Racial Stratification and Local Education Funding

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Stratification economics suggests that voters will be less willing to fund public education if the beneficiaries are of racial or ethnic groups that are stigmatized by a dominant group of the voters. If this is so, then the effects of student racial and ethnic diversity in a school district on local revenue effort will be different than the effects of adult diversity in the same district, since adults may stigmatize and students may be the basis of the stigma. It also implies that the effects will be different for different racial and ethnic groups depending on the extent to which they are stigmatized, and the extent to which the group that stigmatizes them can control revenue effort. I examine this prediction using data from United States unified school districts on local funding and racial identification of district populations and students. I find that there are significant differences in the effects of student and adult racial and ethnic diversity, and that the effects for both groups differ between districts which are dominated by White voters and those which are not. The results are consistent with the idea that White voters stigmatize Black children, but not non-White children, when they are the dominant group; in more diverse districts, local revenue increases when more students in the district are Black or Hispanic. The findings are evidence for stratification as part of the explanation for general racial and ethnic disparities.

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1. Introduction

Education is critical for preparing people to lead productive and meaningful lives, but in the United States, students of different racial and ethnic identities often receive education of different quality. Racial and ethnic conflict, such as that over integration, has periodically led to sharp political disputes about public provision of education. There is an extensive literature within economics asking whether racial and ethnic heterogeneity affect local government taxation and spending on public goods, and in particular whether they affect local revenue raised for public schools. Much of this literature finds that greater diversity reduces public goods spending (e.g. Alesina, Baqir, and Easterly 1999) but some more recent papers find that more diversity increases spending on at least some categories of public goods (e.g. Lee, Lee, and Borcherding 2016, Boustan et al 2013) or has no effect (e.g. Hopkins 2011, Zimmer et al. 2011).

Some of the papers in this literature measure the racial and ethnic heterogeneity of the population of the school district as a whole, while others measure the heterogeneity of the student body, and a few measure the heterogeneity of the voting population or of other subsets of the population (e.g. adults 65 or older). However, different types of heterogeneity are likely to affect local education revenue in different ways. Greater diversity among adults affects willingness to pay taxes for schools and the ability to find political consensus, while greater diversity among students affects classroom behavior and the mixture of educational needs and desires within schools. Many papers in this literature measure diversity in ways that are symmetric across all racial and ethnic groups, or at least among all non-White groups. But it may matter which groups contribute to racial and ethnic heterogeneity, if there are differences in the ways in which different races and ethnic groups view one another. Even with other factors such as income held constant, a district which is 80% White and 20% Black might choose different levels of spending than one which is 80% Black and 20% White, or one that is 80% White and 20% Asian.

Stratification economics proposes that one reason for this is that a privileged group has preferences not only over its own consumption of public goods, but also the consumption of public goods by a stigmatized group. If the privileged group can control the decision about how much to spend, then less will be spent in order to avoid allowing the stigmatized group to consume the public good, even though this means less of the public good for the privileged group. This implies an asymmetry between the effects of adult diversity and student diversity. For the privileged group, having more adults of voting age will make it easier to impose discriminatory preferences, but for the stigmatized group, having more students receiving benefits will matter for spending. It also implies asymmetry across racial and ethnic groups; whether more members of a group affect spending will depend on whether that group is stigmatized or not.

I examine these proposed asymmetries in the effects of racial and ethnic heterogeneity on local revenue for public education, using data from the National Center for Education Statistics' Common Core of Data (CCD) and the American Community Survey (ACS) on over 10,000 unified US school districts from 2018-19. I test whether adult shares of different racial and ethnic groups in the district's population have the same effect as student shares of those groups, and whether the shares of different groups have an equal effect on spending. I find substantial asymmetries between the effects of adult shares and student shares, and between the shares of different racial and ethnic groups. I also find that the response of spending to racial and ethnic heterogeneity differs depending on the size of the White adult population. In school districts that have a higher percentage of White adults than the median district, the predictions of stratification economics are generally confirmed. A higher proportion of Black students, the stigmatized group, reduces local revenue for public education; the proportions of students of other groups does not have such an effect. This is consistent with White voters reducing public funds stigmatized Black students, when the district has a large White majority. By contrast, in districts with a lower percentage of White adults than the median district, the reverse is true. A higher percentage of

both Black and Hispanic students in those districts increases local revenue per student. The results are consistent with the idea that in White-dominant districts, stratification leads to lower public funding where there are more Black students; when the share of non-White voters is larger, stratification no longer takes place and more money is allocated towards the education of students from historically underserved groups.

The rest of this paper is organized as follows. Section 2 reviews the existing literature on the effect of racial and ethnic distributions on public goods provision in general and education in particular. Section 3 describes the analytical approach of this paper and the data used. Section 4 shows regression results and interprets them. Section 5 concludes.

2. Racial and Ethnic Distribution and Public Revenues and Expenditures

There is a long literature on the relationship between the racial and ethnic distribution of a population and the amount of money that population will choose to raise in taxes and spend on public goods, including education. Racial and ethnic distribution can affect taxes and public goods spending in two broad ways. First, policy choices about taxes and spending depends on the preferences of voters, and voters' preferences may be correlated with race and ethnicity for a variety of reasons. Among these are cultural attitudes towards taxes and spending which are correlated with race and ethnicity, and preferences for spending public money on members of one's own racial or ethnic group rather than another. Second, the way in which voter preferences produce public decisions may depend on the racial and ethnic distribution of the population; when one group is a large majority of the population, preferences of that group's members may dominate public decision making, while in more diverse communities, the preferences of minority racial and ethnic groups may have more influence over public choice.

2.1. Racial and Ethnic Diversity and Public Goods Spending

Alesina, Baqir, and Easterly (1999) propose that members of different ethnic groups will have difference preferences for public goods spending, and may have a stronger preference for public goods provided to members of their own ethnic group than for public goods provided to members of other ethnic groups. They measure ethnic heterogeneity by an index of fractionalization, which is equal to 1 minus the squared shares of each racial and ethnic group (White, Black, Asian and Pacific Islander, Native American, and Other). This measure is equivalent to the probability that two people drawn from the population at random will be from different groups, and treats each group symmetrically (see also Vigdor 2002). Using samples of US cities, counties, and metropolitan areas, they look to see whether various measures of taxation and public goods spending are correlated with ethnic heterogeneity. They find that more diverse jurisdictions have higher spending, but that this is financed by larger transfers from higher levels of government and by higher debt, not by higher local taxes. Higher ethnic heterogeneity reduces the amount of spending spent on some categories of goods, notably education and roads. This may happen because, as noted by Beasley and Coate (1991), some public goods have alternatives that are privately provided, such as education and recreational facilities like swimming pools. If a majority group doesn't want to spend on public goods for a minority group, they can cut public spending and obtain the goods themselves in the private sector (e.g. send their children to private schools, build pools at private clubs). Overall, Alesina, Baqir, and Easterly conclude that greater ethnic divisions lead to a lower willingness to fund public goods.

Some subsequent work on the question has found similar results. Alesina and La Ferrara (2005) review this literature and find strong evidence that greater racial and ethnic heterogeneity reduces spending on public goods. They also find that more heterogeneity increases productivity, and thus there are benefits to racial and ethnic diversity even if it does reduce the willingness of a society to provide public goods. Other papers look at support for tax collection as well as for spending. Luttmer (2001)

finds that voter support for spending on welfare depends on whether the recipients are members of the same ethnic or racial group as the voter, so when a society has greater racial and ethnic heterogeneity, there is lower support for welfare spending, even from low-income voters. O'Brien (2017), drawing on both financial data and survey data, finds that a higher share of Hispanics (but not Blacks or Asians) in the population reduces public support for both support for taxation and for welfare spending.

However, some more recent literature has found different effects. Hopkins (2011) finds that increasing racial and ethnic diversity does not necessarily reduce public goods spending, and increases it for health spending. The effect of diversity on public goods spending has changed over time, and matters less since the 1970s than it did before that time. Greater diversity also increases spending on criminal justice, although this phenomenon appears only after 1973. It appears to be driven by national trends in the treatment of race and crime in electoral politics; it is not related to changes in racial and ethnic compositions of particular cities. He concludes that, contrary to public concerns, increases in immigration into the United States, by populations that are more non-White than the native population, are not likely to decrease public goods spending.

