
LFPR	0.189**	0.032	0.021
	(0.062)	(0.156)	(0.030)
Median Age	0.086	-0.018	0.010
	(0.069)	(0.173)	(0.033)
Poverty %	0.035	0.103	-0.009
	(0.041)	(0.114)	(0.021)
Inequality	0.092	0.473	0.021
	(1.658)	(4.647)	(0.870)
Bachelor %	0.008	-0.052	0.001
	(0.019)	(0.046)	(0.009)
Same Tract %	-0.038	-0.101	-0.021
	(0.032)	(0.083)	(0.016)
HH Size	-0.868	3.534*	-0.295
	(0.605)	(1.604)	(0.305)
White	0.045	0.065	-0.007
	(0.044)	(0.107)	(0.021)
Black	0.063	0.124	-0.009
	(0.051)	(0.126)	(0.024)
Hispanic	0.077	0.075	-0.002
	(0.044)	(0.109)	(0.021)
RUCC	-0.214	-0.398	-0.184**
	(0.152)	(0.337)	(0.069)
Amenity Scale	-0.093	-0.071	-0.014
	(0.084)	(0.209)	(0.040)
e.Y	2.651***	0.664	1.598***
	(0.630)	(1.106)	(0.434)
N	1228	1228	1228
chi2	544.159	429.221	934.362
P $> \chi^2$	0.001	0.001	0.001

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 13: Tracts Dropped from Balanced Panel



Chapter 4- Do Birds of a Feather Flock Together? The Role of Demographic Information in a Voluntary Contribution Survey Experiment

I Introduction

Previous economic literature identifies inequality in the provision of public goods at the local community level. For example, educational providers are of higher quality in wealthier areas, and of lower quality in predominantly non White areas– especially inner cities (Darling-Hammond 2007; Lleras 2008). Access to quality health care is limited in low income and racially diverse areas. (Fiscella 2000; Kawachi 2005; Williams 2005).

Alesina, Baqir and Easterly (1999) provide a seminal framework to measure the impact of racial heterogeneity on public goods provision, finding that a measure of race heterogeneity is positively associated with expenditures and tax collection per capita, but negatively associated with "productive" public goods and services: education, roads, and sewage/trash pickup. In the years since the work of Alesina, Baqir and Easterly, there has been an expansive literature on the role of race diversity on provision of publically funded services.

If preferences regarding public funding and projects are correlated with group membership, diversity will imply a diversity of tastes, which may cause disagreements or undermine efficacy in determination of public resource provision (Alesina, et al. 2003), thereby resulting in non-Pareto optimal outcomes. Bowles and Gintis (2004, 2004a) posit that cooperative strategies may be available within communities which are able to identify themselves along some characteristic, such as gender, race or ethnicity. Conversely, without clear communication of interests groups, and "because local governmental decisions often concern spatial allocation, neighborhoods are important municipal actors in local politics, and in more segregated places, neighborhood interests become overlaid with racial division. Segregated cities are more racially polarized in elections and may be less likely to generate policy consensus. The result is that cities with more segregation have smaller public goods budgets. Segregated cities raise fewer dollars from their residents and spend less money on roads, law enforcement, parks, sewers, welfare, housing, and community development" (Trounstine 2016). Because non-White residents tend to live in places which are more racially integrated (Logan and Stults 2011), the social capital which exists within neighborhoods is likely more important than the exact composition of races/ethnicities within the group (Leonard, et al. 2010).

Existing work in the literature consistently finds that there is a negative relationship between race heterogeneity and public funding across nations (Alesina, et al. 2003; Baldwin and Huber 2010; Lieberman 2012) and at various units of analysis including world regions (ex. Banerjee, et al. 2005; Jackson 2013), local districts and municipalities (Bardhan 2000; Habyarimana 2009). These hypotheses, generally summarized as 'conflict and inefficiency' explanations of

the relationship between race heterogeneity and public spending, rely on the finding that more racially heterogeneous places collect more tax and spend more per capita, but provide lower spending shares on productive public goods such as roads and sewage.

In Chapters 2 and 3 of this dissertation, I demonstrate that one of the main tenets 'conflict and inefficiency' hypothesis as suggested in the literature surrounding Alesina (1999) is likely flawed due to omitted variables and the impact of change over time. Rather than racially heterogeneous areas having higher tax and expenditure per capita, but failing to spend it on "productive" public goods, I have found that places which diversify actually feature lower levels of tax and spending. Nonetheless, it is still important to consider how individuals respond to potential public spending measures, especially as the United States continues diversifying. If there is less support for public financing measures in racially heterogeneous areas, local policymakers will want to understand the motivations as to why, and also what tactics could be implemented to ensure that diversifying places do not get left behind in terms of the types of public goods and services which are available in those areas.

Since 1980, the US has undergone a considerable demographic change. In US Cities, the average probability that two randomly selected citizens will be of different races, as defined by the US Census, has increased from around 23% in 1980 to 43.5% in 2010, while overall percentage White non-Hispanic has diminished from about 84% to 67% during that time and continues to fall. As places diversify, local policymakers will want to understand how individuals view that diversification and use the information to make judgements about the effectiveness, tractibility, and desirability of potential public projects and funds. The availability and implementation of these public expenditure projects could ultimately impact neighborhood level observables and unobservables, which have been shown to alter adulthood outcomes for children growing up in these neighborhoods.

Certain strands of economic literature, especially those associated with Opportunity Insights demonstrate that exposure to neighborhood effects over time is associated with a wide range of economic outcomes. Moving to a lower poverty neighborhood during adolescence increases college attendance, adulthood earnings, and reduces single parenthood rates (Chetty, et al, 2016). The neighborhood effects are also associated with higher rates of employment and lower violent crime arrests and high school dropout rate (Chyn 2018). Better schools which exist in the higher income areas strongly explain the differences in adulthood outcomes (Laliberte 2021).

In the United States, these adulthood outcomes such as income/poverty (Akee, et al, 2019) , employment (Emeka 2018), education (Kelly 2010) , incarceration (Western 2005) and mortality rates (Deaton 2003) are also highly correlated with race. Even among households with identical annual income, there are large and persistent racial differences in the neighborhood context. In particular, non-Whites live in lower income neighborhoods on average than their White counterparts earning equal incomes (Reardon 2015). Race in combination with neighborhood is also an important factor in intergenerational mobility (Chetty, et al. 2020).

Still, as Hopkins (2009) writes, "we do not understand the political processes that lead diversity to reduce local

public spending. Past work typically suggests that public opinion is the mechanism: diverse environments generate distinctive opinions, which are then translated into policy by local leaders. Yet recent research has demonstrated that opinions on public spending are often unrelated to local demographics (Soroka, Johnston, and Banting 2005). Also, we know significantly more about attitudes towards public spending than about the local political processes that draw on those attitudes to set spending levels" (Hopkins 2009 pg. 160).

As the United States continues to diversify, public policymakers will want to focus on understanding how this diversity alters perceptions of public funding projects. This study is designed to test the impact of information regarding US Census Race and Ethnicity classifications on behavior in a voluntary contribution game. It is possible that public goods in certain areas are under-funded as a result of "conflict and inefficiency" type hypotheses arising via *preference, technology and strategy selecton* (Habyarimana 2007).

If preferences are correlated with group membership, racial or ethnic diversity will imply a variety of tastes, which may cause disagreements or undermine efficacy in determination of public resource provision (Alesina, et al. 2003), thereby resulting in non-pareto optimal outcomes. Bowles and Gintis (2004), Henrich, et al. (2004) posit that cooperative strategies may be available within communities which are able to identify themselves along some characteristic, such as gender, race or ethnicity. Technology such as language is a medium by which groups are able to identify cooperators and punish non-cooperators. Finally, under-provision could be the result of strategy selection, wherein group members choose lower levels of provision when the resource is shared with members of other groups than within their own.

This paper is a test of the third potential mechanism, strategy selection. In Chapters 2 and 3 I found that more non-White areas have lower tax and spending, and perform worse across a variety of economic opportunity measures. Although these results present a challenge to the conflict and inefficiency hypothesis as it stands, policymakers should still be interested in understanding why spending on productive public goods is lower in these areas. One possible explanation is that because non-White areas often feature lower economic opportunity, individuals or cultural groups may have incentive to support public projects and funds which are interpreted to have direct benefits to their group. If contribution is highest within group, it suggests that individuals could be underestimating other groups' contribution to public projects, resulting in lack of support or under-investment.

To test this hypothesis, the remainder of the paper will be divided into the following sections: Section II explains the experimental methods, Section III discusses the survey, Section IV details recruitment efforts, and Section V presents results. Section VI concludes.

II Experimental Methods

To test this type of conflict mechanism, I will use a list survey embedded in a questionnaire regarding voluntary contribution in a simplified Marwell and Ames (1979, 1980, 1981) style one-shot voluntary contribution mechanism game which has been adapted throughout the literature. In the original, respondents are given a set of $X tokens which can be invested into either a private fund, earning a fixed return, or a public fund out of which all respondents earn an equal share of the total public investment. Alternatively, respondents can invest in a public fund and earn an equal share of the total returns of the public fund. If contribution reaches a certain threshold, the returns on the public fund are greater than those on the private fund.

Milinski, et al (2008) pioneers a multi-equilibrium disaster threshold version of the game by introducing a certain threshold and probability of loss. In the multi-equilibrium 'disaster threshold' version, if fewer than %N of the community contribute, all endowments are lost. However, if more than the threshold of %N contribute, all community members have access to a public fund which doubles individual returns. In that version, the possibility that even non-contributors will lose creates a second possible Nash equilibrium on conditional cooperation. Together, these works cast doubt on the strength of the long-standing "free-rider" hypothesis from Olsen 1968 and Hardin 1968. Literature following this setup is robust in its discussion on the impact of the chosen threshold location (Barrett 2013), uncertainty about the location of the threshold (Dannenberg 2014), variation in income (Van Dijk 2002, Kroll, et al. 2007, Reuben 2013), and endowments (Milinski, et al. 2011; Tavoni, et al. 2011; Burton-Chellew, et al. 2013). Brown and Kroll (2017) argue that the characterization of uncertainty is crucial to the experimental results.

This experiment starts with the more simple game without non-contributor loss, as it presents an easier opportunity to test respondents' understanding of best responses. The private fund represents the standardized return rate of 1 with certainty. The public fund provides a return of double the investment amount, so long as 50% of respondents invest. In the original game (see Marwell and Ames 1979), group sizes vary and the contribution threshold to earn positive return on the public fund is set at 8,000 which is about 1/3 of the total inital allocation given to all respondents. In this game, each respondent is given an allotment of $100, and can choose to either keep this allotment or contribute it to a public fund or project, or keep it as a private fund. If a contribution threshold of 50% to the public fund is met, because it is a public good, everyone gains access to a fund worth $200, regardless of the contribution choice. If the threshold is not met, contributors lose their contribution, while non-contributors keep their $100.

