Between the lines: Segregation across school district boundaries

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Abstract

Do political boundaries, particularly along racial cleavages, contribute to differences in spending on public goods? In explaining differences in per child expenditures across school districts, economic differences are the most cited. Racial segregation often occurs along school district borders and could lead to differences in per child expenditures through concentration of resources in certain districts. To test whether racial segregation across districts impacts inequality in education funding, I have collected data on the 11,000 plus school district and 1,800 counties in the United States from 1995 to 2011. Using a series of panel models, I find that white-black segregation leads to increased variation in per child local revenue within counties. Within these segregated counties, districts with larger black populations collect less in local revenue but have a higher tax burden.

When Michael Brown was gunned down by police in 2014, his mother through her grief, exclaimed, "You took my son away from me. You know how hard it was for me to get him to stay in school and graduate? You know how many black men graduate? Not many!" (Glass 2015). In St. Louis County, Missouri alone, there are 23 independent school districts, and the differences between them could not be more stark. The four-year graduation rate in 2014 for Normandy, the school district Michael Brown attended, was 61.6 percent. Compare this to school districts just south of Normandy, like Brentwood, where the graduation rate was 95.2 percent in 2014 (Missouri Department of Education 2014). The districts are just miles apart but vary in many ways; from racial composition to financial investment of local communities. Normandy, which was 97 percent black, collected $4,402 in local revenue per pupil compared to Brentwood, which was 71 percent white, collected $14,891 (National Center for Education Statistics 2013). This scenario is repeated over and over again throughout the United States. School districts in close proximity, and even in the same county, are vastly different.

Education is often the foundation for life-long opportunities and achievement. But access to good public education varies significantly across the United States, even in school districts that are side by side. While there is clear evidence that educational opportunities and outcomes vary across the United States, evidence on what influences investment in public education is less clear. Current research attributes differential rates of investment in public education to economic factors (i.e. Hoxby 1998) and not on racial cleavages. The existing scholarship about the effects of race on public spending have almost exclusively focused on *within* jurisdiction segregation ignoring segregation that occurs along boundaries. This paper seeks to understand how racial segregation along boundaries contribute to variation in investment in public education. School district boundaries define what school a child attends and play a large role in determining the property tax residents pay. Instead of using boundaries as a way to define the unit of interest, it is important that we understand the implications that the boundary itself play.

This paper seeks to move the focus of the effects of segregation on public goods *within* a specific boundary to its effects on public goods *between* boundaries. To do so, this paper uses an originally complied data set of over 11,000 school districts and 1,800 counties from 1995 to 2011. First, I establish that in counties with multiple school districts, white-black residential segregation is associated with increased inequality in per child current expenditures between districts. Focusing on the revenue that comes from local sources, white-black residential segregation is associated with increased inequality in per child local revenue. Then, I focus on school district level data to better understand the characteristics of what leads to increased inequality. Within these segregated counties, school districts with larger black populations collect less in local revenue.

To better understand whether the difference in collection is due to desire to support education or ability to contribute, I create a measure to proxy tax burden in the district. This is done by dividing the median household income within a district by what the average household contributes to property tax. I find that an increase in the percentage of black residents in a district is associated with an increase in tax burden. Therefore, although these districts are collecting less, they are paying more of their income. Lastly, I use test scores as a proxy for school quality. The percent of black within a community is associated with lower test scores, but even more so in segregated counties than in integrated ones.

Historic Context of School District Boundaries

While political boundaries are often used to define our unit of interest, understanding the impact that the boundary itself has is equally important. This is particularly true for school districts, where in many areas of the United States boundaries coincide with racial cleavages. Because school district boundaries define what school a child is able to attend and play a large role in determining the property taxes residents will pay, boundaries can have significant implications for residents.

The type of school district, whether dependent or independent from other forms of local government, matters as well. Independent school districts were part of progressive era reform for public education that sought to professionalize schools and remove them from the partisan politics of cities so that they are fiscally independent from other forms of local government (Berkman and Plutzer 2005). Approximately 92 percent of school districts in 2010 were independent school districts.[1] On the other hand, county, city or township dependent school districts are fiscally dependent on local government. County and city districts are most common in the South (approximately 4 percent of school districts) while township dependent school districts are more common in the Northeast (approximately 3 percent of school districts). Dependent school districts share the same geographic boundary as the local government that they are dependent on. Independent school districts geographic boundaries are not dictated by other forms of local government. While they can coincide with town, city, or county boundaries, they do not have to be defined that way. To illustrate the difference, Florida has 67 counties and 67 county based school districts (NCES 2012). Contrast this with New Jersey which has independent school districts; there are 21 counties and 567 school districts (NCES 2012).