An, Levy, and Hero (2018) examine the structure of income inequality within and across racial and ethnic groups. They hypothesize that when wealthy voters are more likely to be of different racial and ethnic identities than poorer voters, those voters are less likely to support redistributive spending than they would be if the poorer voters were of the same racial/ethnic identity as themselves. They use the Theil index to decompose income inequality into within-group and between-group components, and look to see whether between-group inequality reduces redistributive spending than within-group inequality has. Looking across different types of public goods, they expect a larger effect on goods for which substitution is relatively easy because privately provided alternatives exist; that is, more effect for goods like education and recreation facilities, and less for goods like roads and sanitation. They find that racial income inequality has a significant negative effect on total public goods spending, but racial

distribution by itself does not, nor does overall income inequality. This result does not depend on whether distribution is measured by group shares or by a fractionalization index. For nine types of public goods the generally find that racial inequality matters more for privately substitutable goods. These results are generally not dependent on the political mechanisms by which jurisdictions make funding decisions.

Research specifically on the effects of racial and ethnic heterogeneity on education spending similarly tends to find mixed results. Silverman (2011) finds, as Alesina, Baqir, and Easterly (1999) predict, that a larger minority percentage of a school district's population increases the share of voters voting No on the school district's budget. However, Ehrenberg et al. (2004) examine support for school budget proposals in New York State and find that ethnic diversity of the student body doesn't affect the probability of budget proposals passing. Similarly, Zimmer et al. (2011), also using ethnic diversity of the student body as controls, find that ethnic diversity has no effect on the probability of passage, or the percentage of favorable votes, of school bond referenda in Michigan. Lee, Lee, and Borcherding (2016) finds that an increase in ethnic diversity shifts public goods spending from some categories to others, including an increase in education spending. These changes are likely to matter for educational outcomes, as a substantial past literature (e.g. Condron and Roscigno 2003 and Owens 2018) find that lower spending on minority students, both within districts and across districts, contributes to the achievement gap between white and minority students.

2.2 Stratification and Asymmetric Effects by Racial and Ethnic Group

Measures of ethnic diversity like the fractionalization index – 1 minus the squared shares of all racial and ethnic groups in the population – or the percentage of non-White people in the population or non-White students in the student body all assume that the effects of diversity across non-White racial and ethnic groups are symmetric; there is no difference between a population that is 75% White and

25% Black, and one that is 75% White and 25% Asian. In the case of the fractionalization index, there is also symmetry with the White group; there is no difference between those populations and one that is 25% White and 75% Black. There is a recent literature in economics, drawing on a much longer literature in other social sciences, suggesting that that is not the case. In particular the hypothesis of racial stratification suggests that some races are stigmatized, and the interactions between racial groups depend on whether one group is stigmatized or not. In particular, members of the stigmatizing race (in the context of the United States, usually Whites but sometimes other groups also) are unwilling to fund public goods for members of the stigmatized race (in the US context, usually Blacks but sometimes also Hispanics), but are willing to fund them for members of other non-stigmatized races. The idea of racial stigmatization in economics is presented in Loury (2002). The idea of stratification based on racial prejudice goes back as far as Blumer (1958) in the sociological literature and Ogbu (1994) in the education literature. Darity (2005) brought attention to stratification economics; a recent review of the stratification literature is found in Darity et al. (2017).

Alvord and Rauscher (2019) looks at voter support for bond issues and school tax increases in California, allowing for differences between racial and ethnic groups in support for school funding. They measure racial diversity with the percentage of Black students and the percentage of Hispanic students as well as a fractionalization index for the student body. They find that increasing racial and ethnic diversity, measured by the index, increases the amount of support that a bond issue will draw but reduces the support that a property tax increase will draw. They believe this to be true because property tax measures are less progressive than bond measures, and also because bond measures deal with specified uses of the funds and a relatively short time horizon. In some regressions, but not all, they find heterogenous effects with respect to both Black and Hispanic populations. A higher fraction of Black students increases the odds of a bond measure passing, while a higher fraction of Hispanic students may reduce it (10% significance). But these race-specific patterns do not appear when the number of votes,

rather than the odds of passage, are the dependent variable; while the diversity index has similar effects for both dependent variables.

Pastor, Scogguns, and Treuhaft (2017) define the racial generation gap as the percentage seniors that are people of color minus the percentage of children under 18 that are people of color. Nationwide, the generation gap was 27 points in 2015; 49% of under-18s were people of color, but only 22% of seniors. The gap varied considerably across states, being as high as 41 points in Arizona, and as low as 6 points in West Virginia. They find that "states and counties with larger racial generation gaps tend to spend less on K-12 education on a per-capita basis" as White voters prefer not to spend public money on non-White students. Nations and Martin (2020) examine whether the racial generation gap, as well as the percentage of Black and Hispanic students, predict support for education funding in voting on parcel taxes in California. They distinguish between generic bias (against supporting any group besides a voter's own group) and specific bias against stigmatized groups. They find evidence for both types of bias at the stage of proposing tax votes; parcel taxes were less likely to be proposed when the racial generation gap was larger (generic bias against non-Whites) and also where the proportion of Hispanic students was higher (specific bias against that group); there was no effect for a higher proportion of Black students. However, given the proposal of a tax, there was no bias of either type at the voting stage; racial and ethnic diversity did not affect voting behavior.

Ajilore (2017) looks at both the fractionalization index used in much of the literature and a polarization index that captures the potential resource conflicts among different racial and ethnic groups, testing to see if more fragmented, or more polarized, districts have lower district expenditures. The polarization measure depends on the cube of each group's share of the population, as well as the linear and quadratic terms, and depends on how close the group is to a 50% share of the population, with groups with shares very near 50% having little effect on polarization, and very small groups or very large groups having more. Alijore finds that increased ethnic fractionalization reduces school district

expenditures but that the polarization index has no effect on them. More homogenous districts spend more, but the reduction in spending in more diverse districts is not driven by resource competition among the groups.

2.3 Other Effects on Education Spending

Racial and ethnic diversity are not the only factors affecting education spending (and public goods spending more generally). Some of the other factors that matter are correlated with racial and ethnic diversity, which makes it necessary (and not always easy) to separate their effects from the effects of ethnicity and race. The most important correlated factor is income. Corcoran and Evans (2011) look at income inequality and education spending, find that income inequality increases public goods spending; tax progressivity means that where a few individuals have a higher share of wealth, the median voter prefers higher spending on public goods, since less of the tax burden will fall on the median voter. They use a measure of fractionalization similar to the one used by Alesina, Baqir, and Easterly (1991) as a control, and find that racial and ethnic fractionalization has no effect on spending when their income measures are held constant, although higher fractionalization does increase private school attendance. Boustan et al. (2013) similarly find that higher income inequality increases both revenues and expenditures for school districts and municipalities. The share of Black and Hispanic voters reduces both revenues and expenditures but the effect is usually only significant at the 10% level; if these variables are omitted then the income inequality results lose their significance.

There is a substantial literature on the effect of the size of the elderly population on education spending. Ladd and Murray (2000) find that the share of elderly has no significant direct effect on education spending, but does have an indirect effect; if the elderly tend to live in areas with relatively few children, then areas with more children will have higher tax prices (more of the cost of education is borne by voters with children) and this reduces education spending. They also include a version of the

racial generation gap; the non-White share of the child population minus the non-White share of the adult population. A higher relative share of non-White children reduces education spending, which is consistet with the theory that older voters prefer to fund education for members of their own group. Percent of non-White population has no effect. In contrast, Figlio and Fletcher (2012), using IV techniques to deal with the possibility of Tiebout sorting, find that a higher elderly population reduces education spending. They also look at the effects of racial and ethnic heterogeneity, defining racial mismatch as the ratio of the non-White student share to the non-White elderly share (rather than the difference between the two). They also find that a higher racial mismatch reduces support for education spending, since it implies that elderly voters pay taxes to support students of a different racial or ethnic group.

Another determinant of education levels is the federal nature of spending and the extent to which local school districts are able to spend state funding (i.e. money that comes from outside the district). School finance reforms which have required states to take steps to equalize spending, or to bring up spending levels in the lowest-income districts, may increase local revenue effort by lowering the tax price of expenditures. Rothbart (2020) examines whether school finance reforms affect race gaps in school funding. He offers four reasons why this might happen. First, race may be correlated with unobserved drivers of costs or revenue capacity. Second, more diverse districts may be less willing to fund education, as the literature has tended to show. Third, racial composition may affect costs directly; teachers may demand higher wages to teach in such districts if there are non-monetary costs to teaching in them. Fourth, race may be correlated with a variety of factors lowering house prices and thus lowering local revenues, some historical (redlining), others contemporary (discrimination against non-Whites in mortgage markets). He finds that SFRs increase state aid more in districts with larger shares of Black, Hispanic, and Native American students, and less in districts with larger shares of Asian students. Reductions in local revenues have only small offsetting effects, so the net effect is greater total

revenue and expenditures in districts with larger Black, Hispanic, and Native American populations, and less in districts with larger Asian populations. He concludes that SFRs can be useful tools to produce greater racial equality where race-aware policies are prohibited or politically unacceptable.