Despite this key difference, the worst outcome in both the original and simplified game presented here is to be contributing when all others do not contribute to the public fund. Extensions to future research could include a comparison to behavior in the disaster threshold game or use of the continuous value public fund. Nash equilibrium requires correct beliefs. Conditional on the (correct) belief that the threshold would not be met in this game, the respondent gets $0 for contribute or $X for keep. Conditional on the (correct) belief that the threshold would be met,

the respondent gets $2X regardless of their decision so the decision to keep weakly dominates contribute. The Nash equilibrium is unique, and non-optimal. If all respondents play the equilibrium strategy, the expected payoff is $X. If all respondents contributed, the expected payoff would be $2X. Although this game is not a true prisoners' dilemma because of the weak instead of strong dominance of the non-contribution decision, the two similar games, and that of Marwell and Ames (1979) share the unique non-pareto optimal equilibrium.

The results of this experiment may also differ from those conducted by Andreoni, et al. (see: Andreoni, 1988). In that strand of the literature, the utility from the private fund, and from the public fund (described as a gift G) is specified as a continuous, quasi-concave function. As the population size grows to infinity, it is predicted that free-riding will dominate. However, in laboratory experiments, respondents often express interest in behaving unselfishly, and altruistic giving can be justified as 'rational' or utility maximizing under a broad classification of preference functions (Andreoni and Miller 2002). Alternatively, respondents may choose to behave altruistically to pursue a 'warm glow' feeling of satisfaction (Andreoni 1990), or to avoid a feeling of guilt for free riding when others contribute (Cubitt, et al. 2011). Conversely, among mixed groups an individual may choose not to contribute if they do not feel as though they are not part of the group (Akerlof and Kranton 2000).

Given the sense of self and community may be important, policymakers should understand how information about the community, and implicitly one's relative standing, directly or indirectly impacts contribution. Existing literature has not yet investigated whether race composition might be a pertinent piece of information upon which people base decisions. Since perceptions and beliefs about the likeliness of others to contribute is a potentially sensitive question, respondents may choose not to answer questions about their beliefs and perceptions truthfully. This effect is known as social desirability bias. In an effort to combat social desirability bias, social scientists have in recent years employed the list survey experiment.

In the standard list survey experiment, respondents are divided into control and experimental groups. Each group is given a list of statements and asked to count how many in total produced a certain emotional response such as anger. The control group is given a list of statements which are not related to the type of bias being studied, such as "professional athletes getting million-dollar-plus salaries", while the experimental group receives the same set of statements with the addition of one sensitive statement such as "a black family moving next door to you" (Sniderman, Tetlock and Piazza 1991; cf. Kuklinski, et al. 1997a).

The list survey framework has been implemented in recent years to test a variety of sensitive subjects for which social desirability bias may occur. This survey methodology offers a potential solution to measurement error due to respondents choosing to answer in ways they believe are 'correct' or socially desirable. These studies range in scope from racial prejudice to political and military preferences and discrimination against homosexuals (e.g. Kuklinski, Cobb and Gilens 1997a; Kuklinski et al. 1997b; Sniderman and Carmines 1997; Gilens, Sniderman and Kuklinski 1998; Kane, Craig and Wald 2004; Tsuchiya, Hirai and Ono 2007; Streb et al. 2008; Corstange 2009; Holbrook and

Crosnick 2010; Janus 2010; Redlawsk, Tolbert, and Franko 2010; Imai 2011; Blair and Imai 2012; Glynn 2013).

This project combines a list survey type experiment into a voluntary contribution game to examine perceptions about race. In particular, we want to know whether information about the demographic composition of respondent's community will be an impactful determinant of the respondent's willingness to contribute to a hypothetical public project. Because direct questioning about this subject is likely to be sensitive and therefore suffer from social desirability bias, the information about demographic characteristics will be embedded in a list type structure, with the control group receiving no demographic information. If it is true that individuals will choose to contribute less frequently when placed into communities which differ in their majority Racial/Ethnic composition to that of the respondent, there is strong evidence in favor of negative strategy selection bias in ethnically diverse communities leading to inefficiencies in public goods provision.

III Survey Design

I embed a list survey experiment into a questionnaire regarding behavior in a voluntary contribution game with a non-pareto optimal free-riding equilibrium. The setup of this survey will allow the investigators to analyze differences in contribution between control and experimental groups, and compare contribution rates for individuals with different characteristics, such as a demonstrated understanding for the rules of the game, or those who were placed into hypothetical communites for which the majority demographic is the same as their own. All respondents are given the following prompt to begin:

> *Suppose that you have been randomly placed in a hypothetical community.*
>
> *Each community member is given $100. Community members will each choose whether to Keep the $100 (K) or Contribute it to a public project fund (C).*
>
> *If more than 50% of the community Contributes (C), each person in the community will gain access to a public investment worth $200. If less than 50% of the community Contributes (C), each person who contributed will lose their contribution, while those who did not contribute have kept their $100.*
>
> *Information about your community will be shown to follow.*

Individuals who are responding to the threat of free-riding behavior as proposed in the literature following Olsen (1968) and Hardin (1968) would have to be able to identify the free-riding strategy as a possible equilibrium. In order to categorize respondents into those who do and do not fully understand best response strategy in the game, I ask the

following two questions regarding the information in the survey prompt:

> Question 1: *The contribution threshold of this game was 50%. If you believed that the contribution threshold would be met, and so the project is successful, the payoff maximizing response would be:*
>
> Question 2: *The contribution threshold of this game was 50%. If you believed that the contribution threshold would* ***not be*** *be met, and so the project is unsuccessful, the payoff maximizing response would be:*

The purpose of this line of questioning is to be able to categorize respondents into two groups which I hereforward call 'informed' and 'uninformed'. We would like to distinguish respondents who understand the best responses in the game from those who are simply guessing. An "informed" respondent will be defined as one who was able to correctly answer the two payoff maximizing *Best Response* questions, while an "uninformed" respondent will be defined as one who answered either of both of Questions 1 or 2 inaccurately, or indicated that they did not know the answer. A comparison of the informed and uninformed groups may ultimately be instructive because it is possible to infer true beliefs from the informed respondents. Those who understand the best responses, or optimal paths of play in the game should only deviate from those paths given certain beliefs about the community. This survey will test whether information about demographic composition of a community is an important factor in the formulation of these beliefs. In total, only 37 respondents (10.53%) correctly answered the best response questions 1 and 2 and were categorized as 'informed'.

As "non-key" items which are not meant to be sensitive to social desirability response bias, the survey provides information about the community, which are exactly reflective of United States averages. All respondents are shown a page displaying information about median incomes and age of the US population (example in figures 18 and 19) as well as statistics about employment and insurance, which are also reflective of US averages (example in figures 20 and 21).

These four pieces of information are meant not to induce any social desirability bias in responses. The experimental groups will see one additional page of information concerning race and ethnicity, which could potentially induce a social desirability effect. There are four experimental groups: primarily White, Black, Asian, and Hispanic. The experimental item added to the survey about demographics is shown in Figure 22. In addition to measuring overall contribution rate, we want to determine whether individuals who were randomized into communities primarily occupied by a different race/ethnicity than their own were significantly less likely to contribute than in the control group, or when the randomized community matched the race/ethnicity of the respondent.

Following the information about US averages, and either the addition or absence of a page about demographic information, Question 4 asks respondents whether put in this position, they would choose to Contribute (C) or Keep

(K) the $X (in this case $100). Question 5 follows up by providing a free response box in which respondents can explain their decision whether to Contribute or Keep.

To adhere to the list survey methodology, respondents are asked a question which is the basis for the standard item count analysis. Question 5 asks respondents in the control group:

> Question 5: *Of the following pieces of information: income, age, employment, insurance status, how many were influential in your decision to Contribute or Keep the $X?*

Respondents in this group may input any answer 0-4 inclusive. In the experimental group, respondents receive the prompt:

> Question 5: *Of the following pieces of information: income, age, employment, insurance status, demographics how many were influential in your decision to Contribute or Keep the $X?*

Respondents in the experimental groups may input any answer 0-5 inclusive. Using the list survey methods suggested in Blair and Imai 2012 and also implemented in Tsai 2019, we can test the collected item count data in order to determine whether, on average, the addition of the demographic information was impactful on individuals' contribution decision.

Questions 6 and 7 ask for the race and ethnicity of respondents as defined by US Census categorizations: White, Black, Asian, Native, Other for Race and Hispanic/Non-Hispanic Ethnicity, respectively. Question 8 asks respondents genders among the possible categories: Male, Female, Other/NonBinary/Prefer Not to Respond.

Finally, Question 9 asks respondents to imput their declared major, or "undeclared" if they have not yet chosen. The purpose of these questions is twofold. Collecting this individual specific data allows us to test whether there are any systematic differences in how respondents contribute to the public fund in a game with a unique, non-optimal equilibrium based on race, ethnicity, gender, or field of study. We are also interested in knowing whether one's own Race and/or Ethnicity in comparison to the demographic composition of the community is impactful in determining contributions.

Figures 14- 15 and 18- 22 of the Tables and Figures section show the survey information as displayed to all respondents. These pages include a preamble as required by IRB, a prompt for the survey question, and the Income, Age, Employment and Insurance statistics. All respondents were given the same information except that in the control group, there was no Figure 22 displaying any demographic information and respondents were taken directly to the next step instead. Figures 16- 17 and 23- 29 show the response questions of the survey as they were displayed to the students. All respondents in both the control and experimental groups received the questions displayed in these Figures.

IV Recruitment and Survey Distribution

Respondents were sampled from Colorado State University, primarily in the Economics department with one introductory level course from Political Science also participating.[1]Recruiting was conducted via email. I contacted course instructors to determine their willingness to participate in this survey. Instructors who were willing to have their classes participate sent me their student email lists to be randomized into Control and Experimental groups and sent the link to participate in the survey. The survey was usually conducted during class time, guided by the course instructor. In some cases, the survey was completed by students who were not present in class on the day the survey was distributed. None of the principal or ancillary investigators of this project were present at the time of survey distribution to reduce any additional response bias created by our presence.

In total, 350 students at Colorado State University participated. Among the 350 participants were 26 Economics majors and 324 non-majors. In the US Census Race categorization, 283 (80.86%) of respondents identified as White, while in the US Census Ethnicity categorization, 57 (16.29%) of respondents indentified as Hispanic. Respondents identified as 50.29% Male, 47.71% Female and 2.0% Other/Nonbinary/Prefer Not to Respond. The demographic distribution of the sample is reasonably close to official CSU demographic statistics. According to Colorado State's Office for Institutional Research, the student body is on average 69.2% White and 14.4% Hispanic, while 45.8% Male (https://www.ir.colostate.edu/data-reports/).