Over the course of the twentieth century, the number of school districts in the United States declined rapidly as school districts consolidated. While there were over 100,000 districts at the start of the century, by the 1970s, that number had dropped to around the current level of approximately 14,000, as shown in Figure 1.[2] Consolidation was seen as another way to help professionalize education by making administration more efficient and allowing more specialization of instruction (Tyack 1974). However, consolidation did not happen uniformly across the United States.

Prior to the start of consolidation, the local school "was typically the key neighborhood institution binding neighbors and linking them to the larger social and cultural world around them" (Reynolds (2002), pp. 61). Fischel (2009) argues that consolidation was accepted by

[1] See Table A3 in the Appendix for a count of school district type by region.

[2] Because of expanded survey coverage, data before and after 1984 are not directly comparable.

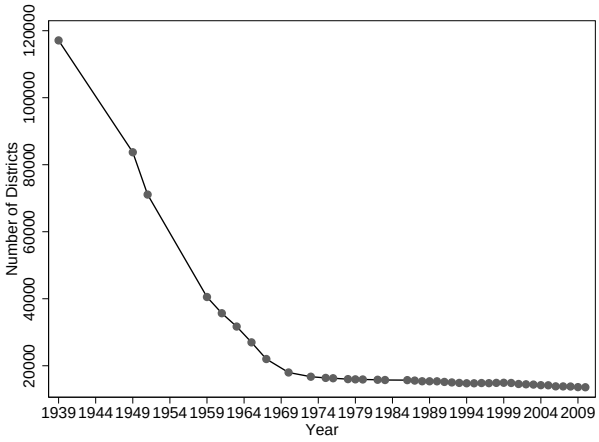


Figure 1: Number of School Districts Over Time

The number of school districts from 1939 to 2010. There was a drastic decrease in the number of school district during the first half of the centuryNational Center for Education Statistics (2012)

voters when consolidation proposals included natural community boundaries. That is, many states at first tried consolidation along town or county lines but efforts failed. It was only when consolidation occurred along "organic" community boundaries that it was successful (Fischel (2009), pg. 103). School districts that were more racially, ethnically, or religiously diverse were less likely to consolidate (Alesina et al. 2004). Variation in income also limited consolidation (Kenny and Schmidt 1994). In areas that were less willing to consolidate, states used funding as a way to encourage consolidation (Kenny and Schmidt 1994). In some cases, states unilaterally redrew district boundaries to force change (Hooker and Mueller (1970); Strang (1987)) Consolidation often occurred in rural areas (Kenny and Schmidt 1994), while urban and suburban areas contribute very little to the overall decline in the number of districts (Fischel 2009).

While there has been some district consolidation since the 1970s, overall, the change has been minimal (Berry and West 2008). The timing of the end of massive school district consolidation coincided with the effort to desegregate schools. *Brown v. Board of Education of Topeka* set forth steps to desegregate schools in 1954. But because the ruling failed to outline mechanisms for desegregating, it was not until the federal government threatened to with-

hold Title I funds in the 1960s that districts, particularly poorer districts, began to comply (Peterson 2010). By 1970, the average school district in the South had desegregated (Cascio et al. 2008), where county and city dependent school districts are more common. School segregation levels declined substantially between 1968 and the mid-1970s, with segregation levels declining more in the South than the North (Reardon and Owens 2014)

However, in many areas of the United States where independent schools are more common, the issue with segregation was not *within* a school district but segregation *between* districts. In 1974, it was ruled in *Milliken v. Bradley* that inter-district busing to help achieve integration across districts was unconstitutional. Segregation could only be legally addressed within a district, but could not be addressed when it occurred between two or more districts. With this ruling, it effectively limited ways to address racial disparity and allowed the possibility of racial disparity to grow between districts (Clotfelter 2011). School district consolidation has been extremely limited after the 1970s. In recent years, we have started to see the reverse. Communities within school districts are seceding from districts to form their own, more homogeneous school district. Since 2000, 71 communities have attempted to secede from their school district with 47 of them successfully doing so (EdBuild 2017). In many places, the process divided communities along socioeconomic and racial lines (EdBuild 2017). Furthermore, while school boards have been a way in which minority communities have gained political empowerment (Chambers 2006; Henig et al. 2001; Marschall 2005), dealt with systemic discrimination (Katznelson and Weir 1988), and reduced within district segregation (Macartney and Singleton 2018), school boards can only make changes within their jurisdiction and are limited to the resources within it.