3. Analytical Methods

The research goal of this paper is to examine how education revenue raised locally varies with the racial and ethnic composition of a school district, both among the student population and the adult population of the district. I expect each distribution to matter, for different reasons. The amount of money that the district will raise to spend on education will depend on the preferences of each voter in the district for spending on education, rather than private consumption or other public goods, and also on the way that the district's political process aggregates the preferences of each voter into a collective decision. The voter's preference for how much to spend on education depends on the voter's income, the tax price the voter will pay which depends on the distribution of income and housing wealth within the district, the number of students to be educated, and the voter's personal preferences about education. If racial and ethnic identity is important, then the voter's preferences for education may depend on whether the students in the district schools are of the same race and ethnicity as the voter, and if they are not, the extent to which the voter's group stigmatizes the groups to which the students belong. The racial and ethnic distribution of the students will determine the extent to which stigmatization affects the preferences of individual voters.

The preferences of the voters will then determine the amount of revenue raised in the district, in a way that is probably more complex than simple models such as the median voter model would predict. However, if there are racial or ethnic differences among the voters in their preferences for education spending (holding the voter's income and education constant) then the racial and ethnic distribution of

the adults in the district will influence the collective choice of local revenue amount. Where one racial or ethnic group is dominant (typically Whites) then that group's preferences are likely to determine the collective decision. If that group stigmatizes another group, then the chosen revenue level will display the effects of the stigmatization. In a more diverse district, the decision about raising revenue is more likely to reflect a compromise among the preferences of the different racial and ethnic groups and thus be less influenced by stigmatization of one group by another.

Within a given district, the amount of revenue raised will thus depend on both the racial and ethnic distribution of the students in the district and that of the adults in the district, as well as other variables that affect voter preferences such as income, property values, and education levels, as well as the size of the district to account for the possibility of scale effects in schools. However, the effects of these variables on local education revenue may differ from district to district, depending on the political process that aggregates voter preferences into collective choice about spending levels. Thus I look to see whether the parameters of the equation describing the relationship between local education revenue and the independent variables are heterogeneous; in particular, whether they differ between districts which are dominated by White voters, and districts where non-White voters form a larger share of the population.

Estimating the parameters of that relationship allows me to examine two predictions of stratification economics. First, I test whether the percentage of students of different racial and ethnic groups in the population has a different effect than the percentage of adults of each group on local education revenue. I expect this to be true because stigmatization depends on the racial and ethnic distribution of the student body, while the politics of aggregating voter preferences depends on the distribution of the voting population. Second, I test whether the effect of each group's student population on revenue raised depends on the extent to which each group is stigmatized by other groups in the population, and the size of the stigmatizing groups. In particular, I expect that the percentage of

Black students in the district will have a negative effect on local revenue effort in districts dominated by White voters, whose dominance permits revenue levels to be influenced by stigmatization. This effect will not be present in more diverse districts which are less likely to be affected by stigmatization.

I estimate the relationship on a sample of unified school districts from all states in the United States. The data on school revenue and spending, and on student racial and ethnic distribution, come from the NCES Common Core of Data. Data are taken from the 2018-19 year to avoid any effects of the COVID-19 pandemic that started in early 2020. Total local revenue and state aid come from the School District Finance Survey; I convert to revenue per student. Non-financial data comes from the Elementary/Secondary Information System of CCD. It includes the number of students who identify as Hispanic, and among the non-Hispanic students, the number who identify as American Indian/Alaska Native, Asian, Black, Native Hawaiian-Pacific Islander, White, or other race (including multiracial). It also includes the number of students classified as limited English proficiency or special needs. I convert all of these measures to a percentage of the total number of students in each category. I also calculate the percentage of schools in each distract that are charter schools.

Data on the number of adults in each racial and ethnic group is taken from the 2020 Census, and I convert it to the fraction of the total adult population. Other data are taken from the American Community Survey, 2018 5-year estimate tables. Variables include the percentage of the population under 18 and over 65, percentage of households that are families, percentage of families who own their own households, median income, the ratio of mean income to median income, the percentage of households with income of $200,000 or more, the overall poverty rate, the percentage of adults 25 and older who have at least a high school degree, and the percentage with at least a college degree. I drop any district which reports no students, no traditional public schools (thus, all charter-only districts are excluded), or no revenue or expenditure. The sample contains 10,537 observations. The means and standard deviations of all variables used in the analysis are found in Table 1. Table 1 also shows the

means and standard deviations of all variables for the subsample with above-median percentage of White adults and the subsample with below-median percentage of White adults. The two subsamples are, by construction, very different in racial and ethnic distribution of both adults and students. In some other variables they are similar (local revenue raised, state revenue received, median income, family households) while in others they are quite different (district size, home ownership, age, education, charter schools).

It is possible to separately identify the effects of adult racial/ethnic distributions from student distributions only if the two are not perfectly multicollinear. As the literature on the racial generation gap has shown, the two are distinct from one another because the age distribution differs for the difference racial and ethnic groups; White households are more likely to be older, while households of other groups are more likely to be younger and to have children in the household. Figure 1 graphs the percentage of White adults against the percentage of White students, along with the 45 degree line that represents equal percentages of both in a district. The majority of data points fall above this line, since in most districts the student population contains more non-Whites than the adult population. Table 2 shows the correlation of adult and student populations across districts for each of the seven groups. The correlations are generally above 0.95, though lower for Native Hawaiian/Pacific Islander and considerably lower for Multiracial/Other Race. However, there is enough separation between adult and student populations to identify their effects separately, as will develop below.

4. Estimation and Results

4.1 Least Squares Regression Analysis

To examine whether adult and student racial and ethnic distributions have the same effect on spending as adult distributions, and also whether the effect of racial and ethnic distribution differs when Whites are the dominant group in a district, I estimate the following equation:

$$\begin{aligned}\log(\text{LocalRevenue})_i = {} & \beta_0 + \beta_1 * \log(\text{MedianIncome}_i) + \beta_2 * (\log(\text{MedianIncome}_i))^2 + \beta_3 * \text{IncomeRatio}_i + \\ & \beta_4 * \text{PctIncome200K}_i + \beta_5 * \text{PovertyRate}_i + \beta_6 * \log(\text{Students}_i) + \beta_7 * (\log(\text{Students}_i))^2 + \\ & \beta_8 * \text{HHPctFamily}_i + \beta_9 * \text{HHPctOwnerOcc}_i + \beta_{10} * \text{PctUnder18}_i + \beta_{11} * \text{PctSenior}_i + \beta_{12} * \text{PctHSGrad}_i + \\ & \beta_{13} * \text{PctColGrad}_i + \beta_{14} * \text{PctCharter}_i + \beta_{16} * \text{StudentPctELL}_i + \beta_{16} * \text{StudentPctSE}_i + \\ & \Sigma\, \gamma_j * \text{StudentPct}_{ij} + \Sigma\, \delta_j * \text{AdultPct}_{ij} + \gamma_0 * \text{StudentFrac}_i + \delta_0 * \text{AdultFrac}_i + \lambda_i + \varepsilon_i \end{aligned} \quad (1)$$

where i indexes school districts, j indexes racial and ethnic groups, and s indexes states, StudentPct_{ij} is the percentage of students in school district i who are of group j, AdultPct_{ij} is the percentage of adults in school district i who are of group j, StudentFrac_i and AdultFrac_i are the fractionalization indices for the two populations, and λ_i is a state-level fixed effect. Following Lee, Lee, and Borcherding (2016), I use the state-level fixed effect to pick up the effects of state aid programs to local districts; some states provide less revenue to local districts than others, requiring those districts to provide more local revenue to reach a particular expenditure level. They may also change the local tax prices of expenditure. In the main specification, I do not include state aid directly because it is likely to be correlated with the error term; districts which, for unobserved reasons, are less able to raise local revenue are likely to receive more state aid as a consequence. I do include state aid in some alternative specifications despite its

possible endogeneity, as a robustness check.