V Results

There are four main research questions to be answered from the data:

1. Is information about demographic composition of communities impactful on individuals' contribution decision?
2. Does overall contribution rate change in the presence of demographic information about the community (in the treated group)?
3. Does contribution among the informed group differ from contribution among the group who does not understand best responses of the game? If so, how does the demographic information impact response rates between the groups?
4. Does contribution of respondents who are randomized into groups of similar race/ethnicity to their own differ from those who are randomized into groups racially or ethnically different than their own?

[2]A wider range of courses at Colorado State University were contacted to participate, but only Economics courses and one Political Science course responded.

Is Demographic Information Impactful to the Individual's Decision?

While all four of these questions can be answered in part using difference in means analysis, there are concerns about the statistical power of such estimates, leading to concerns about the size of standard errors. Blair and Imai 2012 suggest implementing either linear or likelihood estimation methods which can restore statistical power. To test the importantce of the potentially sensitive item count question, Imai 2011 develops a multivariate regression estimator:

$$Y_i = f(X_i, \gamma) + T_i g(X_i, \delta) + \varepsilon_i$$
$$\text{where } E(\varepsilon_i | X_i, T_i) = 0$$
$$\text{and } (\gamma, \delta) \text{ is a vector of unknown parameters}$$

In this specification, Y_i is the number of indicated 'important' items from the item count to the respondent's decision. The functional form $f(X_i, \gamma)$ measures the number of non-sensitive items which the average respondent would find important, conditional on observed characteristics X_i of the respondents, in this case, Race, Ethnicity, Gender, Declared Major, and 'Informed/Uninformed' status. The $g(X_i, \delta)$ form measures on average what percentage of respondents in the experimental group were influenced by the potentially sensitive item. This method allows the reseracher to choose between linear, nonlinear and maximum likelihood specifications. For ease of interpretation, I present the results of a linear item count specification in Table 43. I find that both the gamma and delta measures are statistically significant, and that about 36.6% of respondents in the experiemntal group were influenced by the existence of the demographic information. Among all respondents, the predicted number of important non-sensitive items (out of 4 possible) was 1.78.

From this information, we can draw two conclusions. First, given that the average respondent found about half of the non-sensitive items important for their decision making on whether or not to contribute, we can surmise that in general information about one's community is important for making the decision whether or not to contribute. Further, for over 1/3 of respondents in the experimental group, demographic information is important. This leads the experiment to conclude that race/ethnicity *is* an important factor that people may consider when assessing the desirability of a public project.

Does Demographic Information Alter Contribution?

Among all respondents, 243/350 (69.43%) chose to contribute to the public project. Figures 30 and 31 show the rate of overall contribution, while Figures 34 and 35 demonstrate that among both control and experimental groups, contribution was the most likely outcome. For demonstrative purposes, I include word clouds for the written responses given by respondents as figures 32 and 33. Among contributors, terms such as "good, help, community" appear more

frequently than in the non-contributors, where terms such as "risk, money and investment" are more common. Marwell and Ames (1980) conclude that behavior of subjects in voluntary contribution games "is robust to a variety of changes in parameters. [. . .] Even when (the changes in parameters) are duly considered; and appropriate adjustments made in the setting, the power of the "free-rider" hypothesis accurately to predict behavior remains severely limited. Subjects persist in investing substantial proportions of their resources in public goods despite conditions specifically designed to maximize the advantage of free riding and thus minimize investment. The data thus continue to call into question the power of the theory" (Marwell and Ames 1980).

The contribution rate overall seems to justify the conclusion that free-riding behavior, while the Nash equilibrium in weakly dominant strategies, is not the most common strategy choice among respondents. This result could have important implications on public policy. One type of policy implication lies within the realm of environmental and resource sustainability where the Prisoner's Dilemma framework has been frequently used to imply that since actors cannot trust each other to do what would be best for all in the long run, each individual actor has incentive to exploit nature and society as much as possible for their own benefit in the short term (Hardin 1968). Although this experiment is not a true prisoners' dilemma due to the weak vs. strong dominance, the two similar games share the feature of non-optimal predicted equilbrium behavior. From a business perspective, "[. . .] using the rhetoric of the prisoners' dilemma: 'How can we, in our organization, trust that others will follow our ethical example? If they do not, we will lose.' The hidden meaning here is that self-benefit as a driver of sustainable development is not convincing enough to really influence the strategy of a single organization. Repeating the prisoners' dilemma often enough is a way of falsely cementing this mind-set as a matter of common sense" (Robert and Broman 2017).

Similar logic applies in the case of public funding projects. Previous economic literature identifies a "suburban free-riding" phenomenon where suburban policymakers rely on central city resources to build and fund partnerships with immigrant organizations in their own jurisdictions (De Graauw, et al. 2013) , a free-riding effect in the public finance of R&D (Heijs 2003), in pooled public debt (Jordahl and Liang 2010), and general free-riding behavior in a variety of public goods experiments (Fischbacher and Gachter 2010). These results, if followed by policymakers, could end up leading to sub-optimal public investment on the premise that decision makers will choose the free-riding strategy, reducing or eliminating any benefits of the investment.

Perhaps most famously, Samuelson (1954) noted that some goods, once they are made avilable to one person, can be consumed by others at no additional marginal cost. Therefore, in standard price theory, in which price tends to equate to marginal cost, such goods should have a zero price (Hardin 2003). This logic leads to a potential undervaluation from local policymakers on nonrivalrous public resources such as public parks and green space. However, under a paradigm in which free-riding is not the equilibrium behavior chosen, minimizing public investment into public goods or funds does not appear to be as favorable a policy prescription.

We want to test whether overall contribution falls in the presence of demographic information. Somewhat contrary

to the conflict/inefficiency hypothesis, rates of contribution actually increased in the experimental group as compared to the control. In the control group, 60.34% of respondents contribute, while in all experimental groups combined the contribution rate is 71.23%. Using a one sided, unpaired T-test of the hypothesis that (Control Contribution - Experimental Contribution > 0), we are able to reject the hypothesis at a significance level of about 6%. While the two rates of contribution don't differ too drastically between the groups, we can be relatively certain that overall contribution is actually higher in the experimental groups.

If so, this would contradict the conflict/ineffiency type of hypothesis which suggests that more racially diverse communities have a harder time organizing to contribute to public funds. We cannot rule out the possibility of some social desirability bias, such that individuals feel morally obligated to contribute. But its not clear that the introduction of demographic information in the experimental groups should or did impact this feeling of obligation. It could also be that the introduction of demographic information allows respondents to experience a sort of 'moral satisfaction' as a result of their decision to contribute (Kahneman and Knetsch 1992). These feelings are also at odds with the pure free-riding theory found in other economic and environmental work. A perceived relationship between contribution and morality seems to exist, and the stronger that relationship to the respondent, the higher likelihood of contribution (Frey and Torgler 2007).

Does the Contribution Rate Differ for the 'Informed'?

The impact of the potential for free-riding behavior on individual decision making must also be influenced by individuals' ability to identify that possibility. The first research question of interest considers the true beliefs of informed respondents, that is, respondents who accurately answered Q2 and Q3 concerning the profit-maximizing best responses in this game. In the test group, 10.539% of respondents accurately answered the two questions concerning profit maximizing response conditional on the belief that the threshold would/would not be met. Among 'informed' respondents, only 43.24% contribute to the fund, compared to 72.52% of the 'uninformed' respondents. Using an unpaired T-test incorporating unequal variances for the two groups, we can reject the hypothesis that the rate of contribution in the informed and uninformed group is equal with a confidence interval of $> 99\%$.

This is an interesting result because it suggests that the threat of freeriders could be an influential factor in individuals' decision making among those who identify that free-riding is the weak dominant strategy Nash equilibrium. Among all respondents, 72.57% answered that the best response if the threshold would be met would be to contribute. In reality, if the threshold is met, all individuals have access to the $200 fund regardless of contribution. Although in this case, Keep is only a weakly dominant strategy, there is also the possibility that the beliefs would be incorrect and the threshold would not be met, introducing risk to the equation. Although there was no question in the survey to directly determine these beliefs, it appears clear that those who understood the threat of freeriding were much less

likely to contribute. As a result, additional economic research should study beliefs about freeriding given community composition. If respondents see certain types of individuals or communities as more likely to be freeriders, it is probable that overall contribution rates will fall.

In this vein, it becomes important for policymakers to think critically about the information which is being provided to respondents, and framing that information within a context of cooperation, or need, rather than self-interested maximization. "Given the power of framing, policymakers could encourage more deliberate and complex approaches toward forming opinions on universal health care in an attempt to avoid the influence of racial biases. For example, racial frames may activate free riding stereotypes such that individuals improperly assume Black individuals are free riders of governmental systems, such as universal health care. However, if race is salient, but this free riding stereotype is countermanded by information about the individual's need, the effect of racial attitudes on policy support may be reduced. By framing universal health care rhetoric to provide more explicit information about the degree to which people (Black or White) need universal health care, policymakers may reduce the effects of subtle racial prejudice on attitudes toward universal health care" (Shen and LaBouff 2016).

This literature highlights the importance of information and framing in the promotion of funding for public goods and services. In this sense, similar to previous lab experiments in economics and public policy, many respondents are 'conditional cooperators' whose contributions to public funds are correlated with their beliefs about the average group contribution (Chaudhuri 2011). To garner support for future publicly funded projects, policymakers could focus on providing information to communities which highlights the need for and/or support for the project among all community members.

Are Individuals More Willing to Contribute Within their Group?

Beliefs about the average group member's contribution may also depend on the respondent's Race or Ethnicity as compared to the demographic composition represented in the experimental group. In total, 71 respondents (20.29%) were randomly sorted into hypothetical communities fror which the majority demographic matched their own. Among this group, 81.69% contributed as compared to only 66.31% of those who were randomized into groups for which the majority demographic composition was different than their own. Using an unpaired one-sided T-test, we can reject the hypothesis that contribution among those in communities of composition different to their own is higher with a confidence interval of $>$99%. Among experimental groups, the highest rate of contribution occurs among all individuals in the group represented as majority White (75%) while the lowest rate of contribution occurs among all individuals in the group represented as majority Black (65%).

Among all sub-groups studied, the same-race/ethnicity group had the highest overall rate of contribution (81.69%). This outpaced rates among the 'uninformed' (72.69%), the experimental group (71.23%) and the control (60.34%). So

while it is true that overall response rate was higher in the experimental groups than in the control, individuals seem to be most likely to contribute when the demographic composition of the community matches their own indicated Race/Ethnicity. This result is more amenable to the conflict and inefficiency types of hypothesis which have arisen in the literature. If indivduals are less likely to contribute to or vote for public funds when the demographic composition of the community differs from their own, it could be in part an explanation as to why there is lower spending on important public goods and services such as roads, sewers, parks, etc... in diverse and especially non-White neighborhoods.