Boundaries as a way to exclude

The way in which school district boundaries were created and the type of school district has implications on whether segregation would likely be addressed. Therefore, understanding the role of boundaries is important. The commonly held economic view of local political

boundaries, made famous by Tiebout (1956), is that jurisdictions represent different levels of taxes and public goods, and people can sort themselves into their desired location. Boundaries are endogenous to the outcome; people are self-selecting into what is appropriate for them (Oates (1969); Tiebout (1956)). Therefore, if a family wants to spend more on education than their current school district, then they can simply move to a different school district that has the appropriate level of taxing and spending that the family desires.

However, boundaries can serve as a way to exclude people and concentrate resources as well. By regulating housing, zoning, taxation, or other resource policies, political boundaries can serve in ways to keep residents more homogeneous and exclude certain races or economic classes (Danielson 1976; Weiher 1991). Within the United States today, it is common for school districts to be homogeneous in terms of race within but highly segregated between. Neighborhoods in the United States are highly segregated along racial lines (Oliver 2010). Bischoff (2008) argues that the social construction of political boundaries affects the demographic composition of the units. Fragmentation of political jurisdictions, she argues, affects residential segregation between school districts. Trounstine (2018) takes the argument one step further; white property owners preference for homogeneous communities has created and reinforced segregated cities through zoning laws.

It is the areas with minority populations that are often hurt; segregation concentrates poverty in black neighborhoods (Massey and Denton 1993). Therefore, segregation along district lines could create districts that do not have the same ability to collect revenue as other surrounding districts. The majority of local revenue for public education is garnered through property taxes. If one school district has higher property values than another district, they can tax themselves at a lower rate to obtain the same amount of money. It is also possible that the school structure in an area also has impacts on labor and housing markets of an area (Scott and Holme 2016). In deciding where to live, school quality is used as a proxy for the racial composition of a neighborhood (National Fair Housing Alliance 2006). By reinforcing patterns of segregation, resources are further bifurcated. Interestingly,

the fragmentation of districts is not always beneficial economically for any group. People are willing to give up economies of scale to avoid being in a jurisdiction with significant racial or income heterogeneity (Alesina et al. 2004).[3]

District Boundaries and Financial Variation

While there is evidence that fragmentation and racial segregation are strongly related, how does that relate to differences in resources? There have been many explanations for differences in funding across school districts, but these explanations are often based on economic differences among districts. Financing for public education is primarily left to local and state governments to determine, with about 42 percent from local sources and 46 percent from the state in 2010. The majority of local revenue comes from property taxes. Variation in funding between school districts is often attributed to differences in household income between districts (Hoxby 1998) and an increased sorting of neighborhoods by income (Putnam 2016).

More pressure has been placed on states to rectify variation in per child spending. The California Supreme Court decision's declaring the state funding formula to be unconstitutional in *Serano v. Preist (1971)* created a new way to combat financial inequality within a state. Over 40 states have had their funding formulas challenged since then with hopes of equalizing funding (Berkman and Plutzer 2005). While state funding formulas have helped reduce differences in per child spending across districts within states, they have not eliminated the differences among districts (Odden and Picus 2014). Do these differences among districts relate to racial cleavages? To understand this first question, I focus on a larger region around the school district to capture the effects of segregation across school district lines. I use county as the larger geographic area, where school districts are nested within the

[3]There is also an important line of literature focusing on the appropriate size of a jurisdiction in terms of democracy. Small jurisdictions often allow citizens to feel more competent in participating (i.e) Almond and Verba (1963); Dahl and Tufte (1973); Lassen and Serritzlew (2011)). This article, however, is not focusing on the appropriate size of a school district in terms of democratic values.

county that they reside.[4] I look at both the overall variation in expenditures per child as well as the variation in local revenue per child within a county. This allows me to identify if there is any differences in spending, and if so, is it the local level that is contributing to the differences. I, therefore, hypothesize: *there will be greater inequality in local revenue for public education in counties that are residentially racially segregated compared to counties that are integrated.*

The next question then is, what are the characteristics of districts that collect less in local revenue? Both individual attitudes, like the desire to be in a more homogeneous district, and the availability of resources could contribute to inequality in education revenue across school districts. Diversity has long been shown to be associated with a decrease in public investment (i.e., Alesina et al. 1999; Putnam 2007). This finding has been extending to spending on public education as well (Poterba 1996; Hoxby 2000). Racial threat theory provides an explanation for this. Individuals living in close proximity to different racial groups feel threatened, economically and socially, through increased competition over scarce resources (Key 1949; Blumer 1958; Blalock 1967, and Bobo 1988). Boundaries would then serve as a way to keep resources for a particular group and exclude other groups.