Because of the likelihood that the parameters of equation (1) are different in different districts, I estimate it on two different subsamples; the subsample with an above-median percentage of adults in the district who identify as White, and the subsample with a below-median percentage. The distribution of the percentage of White adults in districts is shown in Figure 2. The median percentage is 86.146% White, so that the districts in the first subsample (the high-White subsample) are dominated by White voters; this is much less true of the districts in the second subsample (the low-White subsample). This division, though crude, is sufficient to test the hypothesis that there is a structural difference between districts whose voters are predominantly White and districts with more racial and ethnic heterogeneity among their voters.

Results of estimating equation (1) for the high-White subsample are found in column 1 of Table 2. Most of the percentages of adults of different racial and ethnic groups are not statistically significant; only one is, and that only at the 10% level. The adult fractionalization index is also not statistically significant. By contrast, all but one of the student percentages are negative and significant at the 5% level, though this is offset because the student fractionalization index (which generally rises as the share of a group of minority students rises) is positive and significant. The hypothesis that each adult coefficient takes the same value as the student coefficient for the same ethnic group is rejected ($F=3.54$, $p=0.0017$). In these districts, the distribution of the non-White adult population is irrelevant, suggesting that in districts dominated by White voters, White preferences primarily determine revenue effort.

By contrast, a higher percentage of non-White students does change local revenue, and the effects are different for different groups. The hypothesis that all coefficients on student minority group percentages are the same is rejected ($F=3.33$, $p=0.0052$) but the hypothesis that all coefficients except the one for Black students are equal is not rejected ($F=1.14$, $p=0.3348$). Because the student

fractionalization index depends on the square of each population percentage, the effect of increasing the percentage of a non-White student group by one percentage point, and reducing the percentage of White students by one percentage point, depends on the values of the student percentages. The formula for the change for group j, calculated at average values for the percentages as shown in Table 1, is:

$$\frac{\partial logRevLocPS}{\partial StudentPctj} = \gamma_j + \frac{2}{10{,}000} * \gamma_0 * (\overline{StudPctWhite} - \overline{StudentPctj})$$

Results of this calculation for each minority student group are shown in Table 4. There is a sharp difference between the effect of increasing the Black student population and that of other groups. The effects of most other groups are positive and three of them are statistically significant; the effect of increasing Asian students is very small, the point estimate is negative, and is not significantly different from zero. For the other groups, a one-percentage-point increase in the student share of the population increases local revenue per student by about 0.5% to 1%. But for Black students, an increase in the share of the population has a significant negative effect on local revenue, reducing it by 0.77%. This implies that in these districts, White voters are willing to fund education for most non-White groups on a par with, or even more than, education for White students, but they are not willing to fund education for Black students, which is consistent with stigmatization of Black students and not of students of other racial and ethnic groups.

Column 4 of Table 2 shows the same regression for the low-White subsample. The results are sharply different from those on the high-White subsample. Neither of the fractionalization indices is statistically significantly different from zero, so the effects of racial and ethnic distribution are captured solely by the coefficients on the percentage of each group. Four of the six coefficients for adult racial and ethnic group percentages are statistically significant at the 5% level. All are negative, indicating that a higher percentage of adults in those groups reduces spending. A higher percentage of Asian adults or

Native Hawaiian/Pacific Islander adults does not affect spending (though in the latter case the lack of significance is primarily due to a large standard error). The size of the significant effects is generally a 0.3% to 0.5% reduction in local revenue for each percentage point increase in a group's share of the adult population, though larger (about 1%) for other race or multiracial adults.

For students, again, the findings are the reverse of those with the high-White subsample. A higher share of Black or Hispanic students significantly increases education spending. The shares of other racial/ethnic groups do not have a statistically significant effect. The hypothesis that adult and student coefficients are equal for each group is again rejected ($F=5.31$, $p=0.000$) and so is the hypothesis that all student groups have the same effect ($F=3.24$, $p=0.0063$). The hypothesis that all adult groups have the same effect, however, is not rejected ($F=1.34$, $p=0.2436$); there doesn't appear to be asymmetry among the different non-White groups in political behavior. Table 4 shows the effect of increasing the size of each minority group's population by one percentage point and decreasing the White population by one point; because the estimated coefficient on the student fractionalization index is close to zero, the estimated effects are essentially the same as the coefficients on the student percentages. The effect of increasing the percentage of Black or Hispanic students by one percentage point is to increase local revenue per student by 0.74% and 0.59% respectively, both effects highly significant. The effect of increasing the percentage of other minority groups is generally smaller and not statistically significantly different from zero (although the Asian effect is significant at the 10% level and, at 0.54%, only slightly smaller than the Hispanic effect).

Other independent variables generally have similar effects in the two samples and are of the expected sign. Higher median income increases expenditure, but at a decreasing rate, suggesting voters view education as a necessity good. Higher income ratios increase spending, because a high mean income relative to median income means that very high-income households have a higher share income and thus tax prices for most voters are lower. The percentage of households with incomes above

$200,000 has no effect when the income ratio is included, however. A larger student population reduces local revenue per student but at a decreasing rate, consistent with increasing returns for relatively small districts. A higher percentage of English language learners increases revenue in the high-White subsample but not in the low-White subsample (this calculation holds racial and ethnic distributions constant) and a higher percentage of special education students increases revenue in both samples. A higher percentage of households as families reduces spending per student, because tax prices are higher when a district has fewer childless households. More senior citizens in the district population raises local revenue while more children in the district population reduces it. Charter schools have no significant effect. Education matters in the high-White subsample, with more college graduates raising spending and more high school graduates lowering it; neither variable is significant in the low-White subsample. State fixed effects are highly significant in both. Columns (2) and (5) show results when insignificant variables in columns (1) and (4), other than racial and ethnic variables, are removed from the regression; this has no substantive effect on the conclusions.

Columns (3) and (6) test for the sensitivity of the results to holding state aid per student constant. Higher state aid would be expected to reduce local revenue if voters substitute between local money and state money in the budget. However, as discussed earlier, state governments may target aid towards districts which, for unobserved reasons, have relatively low capability for local revenue effort. If they do, the state aid variable is endogenous to the model and including it may bias the coefficients of other parameters. If this variable is included, results remain broadly similar in both subsamples. In the high-White subsample, the effect of larger non-White student populations on spending is estimated at half or less of its previous value, and only Black students continue to show a significant negative effect on spending. This result remains consistent with the hypothesis that White voters stigmatize Black students and raise less local revenue when there are more Black students in the schools. The student fractionalization index is significant only at the 10% level in this model. In the low-White subsample,

there are substantial changes in the adult racial and ethnic effects, with Asian and Native Hawaiian/Pacific Islander adults significantly increasing spending and Black and Hispanic ones no longer having a significant effect. The results for student effects change much less; more Black and Hispanic students still increase spending, at nearly the same rate as before, and American Indian/Alaska Native students now increase spending as well, though the effect is only about half the size of the effect of more Black or Hispanic students.

The results suggest that state aid is a substitute for local revenue; if we think of the effect as causal, then a 1% increase in state aid lowers local revenue by 0.44% in the high-White subsample and 0.55% in the low-White subsample. Since local and state aid per student are usually of approximately equal magnitude, this implies substitution on the order of a 50 cent reduction in local revenue per $1 increase in state aid. The very high t-statistics (31.6 in the high-White subsample; 35.9 for the low-White subsample) are, however, suggestive of possible endogeneity, so it would be inappropriate to read this relationship as causal. For the same reason, the estimates of the other parameters of the model are possibly biased by the inclusion of state aid. The estimates in the regressions that exclude state aid are probably more reliable estimates of the true effects of race and ethnicity on spending. However, the broad conclusions one would draw about the effects of race on local tax revenue are fairly robust to the question of whether to include or exclude state aid.