Darity, et al. (2006) suggest that "the intensity of racial identity, as well as the incentives for racial conflict, is very much related to the large inequities in material resources that are everywhere present in American society" (Darity 2006 pg. 302). Therefore, individuals may have incentive to expand the overall wellbeing and access to public services of their own Race/Ethnic group as a means of pursuing additional economic opportunity. Additonal explanations might center around a heightened sense of charitability, moral duty, or otherwise 'warm glow' giving (Andreoni 1990) among those placed into communities with majority race/ethnicity matching their own, combined with the possibility that those in different race/ethnicity groups than their own could perceive a sense of social exclusion resulting in lower contribution (Akerlof and Kranton 2000).

VI Conclusions

This paper presents a list survey experiment designed to model behavior in a voluntary contribution game with a unique, non-pareto optimal equilibrium. The first research question uses the item count technique to determine whether the inclusion of demographic information is impactful to the indivdual's contribution decision. I find that the demographic information is potentially impactful on respondents' decisions. Using the methods from the list survey literature, I present an item count model estimating that about 36.6% of respondents in the experimental group found the sensitive item, demographic information, impactful. This finding has important policy implications, because it indicates that people may be more pessimistic of others' contribution rates in more communities where the majority race or ethnicity differs from their own, leading to lower rates of contribution among respondents, or reduces support for public funds. This could in turn explain the observation that more diverse communities often have lower tax and spending alongside worse quality public goods and services.

The second research question posits whether, among respondents who understood the best responses of the game, information about demographics of the community would impact contribution rate. Somewhat counterintuitively, in the test group adding information about community demographics increases contribution rate when the community's demographics are different from the respondent's. This refutes the hypothesis that individuals would be unwilling to contribute to public projects if they feel that the profits from the project would be shared with other groups outside of

their own race/ethnicity.

From this hypothesis, further study would be warranted into how information about individual's profits may impact contribution to public projects. In the test group, informed respondents were much less likely to contribute than the uninformed. This result may closely mirror reality in the sense that those who do not understand the potential benefits of a public project may be less likely to be in favor.

The third research question attempts to discern whether demographic information is meaningful at all in the decision to contribute. The addition of the list survey methodology discussed above will help to determine whether the existence of the information is meaningful, and in a larger sample, we can determine the direction of the result. In a very small sample, it would appear that the existence of this information actually is meaningful, but not in the expected direction. Instead, this demographic information may increase contributions due to some sense of helping or believing in others. As a result, this research question is most sensitive to social desirability bias. For further research, it would be interesting to place respondents into actual communities to see whether people will actually be willing to contribute with real money on the line. Doing so, however, requires coordinating groups of respondents to generate communities with differing racial compositions.

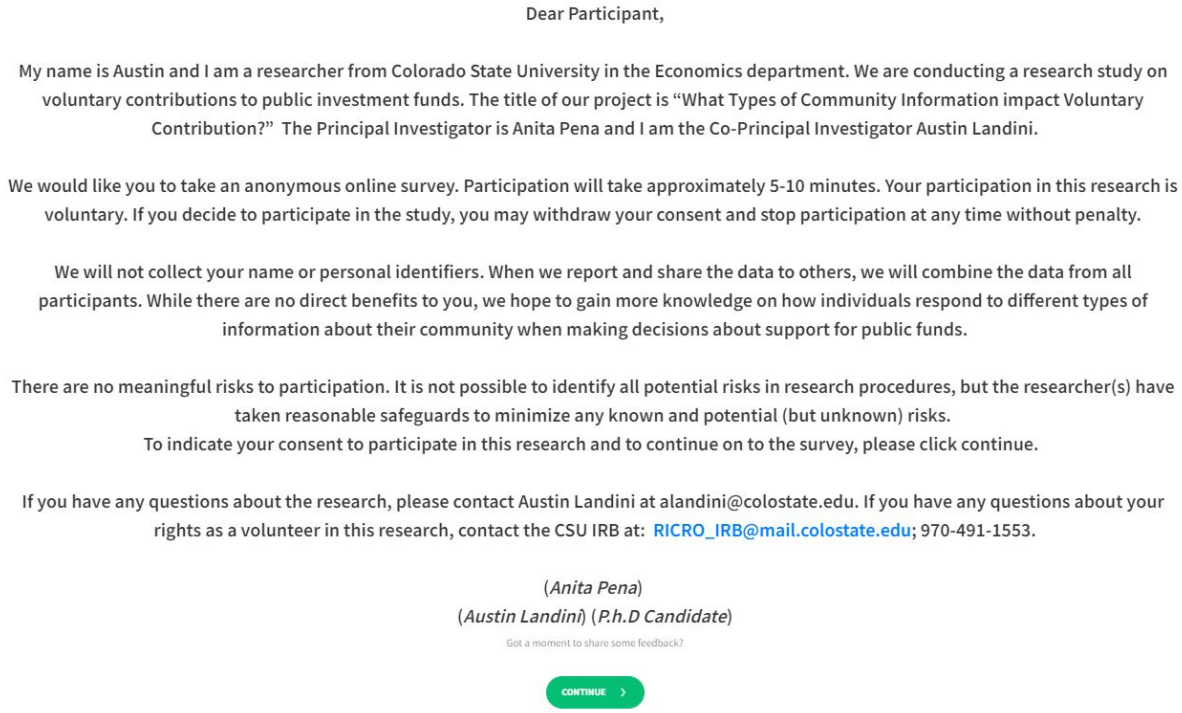
Finally, since being informed about the payoffs of the game is not beneficial in terms of generating higher contribution rate, it would be interesting to determine whether this disparity is created by a type of social desirability bias. This additional question could be tested by comparing the results of the list survey format to those derived from a live experiment. It is possible that in reality, with money on the line, informed respondents would behave more similarly to the uninformed, who had a much higher contribution rate in the sample.

These results have potentially important implications for understanding how individuals react to information about their community to make decisions about contributions to public funds. The 'conflict and inefficiency' hypothesis in Economics suggests that public goods provision could be below optimal levels in more diverse and especially non-White communities due to 1) differing preferences, 2) failure to coordinate/communicate or 3) due to unwillingness to share the benefits outside of own community. However, previous research fails to find strong evidence that preferences over types of goods and services differ drastically between racial or ethnic groups (Habyarimana 2007). In particular, I test the third mechanism in the fourth research question of interest.

The final research question asks whether individuals are more willing to contribute to the public fund when the majority racial/ethnic composition matches their own. The results of this experiment do potentially support the conclusion that respondents are most willing to contribute when the benefits from contribution will be shared mostly within their own racial or ethnic group. In Chapters 2 and 3 I argue that more non-White areas feature in general less tax and spending over time. Individuals may then have incentive to contribute to a higher degree within their own group in order to expand the economic opportunities available locally to the group. The 'conflict and inefficiency' type of hypothesis in Economic literature surrounding Alesina (1999) does not appear to hold, that is, we do not find evidence in

favor of higher tax and spending but lower levels of productive public goods. However, we do find potential evidence of a separate sort of conflict and inefficiency hypothesis which is that contribution to public funds could be higher in less diverse groups as a result of individuals' desire to contribute to funds which expand their own and their group's economic opportunity.

In response, local policymakers may be able to expand interest and contribution into public funds with more targeted information regarding the benefits of the public project to individuals which comprise the population, and the benefits these projects will have to individuals and their smaller communities. However, in recent decades bargaining power has been shrinking for the less affluent but increasing for the most affluent earners (Levy and Temin 2007; Volscho and Kelly 2012; Jacobs and Dirlam 2016; Manduca 2018). . With this in mind, policymakers must be careful not to promote public funding and projects which are accessible primarily to the higher bargaining power groups. Disproportionate access to new and ongoing public projects produced by residential segregation tends to produce and expand sharp differentials in status and well being between neighborhoods (Massey 2020). Therefore, public policymakers must balance the need for clear information regarding fundraising for public projects with the tendency of individuals to most actively support initiatives which expand their own group's interests.


Dear Participant,

My name is Austin and I am a researcher from Colorado State University in the Economics department. We are conducting a research study on voluntary contributions to public investment funds. The title of our project is "What Types of Community Information impact Voluntary Contribution?" The Principal Investigator is Anita Pena and I am the Co-Principal Investigator Austin Landini.

We would like you to take an anonymous online survey. Participation will take approximately 5-10 minutes. Your participation in this research is voluntary. If you decide to participate in the study, you may withdraw your consent and stop participation at any time without penalty.

We will not collect your name or personal identifiers. When we report and share the data to others, we will combine the data from all participants. While there are no direct benefits to you, we hope to gain more knowledge on how individuals respond to different types of information about their community when making decisions about support for public funds.

There are no meaningful risks to participation. It is not possible to identify all potential risks in research procedures, but the researcher(s) have taken reasonable safeguards to minimize any known and potential (but unknown) risks.
To indicate your consent to participate in this research and to continue on to the survey, please click continue.

If you have any questions about the research, please contact Austin Landini at alandini@colostate.edu. If you have any questions about your rights as a volunteer in this research, contact the CSU IRB at: RICRO_IRB@mail.colostate.edu; 970-491-1553.

(*Anita Pena*)
(*Austin Landini*) (*P.h.D Candidate*)

Got a moment to share some feedback?