In addition, underlying government structures within a region that mediate distribution of local resources can contribute to racial disparity in income (Lewis and Hamilton 2011). Local revenue is primarily driven by property tax. Districts that have higher priced property or more commercial property will be able to collect more in revenue at a lower tax rate. This unequal collection of revenue between districts will result in some communities having less to spend per student. This can translate into different levels of resources at a school or unequal teacher pay in districts that are side by side. I hypothesize *in areas where segregation occurs along boundaries, districts that encapsulate larger minority groups, particularly black, will collect less in local revenue than in integrated communities.*

How does this variation in per child revenue impact quality? Research focusing on inter-

[4]Some school districts do cross county lines. School districts are assigned to counties based on where the majority of the school district is located

national governments suggests that higher segregation in terms of ethnicity and language is associated with significantly lower quality of government (Alesina and Zhuravskaya 2011). However, school choice, as argued by Hoxby (2000), would suggest that more districts would create more competition and better outcomes. This assumes that each district has the ability to contribute the same level of resources.

High quality teachers can have a large impact on student success, particularly through future earnings (Hanushek 2011). But access to high quality teachers can vary greatly. Areas with with low-income and non-white students as well as urban areas tend to have less skilled teachers (Lankford et al. 2002). While research has been limited in explaining why exactly teachers sort, there has been substantial work showing that wages do matter in determining selection into teaching, moving to a new school or district, and leaving teaching altogether (i.e. Theobald and Gritz 1996, Imazeki 2005, Borman and Dowling 2008). Instructional support, which is primarily teacher salaries, is often the largest part of the budget. In the data set used in this paper, 60 percent of the average current expenditures went to instructional support. If racial segregation concentrates resources including teachers, then certain districts might not be able to compete with surrounding districts. While test scores fail to capture many important aspects of quality, they can be used as a proxy. Therefore, I hypothesize *in segregated counties, districts with larger proportion of black citizens will have lower test scores.* In the next section, I describe the data set used to test these hypotheses.

The Data: County and Public School Districts

Data was collected at both the county and school district level from 1995 to 2011 on school district budgets, student demographics, and community demographics. Table A1 and Table A2 in the appendix summarize each data set for three years: 1995, 2000, and 2010. The Public Elementary - Secondary Education Finance Data provided by the U.S. Census Bureau has school district budgets from 1995 to 2011 and identifies revenue by local, state,

and federal governments(US Census Bureau 2011). All dollar amounts are in 2013 constant dollars. The Local Education Agency (School District) Universe Survey collects student demographic information like the racial and ethnic breakdown of the students (NCES 2012).

I include community level information about the school districts from the 1990, 2000 and 2010 Census (US Census Bureau 1990; US Census Bureau 2000; US Census Bureau 2010). Because the Census data is not yearly, I interpolate data between the three Censuses. In addition, I included presidential vote by county as a proxy for support for government spending (CQ Press 2016). To obtain county-level measures of all other variables, school districts are aggregated to the county-level. While most school districts do fall within a county, some school districts do cross county lines. When this occurs, school districts are assigned to counties where the largest portion of the district falls in terms of land area.

For this data set, I focus only on Elementary School Districts, Secondary School Districts, and Elementary-Secondary School Districts that are financially independent from other forms of local government or township school districts. I exclude county, city, vocational, special needs districts, non-operating districts, state-run districts, charter districts, and educational service agencies. This yields approximately 11,000 school districts. County and city school districts are excluded because they represent the larger region, county, that I am interested in testing. Because some districts merge, open, or close during this time-frame, the exact number varies from year to year but is stable overtime for the vast majority.[5]

Measuring Segregation

To measure residential segregation, I use the H index (Theil 1972). It calculates a segregation measure that controls for both evenness of the distribution of a group and the relative size of that group. The H index varies between 0 and 1, where 0 indicates that each sub-unit (census tract) has the same composition as the entire unit (district or county) and 1 indicates