4.2 Instrumental Variables Regression Analysis

There is also a possible concern about the endogeneity of racial and ethnic distributions. Since households have choice about where to live, they may sort themselves according to their preferences for education spending, following the model of Tiebout (1956). If so, these results could be driven by households of different racial and ethnic affiliation sorting into districts with higher or lower local revenue levels, rather than by racial and ethnic affiliation causing revenue effort to differ across

districts. A few papers in the literature (Lee, Lee, and Borcherding 2016, Alvord and Rauscher 2019) use instrumental variables techniques to test for possible reverse causality of this kind, using national trends in minority populations as instruments that are plausibly exogenous to district revenue decisions. Those instruments are only suitable with panel data since they require time variation in racial and ethnic distribution. Instead, I calculate the percentage of adults and students of each racial/ethnic group in a school district's combined statistical area (CSA) and use it as an instrument for the corresponding percentage in the district. For school districts that are not in any CSA, I use the percentage of the population of all districts in the same state that are not in any CSA. This instrument will be exogenous as long as there is no Tiebout sorting across CSA borders. CSAs are much larger than school districts; there are 559 CSAs in the data set as well as 44 aggregates of non-CSA regions of states, compared to 10,537 school districts, so the average CSA (or non-CSA aggregate – henceforth I include the non-CSA aggregates in the term "CSAs") contains 10,537/603 = 17.47 districts, The distribution is skewed right; the median is 6 districts. I cannot aggregate to the state level because the regression contains state-level fixed effects and state-level aggregates would be perfectly multicollinear with those fixed effects. I similarly calculate fractionalization indices for CSAs and use those to instrument for the district fractionalization indices.

Table 5 shows the results of estimating equation (1) using two-stage least squares, instrumenting for district racial and ethnic distributions with CSA racial and ethnic distributions for the high White adult subsample. Column 2 shows the results of estimating the full model, with column 1 showing the OLS results for comparison. The parameter estimates have changed substantially and the standard errors are much larger than the OLS standard errors. The reason is almost certainly small sample bias because of the large number of instruments used. Since there are 6 variables to describe each of the two racial and ethnic distributions, plus the fractionalization indices, there are 14 endogenous variables and 14 instruments. Even with a sample of more than 5000 observations, instrumental variables

probably works poorly. The Anderson canonical correlation test suggests that the model is underidentified (LM=0.125, p=0.723). To reduce this problem, I drop all of the adult ethnic distribution variables and all of the student ethnic distribution variables except for Black students and the fractionalization index. This is an acceptable restriction on the full IV model (chi-square(12) = 9.22, p=0.684) and reduces the number of endogenous right hand side variables to two.

Results of estimating the reduced model are shown in column 3. In this model the instruments are acceptably strong; the Anderson test rejects underidentification (LM=69.627, p=0.000) and the Cragg-Donald F statistic is 34.845, well above the 10% maximal IV size critical value of 7.03. The estimated coefficients are quite a bit larger than in the OLS regression, but of the same sign and statistically significantly different from zero. Table 7 shows the effect of a one percentage point increase in each student minority group population, reducing the White population by one percentage point. Because of the significance of the student fractionalization index, increasing the population of minority students other than Black significantly increases spending (the amount varies slightly because of differences in the average value of the percentage of population across the groups) while increasing the percentage of Black students decreases spending. The latter effect is not quite statistically significantly different from zero (p=0.118) but it is different from the effects of the other groups. This matches the OLS finding that Black students are stigmatized in high White adult districts in a way that other non-White students are not. Column 4 of Table 4 shows the results when the student percentage Hispanic is put back into the model. Although this requires using one more instrument, the instruments retain acceptable strength (Anderson LM stat = 69.617, Cragg-Donald F statistic = 23.222). The student percentage Hispanic is not significant, confirming that Hispanic students are not stigmatized in these districts in the way that Black students are, and are treated similarly to other non-Black minority students. Most of the other parameters are comparable in sign and significance to the OLS results.

Table 6 shows the same analysis for the low White adult subsample. The instruments are much

stronger in this subsample than in the high White adult subsample, because there is more variability in ethnic distributions in this subsample. Although underidentification can be rejected by the Anderson test (LM=76.496, p=0.000), weakness of instruments is still a problem, as the Cragg-Donald statistic is only 5.460. However, more of the racial and ethnic distribution parameters are statistically significant in this model than was the case in the high White adult sample. None of the adult population parameters are significant, but one of the student parameters is and so is the parameter on the student fragmentation index (which was not significant in the OLS regression). Dropping all 7 of the adult variables is acceptable (chi2(7) = 7.10, p-value=0.4187). When these variables are dropped, the student parameter that was significant loses its significance, but two other student parameters, Hispanic and Multiracial/Other Race, become significant. Column 3 of Table 4 shows results when only these two student percentages, plus the Black student percentage and the student fractionalization index, are included. In this model, higher fractionalization of the student body increases spending, and the effect is particularly pronounced for Hispanic students, as it is in the OLS results. The effect for Black students is not significantly different from zero, and the effect for students of multiple or other races is significantly negative. Table 7 shows the effects of a one-percentage-point increase in each minority group's student population. All group have a significant increase in spending, in most cases on the order of 0.6% to 0.7% and 0.84% for the Hispanic population. The effect for Black groups is somewhat smaller at 0.43% because their average percentage in this subsample is relatively large, which means an increase in Black student population changes the fractionalization index by less. As in the high White adult subsample, most of the other parameters are comparable in sign and significance to the OLS results.

For the high White adult school districts, the IV and OLS results are fairly similar, though the effects are larger in the IV results. This is similar to other papers that have examined reverse causality, which also, at least in some instances, find that it does not seem to be an important factor. Lee, Lee, and Borderching (2016) find that their IV estimates are similar to their OLS estimates; they suggest that

reverse causality is not a problem. Boustan et al (2013), dealing with a similar issue involving sorting by income, find that their IV estimates are consistent with their OLS estimates and, if anything, larger; they conclude that IV may be resolving measurement error in the income inequality variable which biases the OLS estimates towards zero. That may explain these results also. However, the larger differences between the OLS and IV results in the low White adult subsample suggest that the explanation may be more complex.

5. Conclusions

This paper has examined local tax revenue collected by US unified school districts, asking whether racial and ethnic heterogeneity affects revenue levels, whether racial and ethnic diversity of students has different effects from that of adults, and whether these effects differ between districts where White voters are a large majority and districts with more diversity among voters. I find that racial and ethnic heterogeneity does matter, that it matters differently for student and adult populations, and that it matters differently in more racially homogenous and more racially heterogeneous districts. In districts with large White majorities among adults, local revenue is lower when there are more Black students, but not for students of any other race. This is inconsistent with general models of discrimination, in which all minority groups (or all racial and ethnic groups) are treated symmetrically, but it is consistent with models of racial stratification in which Black students are the group most likely to be stigmatized by White voters. A one percentage point increase in the share of Black students decreases local revenue by approximately 2.7%, while a one percentage point increase in the share of other non-White students decreases local revenue by amounts around 1.5%. Conversely, in more diverse districts, higher proportions of Black and Hispanic students increase local revenue; a one percentage point increase in student population shares increases spending by 0.6% or 0.7%, although only the latter effect is

significant in estimates that allow for possible endogeneity of ethnic distributions; in those results the positive coefficient on student fractionalization suggests that higher minority populations increase spending generally, and more so for Hispanic students but not for Black students. Taken together, these results are consistent with the theory that when White voters are dominant in a district they stigmatize Black students, but not students of other racial and ethnic groups; when the voting population is more diverse this does not happen, and to the contrary, more revenue is raised when the share of students from disadvantaged racial and ethnic groups is larger. This suggests that once a district contains a sufficiently large non-White population, the privileged group is no longer able to impose its preferences for reducing education revenue on other groups. These results imply that government structures that establish funding levels, and aim to provide equitable educations to students of all races, should be designed to counteract the phenomenon of stigmatization in places (and only those places) where it is likely to occur. They also offer evidence on the broader question of the extent to which racial stratification may affect the distribution of tax burdens and public goods expenditures in the United States.