CONTINUE ›

Figure 14: Survey Preamble

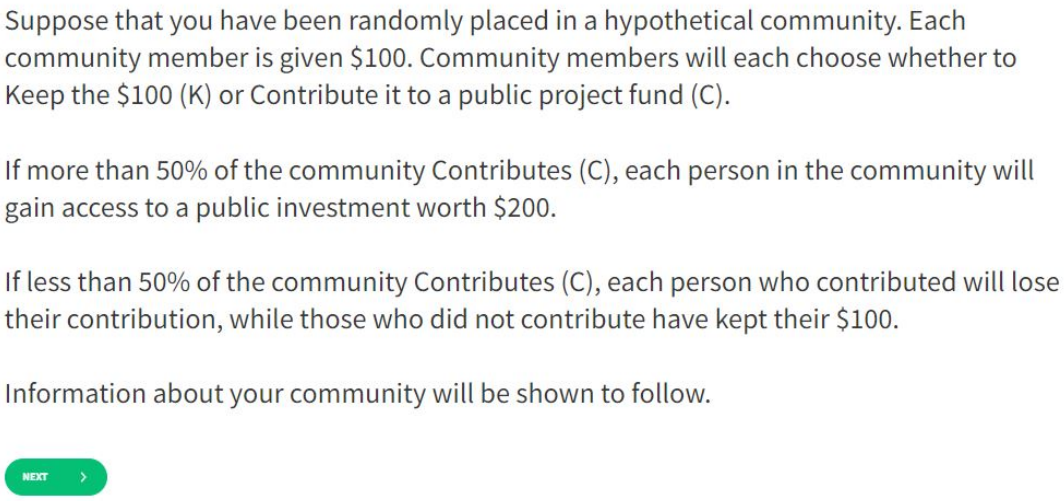


Figure 15: Survey Information Prompt

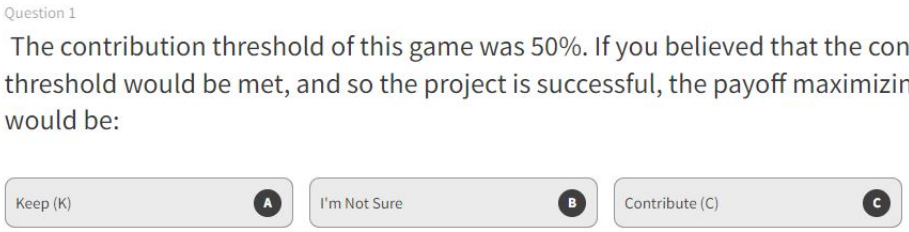


Figure 16: Survey Question 1

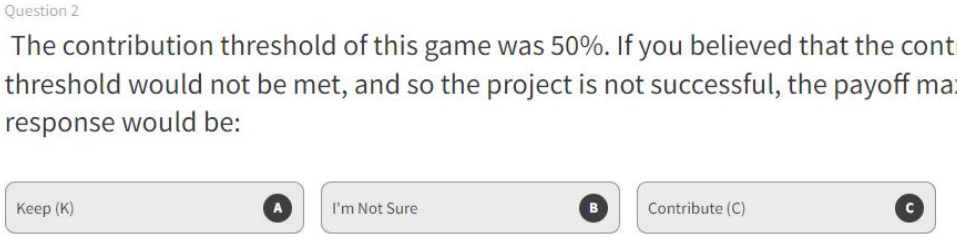


Figure 17: Survey Question 2

Median household income in the community is about $65K.

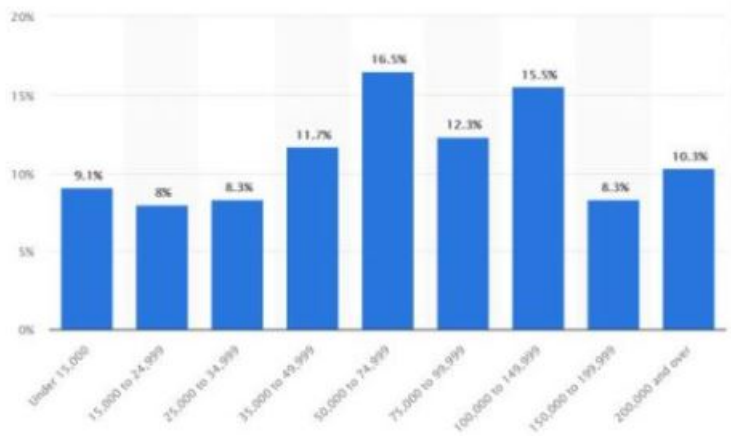


Figure 18: Survey Income Information (All Surveys)

The median age in the community is about 38 years.

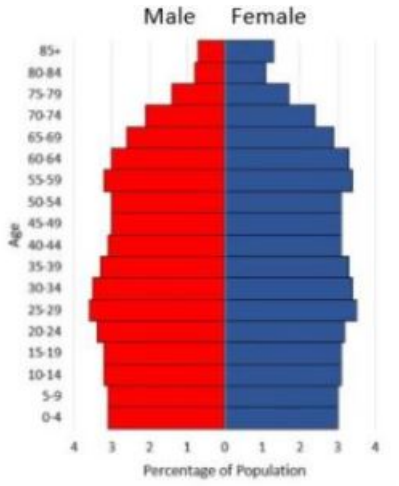


Figure 19: Survey Age Information (All Surveys)

Among the community, 51% are employed, 5% unemployed, and 44% are not in the labor force.

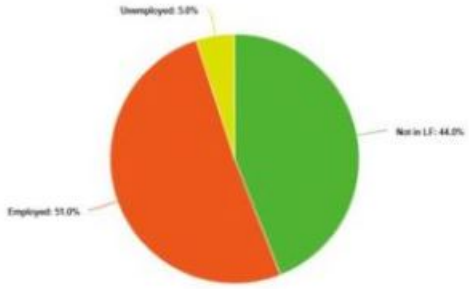


Figure 20: Survey Employment and Unemployment Information (All Surveys)

Among the employed, 18.2% do not have health insurance, while among the unemployed, 51% are without health insurance.

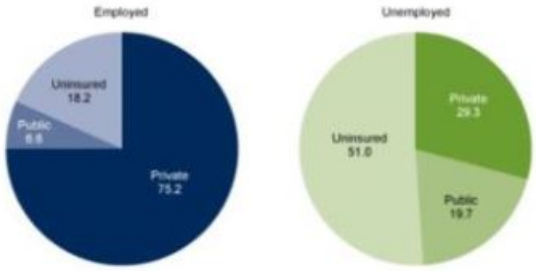


Figure 21: Survey Insurance Information (All Surveys)