[5]There is a small amount of missing in some of the variables early on in the data set. As a robustness check, I re-ran models with imputed data as well as on the districts that had no missing data. Results do not change and are available on request.

that all sub-unit contain only one group.[6] Therefore, 0 implies complete integration and 1 implies complete segregation. To create these measures, I use US Census tract demographic information[7]. Because the geographic area that is included in a census tract can change over time, I re-weight the 1990 and 2000 tracts to reflect 2010 tract boundaries according to Logan et al. (2014).[8] Census tracts are then mapped on to school districts using the 2013 School District Geographic Relationship Files created by the National Center for Education Statistics (National Center for Education Statistics 2013). I use this measure in all models and is denoted as *White-Black Segregation District* (or County). For most models, I calculate the white-black segregation. However, the measure is not limited to two groups. I also calculated white-Hispanic-black segregation for some models as well.

In addition to segregation, I include measures for diversity. Diversity can be measured in different ways, but I am using percent black (*% Black*) and percent Hispanic (*% Hispanic*) to capture the level of diversity of the district. I include the change in percent black and change in percent Hispanic in a five year period (*5 year* Δ *%Black; 5 year* Δ *%Hispanic*) to capture change (Hopkins 2009). To capture economic conditions, I include median household income reported in thousands of dollars as a measure for district wealth (*Median HH Income (thous)*). Home-owners might have different priorities than renters when it comes to protecting property values, therefore, I include the percent of residents that own their own home, *% Own home*. Percent of residents with a bachelor degree or higher is included as a proxy for education support (*% Bachelor or greater*) and percent of Democratic vote in the previous election as a proxy for support for government spending (*% Pres Dem Vote*).Variation in district size is captured by the number of students in a district and the log of the population

[6]The most common measure used for segregation is the dissimilarity index, which calculates the percentage of a group's population that would have to change residence for each neighborhood to have the same percentage of that group as the overall area. However, it does not control for the relative size of one group to another group.

[7]For the 1990 and the 2000 Census, tract level data was downloaded directly from the American Fact Finder US Census Website for each state. The 2010 tract level data was downloaded using USCensustract2010 package in R (Almquist 2010)

[8]The US2010 program at Brown University has created STATA code to re-weight tracts in the 1990 and 2000 Census to reflect changes in boundaries from the 2010 Census. This code was written by Brian Stults.

(*No. of students; Log Population*).

In models that focus on revenue from local government, I include controls for per child state level funding and per child federal level funding (*Per child state; Per child fed*). For county models, I include the log of the number of school districts as a measure of both choice and fragmentation. The next section describes the results when focusing on the effect of segregation within a county on variation in per child local revenue.

Models

I first focus on whether or not segregation within the county is associated with larger variation in revenue among school districts. The focus is on the county to better understand how segregation influences resources in places that geographically close. County is chosen as the larger unit to consider because they exist in every state and are also nested within state.[9] School districts, like local governments, are not independent entities from the state (Morgan and Watson 1995). States fund education at different levels and set the rules that districts must follow in generating education funds. Combining two districts from two different states would introduce an entirely different set of questions in explaining variation in revenue and spending. By focusing on county instead, I can account for state-specific variation through modeling. To make sure that I have variation within a county, my analysis only includes independent school districts.

After determining whether variation exists in overall spending, I then focus specifically on the local amount raised because this is what local citizens and school boards have control over and reflects the resources within a school district. In order to control for differing sizes of school districts at the district level, I calculate *per child local revenue* as a per child measure by dividing what is collected at the local level by school enrollment. Then, for the county level, I calculate the standard deviation in per child local revenue among the school

[9]While core-based statistical areas (CBSA) do define geographic areas and are frequently used, one CBSA can be in two different states.

districts in that county. The dependent variable is then standard deviation in per child local revenue at the county level. As an example, St. Louis County, Missouri would be a unit of observation and the standard deviation in *per child local revenue* among the 23 school districts would be the dependent variable. The standard deviation in per child local revenue in 1995 for St. Louis County was $2,164. There was even more variation in local revenue at the county level in 2010 at $4,027.