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Figure 1. Distribution of Percent of White Adults in District

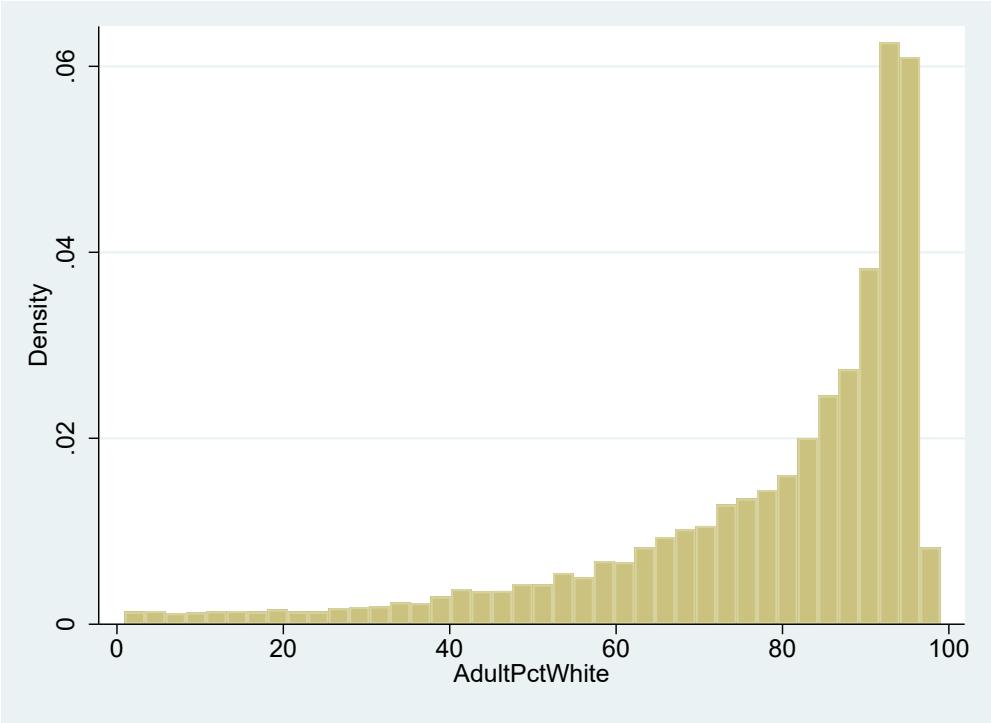

Figure 2. Adult Percent White vs. Student Percent White

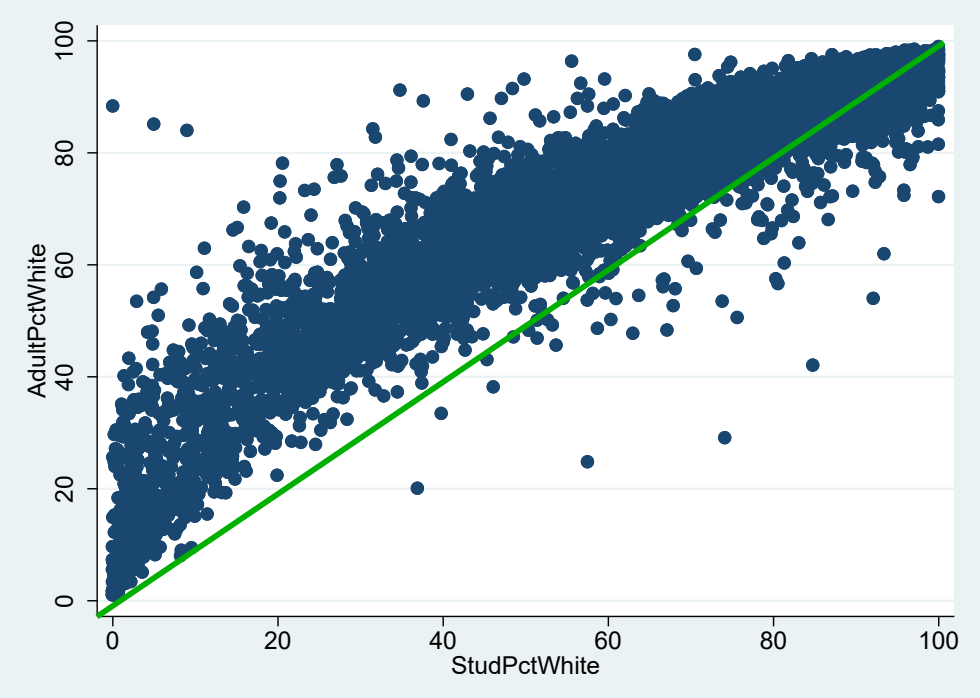

Table 1. Means and Standard Deviations of Variables

Variable	Mean	Std. dev.	Min	Max	Units
LocalRevenue	7942.31	7716.76	118.99	161281.30	Dollars per student
logLocalRevenue	8.718	0.703	4.779	11.991	-
StateRevenue	7858.23	4906.04	214.29	134503.70	Dollars per student
logStateRevenue	8.837	0.520	5.367	11.809	-
MedianIncome	58721.580	21271.720	18194	234167	Dollars per HH
logMedianIncome	10.927	0.318	9.809	12.364	-
IncomeRatio	1.293	0.134	0.823	2.696	-
PctIncome200K	0.261	1.236	0	78.125	Percentage points
Students	4063.884	12932.320	2	492842	Number
logStudents	7.226	1.395	0.693	13.108	-
AdultPctAIAN	1.714	7.726	0	96.812	Percentage points
AdultPctAsian	1.899	4.460	0	70.851	Percentage points
AdultPctNHPI	0.068	0.240	0	9.103	Percentage points
AdultPctHispanic	8.965	14.207	0	98.311	Percentage points
AdultPctBlack	5.429	11.026	0	93.197	Percentage points
AdultPctOther	3.553	1.712	0	25.826	Percentage points
StudentPctAIAN	2.488	10.074	0	100	Percentage points
StudentPctAsian	1.893	4.714	0	70.221	Percentage points
StudentPctNHPI	0.145	0.564	0	27.820	Percentage points
StudentPctHispanic	14.400	19.727	0	100	Percentage points
StudentPctBlack	7.194	15.340	0	99.577	Percentage points
StudentPctOther	3.494	3.372	0	100	Percentage points
AdultFracIndex	0.292	0.179	0.020	0.806	0-1 scale
StudFracIndex	0.330	0.201	0	0.800	0-1 scale
StudentPctELL	4.428	7.492	0	76.923	Percentage points
StudentPctSE	14.951	5.064	0	97.436	Percentage points
HousePctOwn	73.542	11.324	0	97.966	Percentage points
HousePctFam	68.148	7.382	18.902	100	Percentage points
AgeSeniorPct	18.236	5.391	0	60.650	Percentage points
AgeUnd18Pct	22.550	4.468	0	61.150	Percentage points
EdHSGradPct	88.222	7.118	33.65617	100	Percentage points
EdColGradPct	23.838	13.095	2.129984	86.761	Percentage points
PctCharter	0.009	0.062	0	1	Percentage points
PovRate	13.386	7.359	1	59.8	Percentage points

Table 1, continued: Means and standard deviations by subsample

	Low White adult		High White adult	
Variable	Mean	Std. dev.	Mean	Std. dev.
LocalRevenue	7800.38	8791.631	8090.107	6467.714
logLocalRevenue	8.647127	0.760881	8.790711	0.63025
StateRevenue	7715.558	5222.257	7967.327	4476.708
logStateRevenue	8.81036	0.533029	8.861236	0.504227
MedianIncome	59549.64	25427.02	57958.03	16072.17
logMedianIncome	10.92137	0.369369	10.93317	0.257736
IncomeRatio	1.3191	0.142683	1.267442	0.119574
PctIncome200K	0.225458	1.124166	0.294159	1.338757
Students	6707.636	17846	1440.983	1744.676
logStudents	7.730754	1.471143	6.731827	1.103127
AdultPctAIAN	2.940815	10.59902	0.444515	0.688453
AdultPctAsian	3.204245	5.996072	0.601103	0.740132
AdultPctNHPI	0.10114	0.316384	0.035131	0.114377
AdultPctHispanic	15.51594	17.78019	2.439582	1.73746
AdultPctBlack	10.02482	14.15353	0.86048	1.175766
AdultPctOther	3.937578	2.080696	3.159952	1.104145
StudentPctAIAN	4.29035	13.88443	0.69278	2.051904
StudentPctAsian	3.07139	6.354353	0.716989	1.17225
StudentPctNHPI	0.196397	0.724347	0.093095	0.328497
StudentPctHispanic	24.31561	23.73912	4.512202	4.495873
StudentPctBlack	13.14119	19.95615	1.279371	1.742152
StudentPctOther	4.335603	3.874844	2.648514	2.512545
AdultFracIndex	0.442242	0.128518	0.141922	0.050925
StudFracIndex	0.482292	0.156246	0.178179	0.099593
StudentPctELL	7.703522	9.288325	1.167854	2.198373
StudentPctSE	14.36092	5.306933	15.55435	4.728223
HousePctOwn	68.8582	12.45862	78.24135	7.557019
HousePctFam	67.9926	8.388948	68.31728	6.198183
AgeSeniorPct	16.58451	5.153101	19.85741	5.078803
AgeUnd18Pct	23.23465	4.71465	21.87114	4.073818
EdHSGradPct	86.01335	8.089972	90.42208	5.127599
EdColGradPct	25.3693	15.10783	22.32676	10.5197
PctCharter	0.008448	0.042604	0.004837	0.039696
PovRate	15.27264	8.269711	11.4737	5.69249