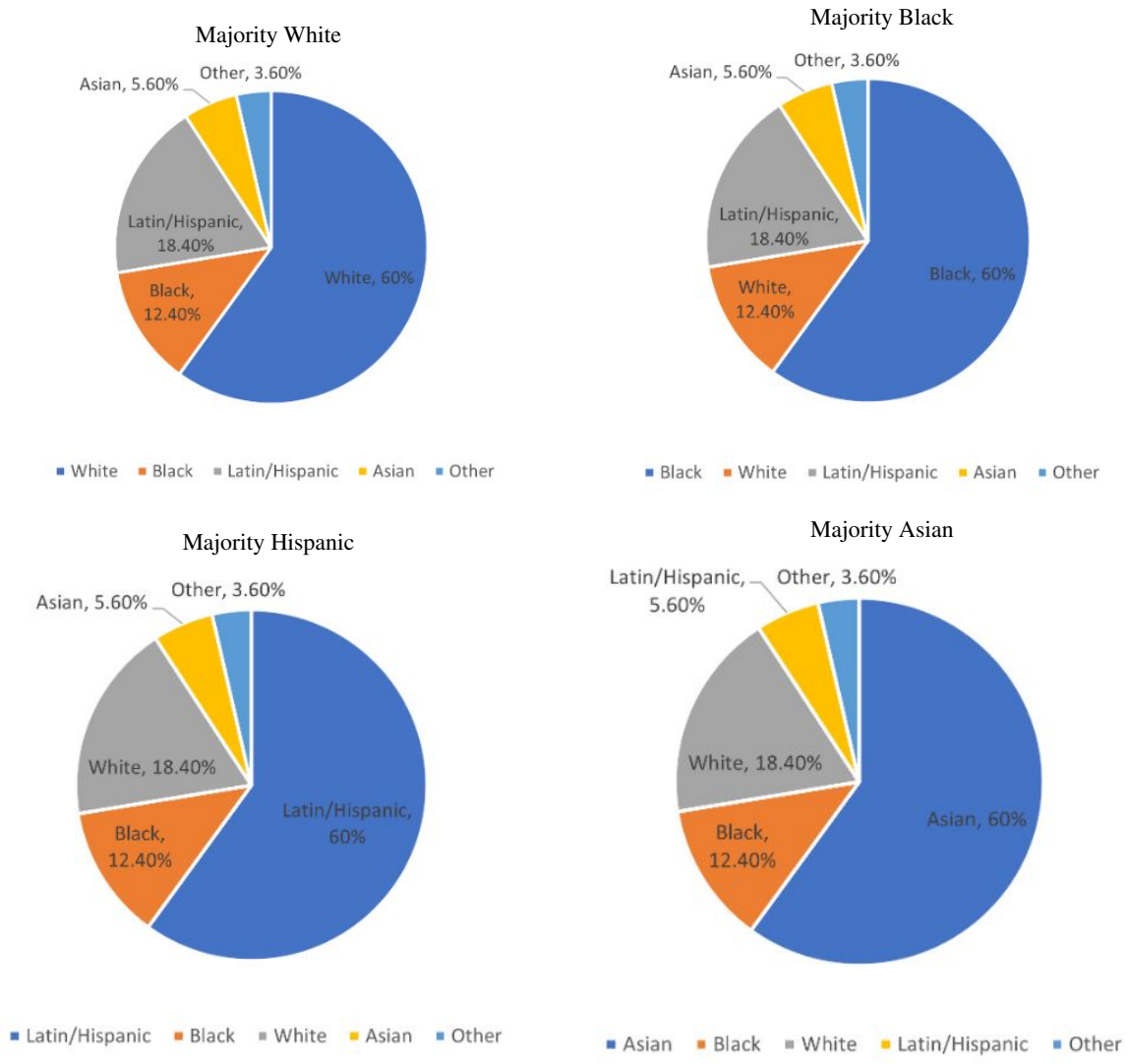


Figure 22: Demographic Experimental Groups

Figure 23: Survey Question 3

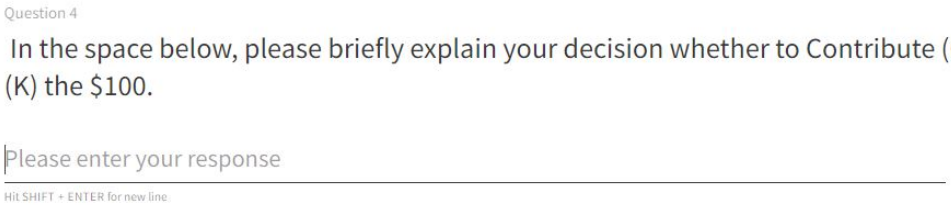


Figure 24: Survey Question 4

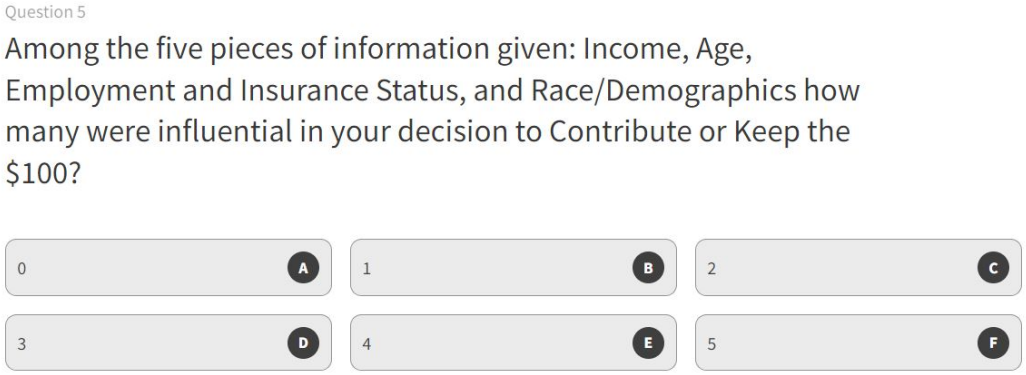


Figure 25: Survey Question 5

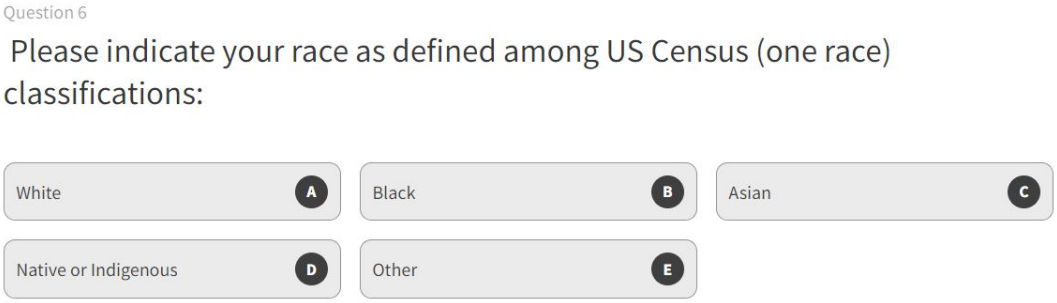


Figure 26: Survey Question 6

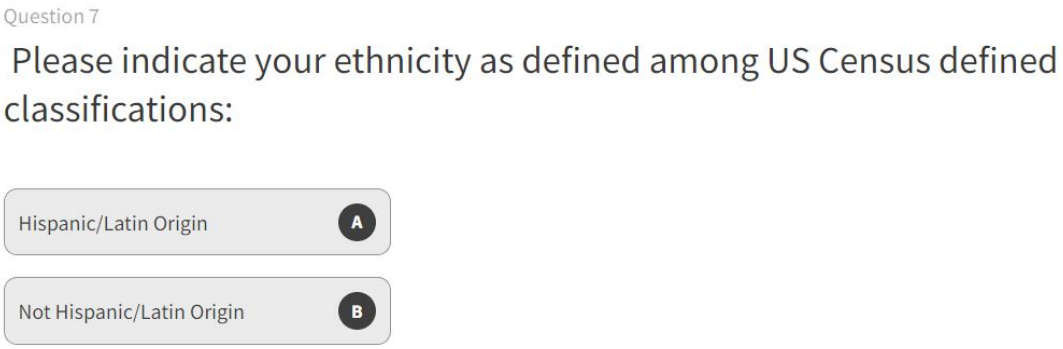


Figure 27: Survey Question 7

Figure 28: Survey Question 8

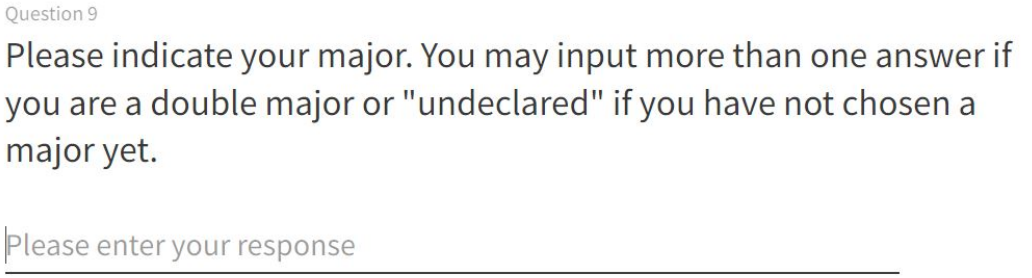
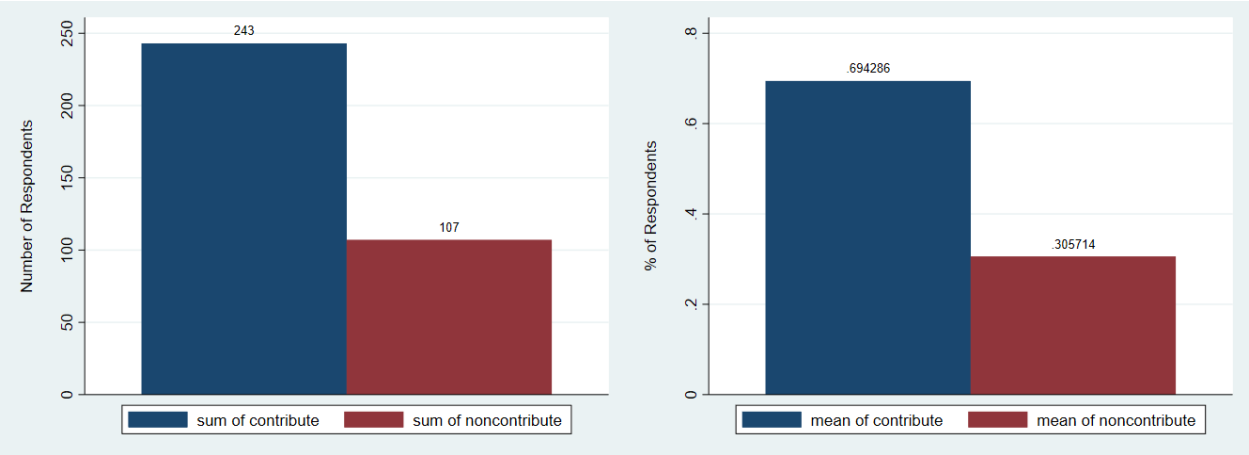