Table 2. Correlation of Adult and Student Racial/Ethnic Group Percentages

Group	Correlation
AI/AN	0.929
Asian	0.941
Black	0.963
Hispanic	0.954
NH/PI	0.816
White	0.948
Other/Multi	0.484

Table 3. OLS Regression Results

VARIABLES	(1) High-White Full	(2) Restricted	(3) StateRev	(4) Low-White Full	(5) Restricted	(6) StateRev
AdultPctAIAN	-0.0182	-0.0195	-0.0643	-0.00550***	-0.00548***	-0.00715***
	(0.0713)	(0.0712)	(0.0654)	(0.00195)	(0.00195)	(0.00175)
AdultPctAsian	-0.0152	-0.0154	-0.0654	-0.00178	-0.00117	0.00693**
	(0.0721)	(0.0719)	(0.0660)	(0.00362)	(0.00356)	(0.00325)
AdultPctNHPI	-0.157*	-0.158*	-0.175**	0.0667*	0.0673*	0.0895**
	(0.0899)	(0.0898)	(0.0823)	(0.0393)	(0.0391)	(0.0351)
AdultPctHisp	-0.000496	-0.000738	-0.0400	-0.00303**	-0.00348**	-0.00186
	(0.0700)	(0.0699)	(0.0641)	(0.00149)	(0.00143)	(0.00133)
AdultPctBlack	-0.0150	-0.0156	-0.0543	-0.00496***	-0.00502***	-0.00252
	(0.0704)	(0.0703)	(0.0645)	(0.00179)	(0.00177)	(0.00160)
AdultPctOM	-0.0290	-0.0300	-0.0594	-0.0108**	-0.00995*	-0.000293
	(0.0714)	(0.0712)	(0.0654)	(0.00517)	(0.00512)	(0.00463)
StudPctAIAN	-0.0103**	-0.0108**	-0.000152	0.00246	0.00257*	0.00285**
	(0.00437)	(0.00434)	(0.00402)	(0.00152)	(0.00152)	(0.00136)
StudPctAsian	-0.0205***	-0.0208***	-0.00741	0.00525	0.00534*	-0.00153
	(0.00716)	(0.00714)	(0.00657)	(0.00325)	(0.00322)	(0.00291)
StudPctNHPI	0.00968	0.00960	0.00608	-0.0135	-0.0127	-0.0146
	(0.0186)	(0.0186)	(0.0170)	(0.0177)	(0.0177)	(0.0158)
StudPctHisp	-0.0143***	-0.0150***	-0.00605*	0.00586***	0.00632***	0.00552***
	(0.00358)	(0.00351)	(0.00329)	(0.00116)	(0.00106)	(0.00104)
StudPctBlack	-0.0269***	-0.0281***	-0.0110**	0.00727***	0.00743***	0.00677***
	(0.00498)	(0.00474)	(0.00459)	(0.00120)	(0.00119)	(0.00107)
StudPctOM	-0.0114***	-0.0116***	-0.00205	-0.00178	-0.00182	0.000987
	(0.00311)	(0.00310)	(0.00286)	(0.00237)	(0.00236)	(0.00212)
AdultFracIndex	1.036	1.083	3.226	-0.0813	-0.107	-0.210**
	(3.967)	(3.957)	(3.633)	(0.105)	(0.104)	(0.0941)
StudFracIndex	1.082***	1.111***	0.354*	0.0142	0.0227	0.0213
	(0.212)	(0.209)	(0.196)	(0.0807)	(0.0804)	(0.0722)
logIncMed	5.348***	5.713***	5.352***	3.211***	3.330***	3.038***
	(1.244)	(1.181)	(1.139)	(0.990)	(0.943)	(0.886)
log2IncMed	-0.199***	-0.215***	-0.209***	-0.0788*	-0.0824*	-0.0937**
	(0.0568)	(0.0543)	(0.0520)	(0.0446)	(0.0421)	(0.0400)
IncomeRatio	0.413***	0.412***	0.322***	0.640***	0.658***	0.379***
	(0.0498)	(0.0493)	(0.0457)	(0.0558)	(0.0516)	(0.0505)

IncomePct200K	-0.00284		0.00123	-0.00565		-0.0102*
	(0.00422)		(0.00387)	(0.00596)		(0.00534)
logStudents	-0.734***	-0.731***	-0.829***	-0.419***	-0.418***	-0.646***
	(0.0374)	(0.0367)	(0.0344)	(0.0341)	(0.0326)	(0.0312)
log2Students	0.0416***	0.0415***	0.0473***	0.0192***	0.0194***	0.0324***
	(0.00287)	(0.00283)	(0.00263)	(0.00219)	(0.00210)	(0.00199)
StudPctELL	0.00796***	0.00807***	0.00946***	0.00119		0.000632
	(0.00274)	(0.00274)	(0.00251)	(0.00111)		(0.000989)
StudPctSE	0.0121***	0.0120***	0.0157***	0.00815***	0.00803***	0.0112***
	(0.00123)	(0.00122)	(0.00113)	(0.00172)	(0.00171)	(0.00154)
HousePctOwnOcc	-0.000511		-0.00117	-0.000476		0.000789
	(0.000926)		(0.000848)	(0.000849)		(0.000761)
HousePctFam	-0.0133***	-0.0136***	-0.0108***	-0.0204***	-0.0214***	-0.0164***
	(0.00127)	(0.00118)	(0.00117)	(0.00137)	(0.00116)	(0.00123)
AgeSeniorPct	0.0203***	0.0201***	0.0122***	0.0107***	0.0103***	0.00379**
	(0.00155)	(0.00148)	(0.00144)	(0.00188)	(0.00177)	(0.00169)
AgeUnd18Pct	-0.00625***	-0.00633***	-0.00455***	-0.0105***	-0.0103***	-0.00741***
	(0.00180)	(0.00179)	(0.00165)	(0.00205)	(0.00203)	(0.00184)
EdHSGradPct	-0.00345**	-0.00332**	-0.000979	0.00148		0.00226
	(0.00152)	(0.00150)	(0.00139)	(0.00174)		(0.00156)
EdColGradPct	0.00771***	0.00769***	0.00453***	0.000720		0.000132
	(0.00101)	(0.000995)	(0.000933)	(0.00109)		(0.000974)
PctCharter	-0.0710		-0.158	0.193		0.214
	(0.127)		(0.116)	(0.159)		(0.142)
PovRate	-0.00116		-0.000668	0.00586***	0.00618***	0.00392**
	(0.00161)		(0.00148)	(0.00178)	(0.00174)	(0.00160)
logRevStPS			-0.439***			-0.555***
			(0.0139)			(0.0155)
Constant	-22.79***	-24.90***	-17.54***	-14.74***	-15.48***	-5.320
	(6.834)	(6.433)	(6.261)	(5.527)	(5.328)	(4.954)
Observations	5,270	5,270	5,270	5,267	5,267	5,267
R-squared	0.721	0.721	0.766	0.676	0.676	0.741
State FE	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4. Effects of increasing minority student population and reducing White student population on log local revenue, OLS estimates

High White adult subsample

	Change	Std. Err	t-stat	p-value
StudentPctAIAN	0.0090	0.0033	2.70	0.007
StudentPctAsian	-0.0011	0.0064	-0.18	0.859
StudentPctNHPI	0.0291	0.0182	1.60	0.110
StudentPctHispanic	0.0042	0.0021	2.02	0.043
StudentPctBlack	-0.0077	0.0037	-2.11	0.035
StudentPctOther	0.0075	0.0027	2.82	0.005

Low White adult subsample

	Change	Std. Err	t-stat	p-value
StudentPctAIAN	0.0026	0.0016	1.59	0.113
StudentPctAsian	0.0054	0.0032	1.68	0.093
StudentPctNHPI	-0.0134	0.0177	-0.76	0.448
StudentPctHispanic	0.0059	0.0011	5.19	0.000
StudentPctBlack	0.0074	0.0013	5.80	0.000
StudentPctOther	-0.0016	0.0022	-0.76	0.448

Table 5. IV Regression Results, high White adult subsample

VARIABLES	(1) High-White OLS	(2) High-White 2SLS	(3) Restricted	(4) High-White Add Hisp
AdultPctAIAN	-0.0182	1.275		
	(0.0713)	(2.470)		
AdultPctAsian	-0.0152	1.280		
	(0.0721)	(2.319)		
AdultPctNHPI	-0.157*	2.166		
	(0.0899)	(2.587)		
AdultPctHisp	-0.000496	2.356		
	(0.0700)	(2.405)		
AdultPctBlack	-0.0150	1.890		
	(0.0704)	(2.334)		
AdultPctOM	-0.0290	2.248		
	(0.0714)	(2.435)		
StudPctAIAN	-0.0103**	-0.178		
	(0.00437)	(0.183)		
StudPctAsian	-0.0205***	0.0473		
	(0.00716)	(0.261)		
StudPctNHPI	0.00968	-0.753		
	(0.0186)	(0.701)		
StudPctHisp	-0.0143***	-0.515*		0.0179
	(0.00358)	(0.309)		(0.0121)
StudPctBlack	-0.0269***	-0.437	-0.0789***	-0.0661**
	(0.00498)	(0.365)	(0.0297)	(0.0318)
StudPctOM	-0.0114***	-0.326		
	(0.00311)	(0.265)		
AdultFracIndex	1.036	-117.7		
	(3.967)	(135.2)		
StudFracIndex	1.082***	24.37	1.991***	1.310**
	(0.212)	(15.88)	(0.323)	(0.647)
logIncMed	5.348***	2.453***	5.013***	4.773***
	(1.244)	(0.637)	(1.285)	(1.296)
log2IncMed	-0.199***	-0.0596*	-0.189***	-0.178***
	(0.0568)	(0.0326)	(0.0586)	(0.0591)
IncomeRatio	0.413***	0.238	0.354***	0.365***
	(0.0498)	(0.309)	(0.0565)	(0.0575)
IncomePct200K	-0.00284	0.112	0.00999	0.00473
	(0.00422)	(0.100)	(0.0115)	(0.0122)
logStudents	-0.734***	-1.495**	-0.695***	-0.710***
	(0.0374)	(0.716)	(0.0419)	(0.0435)

log2Students	0.0416***	0.102**	0.0382***	0.0396***
	(0.00287)	(0.0517)	(0.00365)	(0.00385)
StudPctELL	0.00796***	0.0769	-0.0119**	-0.0194***
	(0.00274)	(0.0527)	(0.00503)	(0.00600)
StudPctSE	0.0121***	0.00808	0.0107***	0.0110***
	(0.00123)	(0.00661)	(0.00140)	(0.00144)
HousePctOwnOcc	-0.000511	0.00165	0.000747	0.000574
	(0.000926)	(0.00493)	(0.00118)	(0.00121)
HousePctFam	-0.0133***	-0.0313**	-0.0122***	-0.0123***
	(0.00127)	(0.0126)	(0.00160)	(0.00160)
AgeSeniorPct	0.0203***	0.00941	0.0176***	0.0173***
	(0.00155)	(0.0131)	(0.00173)	(0.00172)
AgeUnd18Pct	-0.00625***	-0.0306*	-0.00545***	-0.00565***
	(0.00180)	(0.0177)	(0.00188)	(0.00189)
EdHSGradPct	-0.00345**	-0.00850	-0.00494***	-0.00460***
	(0.00152)	(0.00741)	(0.00167)	(0.00171)
EdColGradPct	0.00771***	0.0144**	0.00770***	0.00848***
	(0.00101)	(0.00578)	(0.00107)	(0.00120)
PctCharter	-0.0710	-0.126	-0.0454	-0.0410
	(0.127)	(0.448)	(0.139)	(0.139)
PovRate	-0.00116	0.0111	-0.00308*	-0.00286
	(0.00161)	(0.00919)	(0.00174)	(0.00176)
Constant	-23.05***	-3.068	-20.73***	-19.34***
	(6.833)	(0)	(7.061)	(7.124)
Observations	5,270	5,270	5,270	5,270
R-squared	0.721	-1.196	0.685	0.684
State FE	Yes	Yes	Yes	Yes

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6. IV Regression Results, low White adult subsample

VARIABLES	(1) Low-White OLS	(2) Low-White 2SLS	(3) Low-White 2SLS
AdultPctAIAN	-0.00550***	0.00702	
	(0.00195)	(0.0103)	
AdultPctAsian	-0.00178	-0.0259*	
	(0.00362)	(0.0153)	
AdultPctNHPI	0.0667*	-0.228	
	(0.0393)	(0.197)	
AdultPctHisp	-0.00303**	-0.00163	
	(0.00149)	(0.00743)	
AdultPctBlack	-0.00496***	0.0111	
	(0.00179)	(0.0110)	
AdultPctOM	-0.0108**	-0.0148	
	(0.00517)	(0.0205)	
StudPctAIAN	0.00246	-0.00351	
	(0.00152)	(0.00780)	
StudPctAsian	0.00525	0.0442**	
	(0.00325)	(0.0196)	
StudPctNHPI	-0.0135	0.137	
	(0.0177)	(0.104)	
StudPctHisp	0.00586***	0.00905	0.00474***
	(0.00116)	(0.00622)	(0.00145)
StudPctBlack	0.00727***	-0.00653	-0.000916
	(0.00120)	(0.00716)	(0.00130)
StudPctOM	-0.00178	-0.0120	-0.0194***
	(0.00237)	(0.0118)	(0.00707)
AdultFracIndex	-0.0813	-0.290	
	(0.105)	(0.532)	
StudFracIndex	0.0142	0.820**	0.692***
	(0.0807)	(0.408)	(0.183)
logIncMed	3.211***	3.790*	-0.222
	(0.990)	(2.040)	(1.114)
log2IncMed	-0.0788*	-0.108	0.0730
	(0.0446)	(0.0923)	(0.0500)
IncomeRatio	0.640***	0.694***	0.591***
	(0.0558)	(0.0752)	(0.0573)
IncomePct200K	-0.00565	-0.00339	-0.00432
	(0.00596)	(0.00675)	(0.00608)
logStudents	-0.419***	-0.414***	-0.418***
	(0.0341)	(0.0426)	(0.0349)

log2Students	0.0192***	0.0178***	0.0190***
	(0.00219)	(0.00298)	(0.00223)
StudPctELL	0.00119	-0.00485*	-0.00195
	(0.00111)	(0.00266)	(0.00165)
StudPctSE	0.00815***	0.0112***	0.00716***
	(0.00172)	(0.00266)	(0.00182)
HousePctOwnOcc	-0.000476	0.000612	-0.000659
	(0.000849)	(0.00157)	(0.00118)
HousePctFam	-0.0204***	-0.0220***	-0.0199***
	(0.00137)	(0.00223)	(0.00167)
AgeSeniorPct	0.0107***	0.00889**	0.0105***
	(0.00188)	(0.00373)	(0.00202)
AgeUnd18Pct	-0.0105***	-0.0110***	-0.0126***
	(0.00205)	(0.00348)	(0.00205)
EdHSGradPct	0.00148	0.00401	0.00161
	(0.00174)	(0.00318)	(0.00222)
EdColGradPct	0.000720	-0.00117	0.00162
	(0.00109)	(0.00211)	(0.00117)
PctCharter	0.193	0.330*	0.260
	(0.159)	(0.177)	(0.162)
PovRate	0.00586***	0.00745***	0.00653***
	(0.00178)	(0.00241)	(0.00182)
Constant	-14.96***	-18.20	4.273
	(5.527)	(11.51)	(6.226)
Observations	5,267	5,267	5,267
R-squared	0.676	0.624	0.657
State FE	Yes	Yes	Yes

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7. Effects of increasing minority student population and reducing White student population on log local revenue, IV estimates

High White adult subsample

	Change	Std. Err	t-stat	p-value
StudentPctAIAN	0.0356	0.0058	6.16	0.000
StudentPctAsian	0.0356	0.0058	6.16	0.000
StudentPctNHPI	0.0358	0.0058	6.16	0.000
StudentPctHispanic	0.0341	0.0055	6.16	0.000
StudentPctBlack	-0.0436	0.0279	-1.56	0.118
StudentPctOther	0.0348	0.0056	6.16	0.000

Low White adult subsample

	Change	Std. Err	t-stat	p-value
StudentPctAIAN	0.0064	0.0017	3.79	0.000
StudentPctAsian	0.0066	0.0017	3.79	0.000
StudentPctNHPI	0.0070	0.0018	3.79	0.000
StudentPctHispanic	0.0084	0.0020	4.10	0.000
StudentPctBlack	0.0043	0.0020	2.17	0.030
StudentPctOther	-0.0130	0.0072	-1.81	0.071