Figure 29: Survey Question 9



(a) Overall Contribution (b) Percent Contribution

Figure 30: Overall and Percentage Contribution in Test Group

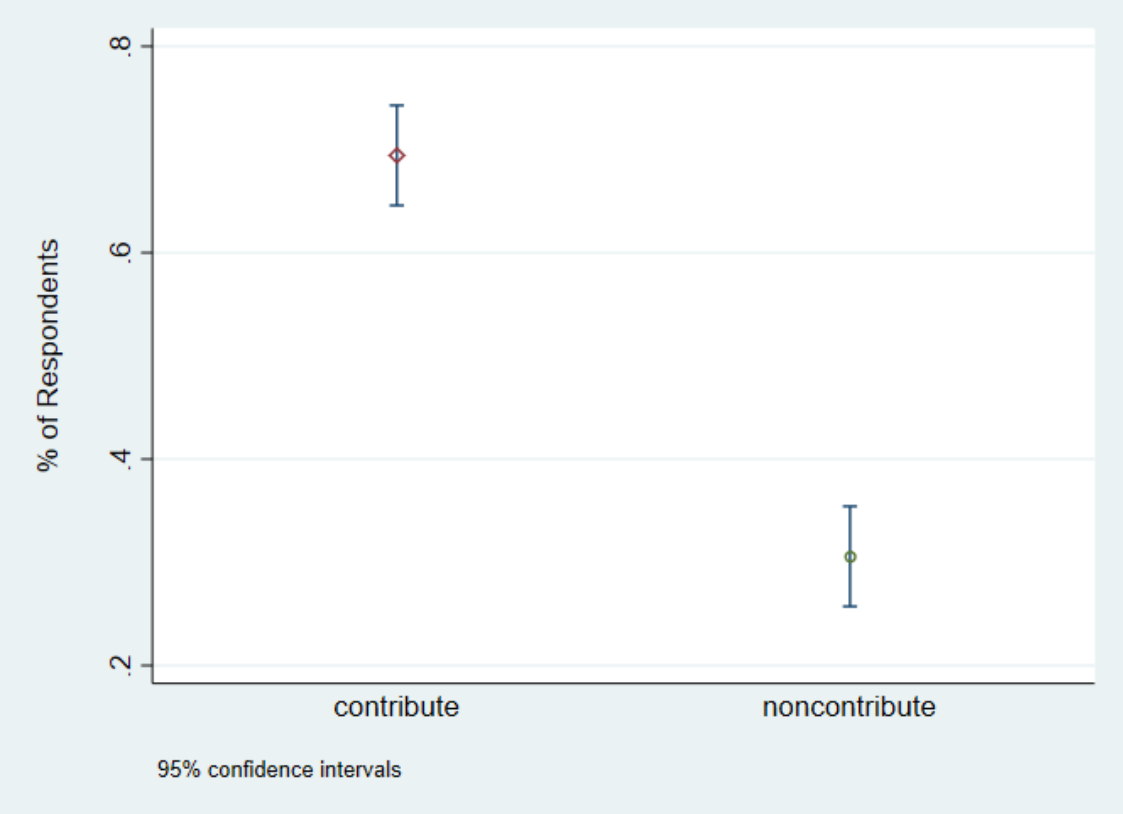


Figure 31: Confidence Intervals on Contribution and Non Contribution

Figure 32: Contributors' Word Cloud

Figure 33: Non-Contributors' Word Cloud

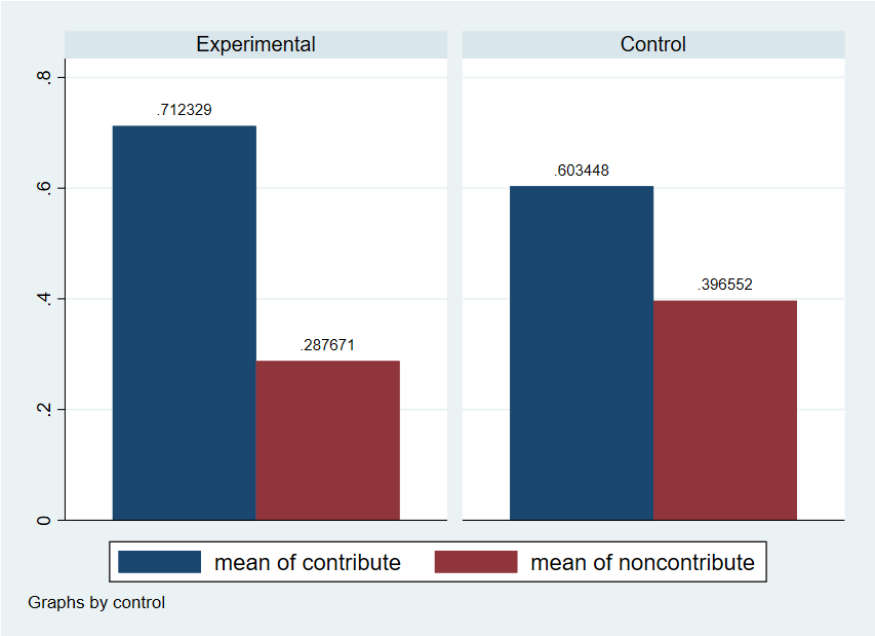


Figure 34: Contribution Rates in Experimental vs. Control Groups

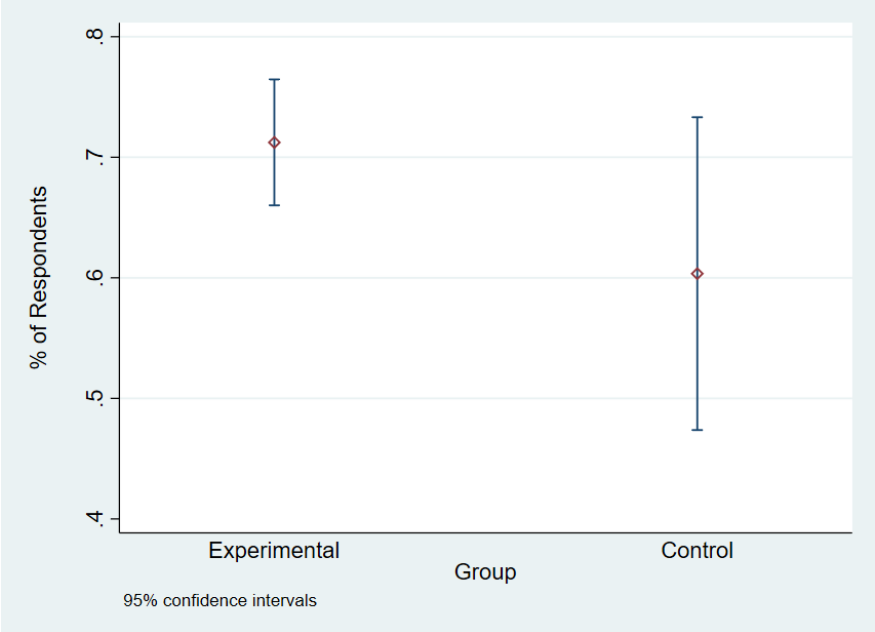


Figure 35: Confidence Intervals on Contribution by Control vs. Experimental

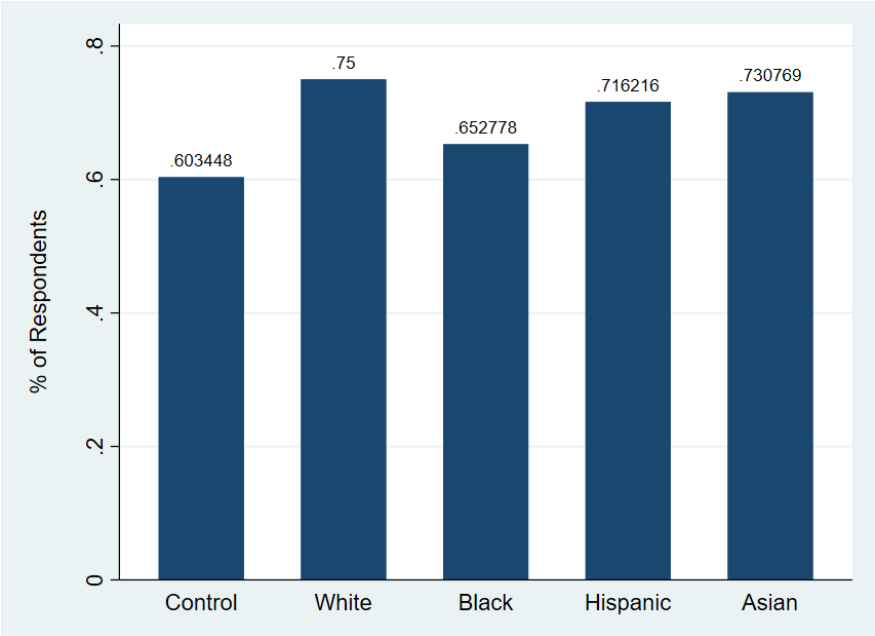


Figure 36: Contribution by Community Type

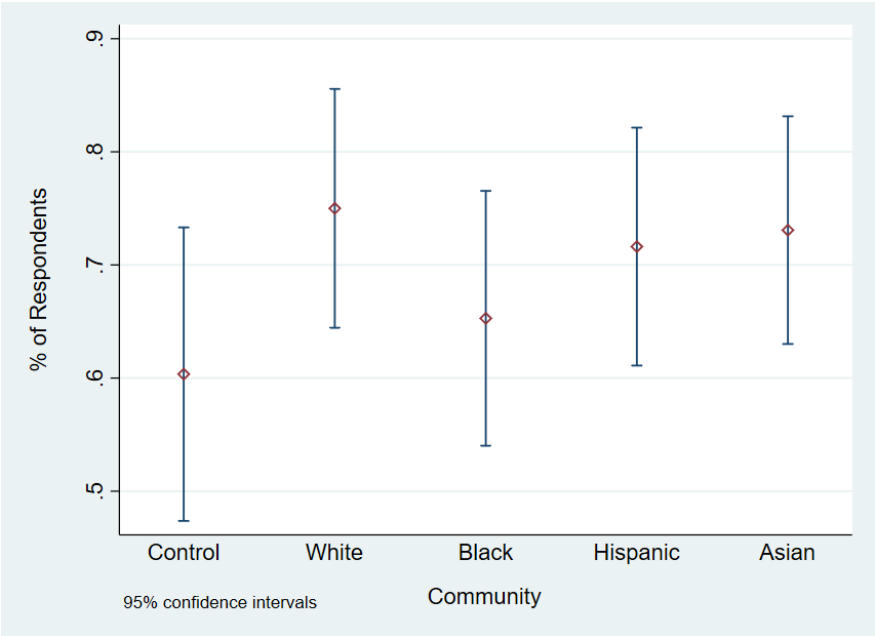


Figure 37: Confidence Intervals on Contribution by Community Type

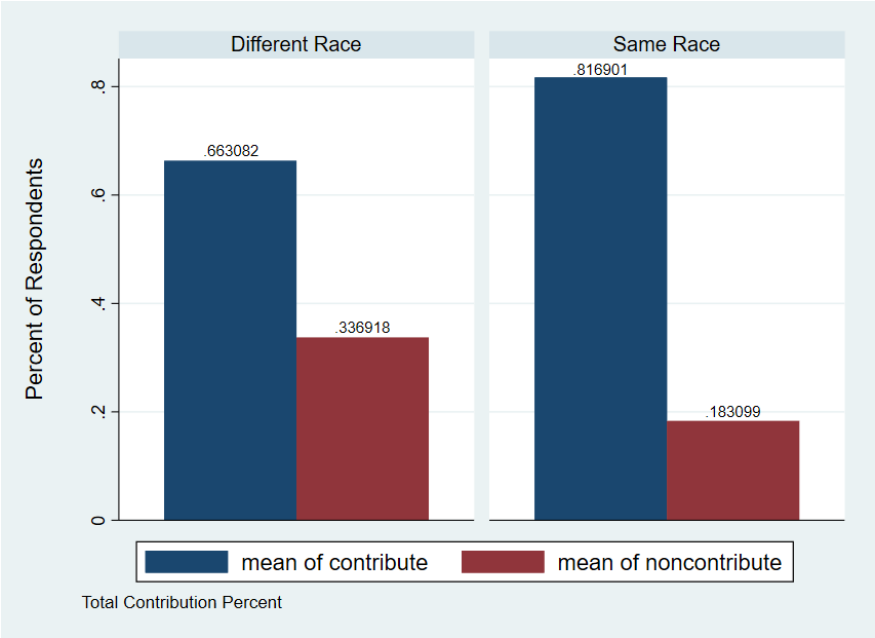


Figure 38: Contribution by Same vs. Different Race Group to Respondent

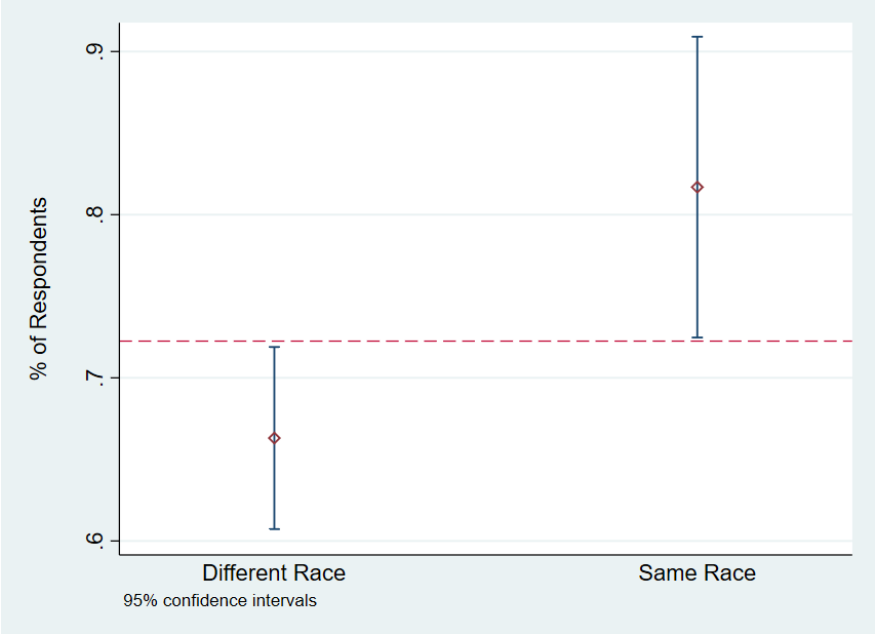


Figure 39: Confidence Intervals by Same vs. Different Race Group

Table 42: OLS Regression on Contribution

	(1) contribute
control	-0.085 (0.071)
Item Count	0.016 (0.018)
white	0.052 (0.062)
male	-0.151** (0.048)
samerace	0.115* (0.055)
informed	-0.274** (0.087)
Constant	0.713*** (0.074)
Observations	348
R^2	0.090
F	6.600

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 43: Imai (2019) Analysis of Item Count

	Item Count
Delta	
Constant	0.366** (0.168)
Gamma	
Constant	1.776*** (0.146)
Observations	348

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

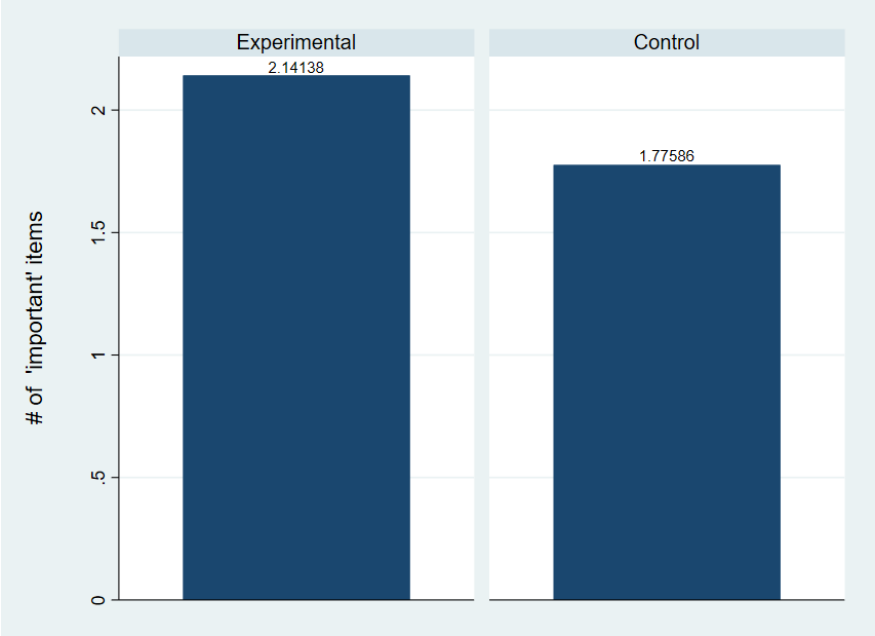


Figure 40: Count of ‘Important’ Items by Control vs Experimental

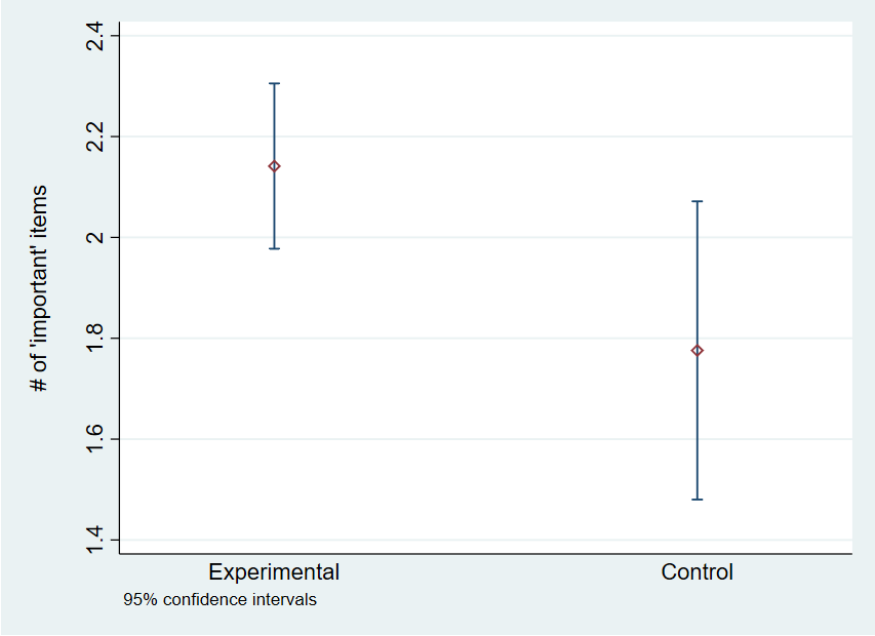


Figure 41: Confidence Intervals on Item Count

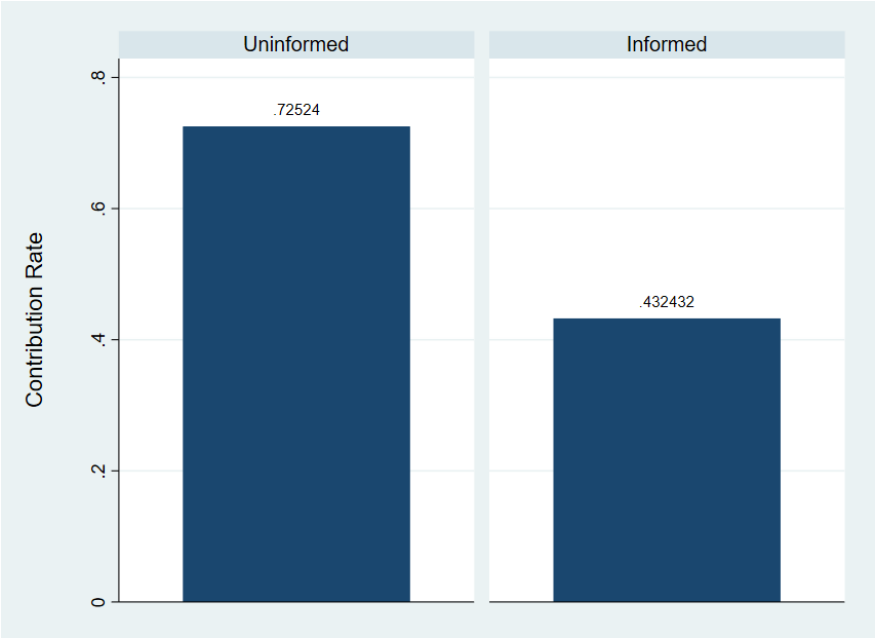


Figure 42: Contribution by ‘Informed’ vs. ‘Uninformed’ Respondent

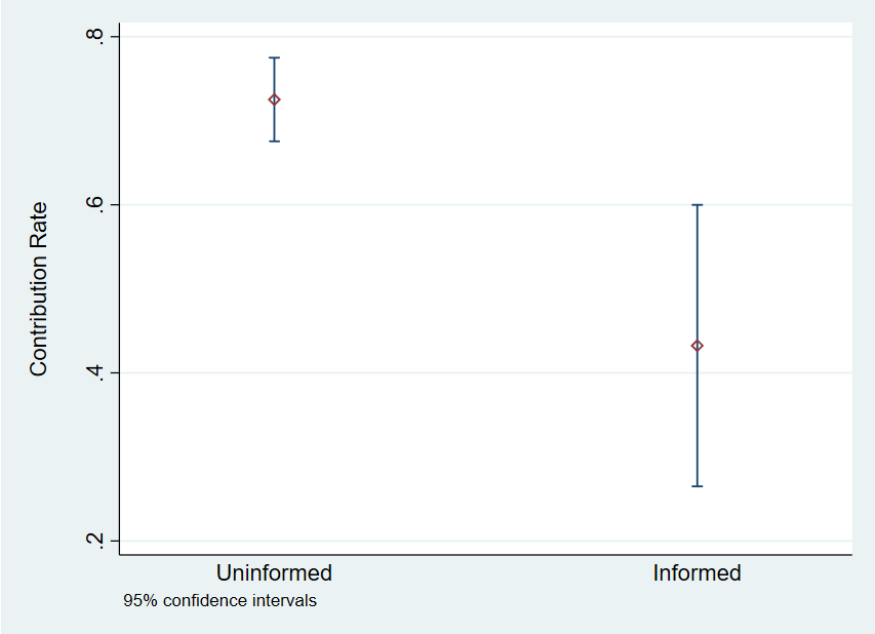


Figure 43: Confidence Intervals on ‘Informed’ vs ‘Uninformed’

Chapter 5- Conclusions

This work in this dissertation is a response to a conflict and inefficiency hypotheis in standing economic literature which finds that more diverse geographic areas feature higher tax and expenditure per capita, but lower spending on public goods and services such as roads, sewers, and parks. In Chapter 2, I demonstrate that the relationship between demographic change and local tax/spending is endogenous due to unobserved factors such as bargaining power, culture, and political representation and neighborhood preference which are all time variant. Accounting for the potential endogeneity using first differences, and instrumental variables, I find that the relationship between changes in racial heterogeneity and changes in tax and expenditure per capita is negative for US Census Places of over 25k population.

As an academic implication of this result, the conflict and inefficiency type hypothesis found in the literature is flawed. Instead of having a larger pool of taxation from which to spend, which is spent ineffiently, more diverse communities actually have a reduced tax basin over time as well as lower income per capita which likely contributes to the lower rates of spending on public goods and services. Historically, unsuccessful policy approaches have tried to cover up urban blight with band-aid policies such as community restoration and gentrification. Instead, policymakers should look to combat urban decay proactively with policies that expand economic opportunites such as education, employment, and access to both human and financial capital. These policies should be implemented at the local level in response to changes in community characteristics over time in order to avoid residential segregation along racial, ethnic and income lines.

In order to implement these policies, policymakers need to understand how demographic transition is occuring over time in their localities, and how demographic change impacts access economic opportunity in their area. The first issue lies in defining economic opportunity. Following Chetty, et al. and Opportunity Insights, I demonstrate in Chapter 3 that US Census Tracts in Colorado which diversified (increased in Black non-Hispanic and Hispanic populations) performed worse across a variety of opportunity measures including personal income, poverty, education, teen birth rate, and homeowner value. This negative relationship holds across a variety of model specifications including OLS, first difference, panel fixed effects, and instrumental variables. While this held true in general for diversifying Tracts, there were clear differences in the ways in which the Tracts were diversifying. The areas with the highest rates of Black population growth were mainly located near larger cities, in contrast to Hispanic populations which showed areas of rapid growth throughout Colorado 2010-2019.

As an implication of these findings, local policymakers should focus on efforts that cut within neighborhoods and schools and improve environments for specific racial subgroups. These might include peer mentoring programs, initiatives which reduce racial bias, and efforts to facilitate social interaction across groups within a community (Chetty,

et al. 2020). In addition, efforts should be undertaken to reduce residential segregation across race and income lines. The results in this chapter provide evidence that the historical trend of communities being geospatially stratified by race and income is continuing within Colorado. Previous programs, such as Moving to Opportunity have attempted to improve adulthood outcomes by improving access to economic opportunity, however these types of programs do not sufficently address the dearth of opportunity in impoverished areas. Instead, policymakers should shift focus to place-based policies at the local level which help to improve and equalize economic opportunity in *all* neighborhoods within the jurisdiction.

The reversal in direction of the relationship between racial heteroegeneity and public tax/spending suggests opportunities for additional study on mechanisms which could explain why more diverse Census Places and Tracts perform worse across economic opportunity measures. Chapter 3 explores the mechanism of individual preference for contributing to public funds in a voluntary contribution game. I find that the inclusion of demographic information is impactful on the individual's decision whether or not to contribute to a public fund. Additonally, while overall contribution levels increase in the presence of demographic information about the community, contribution is highest when the majority racial/ethnic group in the community matches that of the respondent. This result suggests that while the conflict and inefficiency hypothesis may be flawed in its interpretation of the availability of funding for public programs, there is still economic incentive to expand overall wellbeing and access to public services of their own racial or ethnic group as a means of pursuing additional economic opportunity.

Together, the work in this dissertation argues that place-based policies which expand access to economic opportunity within a given area may be a successful method of combatting inequality. More diverse areas are often poorer as measured by income, poverty, education and capital accumulation. As a result, the individuals residing within those areas may have incentive to be most interested in public services and funds which expand their own and their groups' economic opportunites. Policies which create equity in the availability of jobs, education, and capital could potentially combat inequality by decentralizing poverty and equalizing funding access for public programs and services across localities. Policymakers at more precise geographic levels are best equipped to understand the needs of their communities and identify policies well suited to expand local econonomic opportunity using taxation and expenditure programs.

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