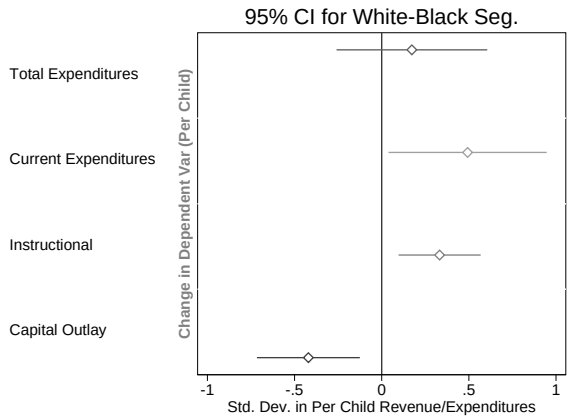
To model the variation in per child revenue, I use a mixed model approach. I include state and year fixed effects to account for differences in state-level policy regarding education spending and changes over time. In addition, I include county-level random intercepts. County-level random intercepts are a compromise between complete pooling, in which county-level information is ignored and not included in the model, and no pooling, in which separate models are fit within each county (Gelman and Hill 2007). Independent variables are all county-level.

Segregation increases variation in revenue

The first set of results focuses on expenditures per child. Specifically, I test whether there is variation in total expenditures (which includes current expenditures and capital projects), current expenditures, instructional expenditures (i.e. money spent on instruction, like teacher pay), capital outlay (i.e. building new schools). Figure 2 plots the 95% confidence intervals for the coefficient *White-Black Segregation* for the four different models. Table A4 in the appendix shows the full regression results. *White-Black Segregation* does not statistically explain variation in per child total expenditures. However, looking at its components, per child current expenditures and per child capital outlay, a different story emerges. *White-Black Segregation* explains an increase in variation in both current expenditures and instructional expenditures but a decrease in variation in capital outlays. Therefore, state and federal revenue help even out variation in spending, particularly when it comes to capital projects. But in regards to money spent on instructional support for things like

teachers, there is more variation in spending in more segregated areas.

Figure 2: Change in Dependent Variable (Standard Deviation)

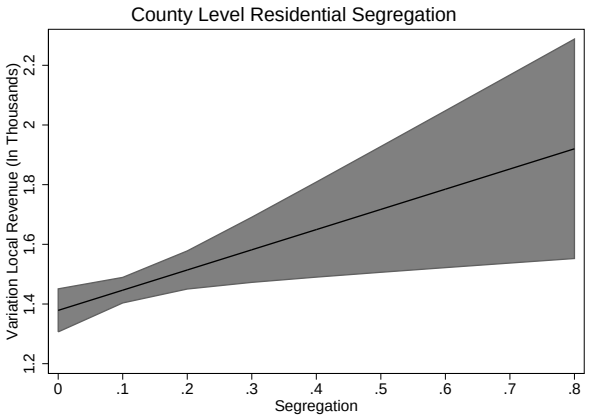


Note: Each row represents a new regression with the 95% confidence interval on the coefficient *White-Black Segregation* plotted for different dependent variables. Each row is the standard deviation of the per child measure.

The next step is to look at the revenue stream to identify where the differences are emerging. Revenue from schools comes from local, state, and the federal levels, but the local level is what communities have control over and where differences in resources are likely to play the largest role. Therefore, I focus on variation in per child local revenue. The analysis in Table 1 shows that *White-Black Segregation* at the county-level is associated with increased variation in per child local revenue, even after controlling for economic conditions within a county. That is, the more segregated a county is among scool districts, the larger the variation in what is collected in terms of local revenue per child. Column 1 in Table 1 shows the results with only two explanatory variables, *White-Black Segregation* and the *Log Number of Districts*. Within the same state and year, counties that are more residentially segregated have more variation in per child revenue. The log of the number of districts, a proxy for county fragmentation, is not statistically different from zero.

Column 2 adds covariates to the model. If *White-Black segregation* does cause increased variation beyond economic and attitudinal factors, then I would expect the coefficient on

Figure 3: County Level Residential Segregation



Note: This figure plots the marginal effect of an increase in White-Black segregation on the standard deviation in per child local revenue. It corresponds to Table 1 Column 2.

this term to be positive and significant. Again, I find that segregation is associated with an increase in variation in per child local revenue. Figure 3 plots the marginal effect of an increase in white-black segregation on the standard deviation in per child local revenue. As *White-Black Segregation* increases, so does the variation in local revenue.

In addition to analyzing white-black segregation, columns 3 and 4 in Table 1 replace this with *Multi-Group Segregation* and *Income Segregation*. The multi-group measure is a measure of segregation among all racial and ethnic groups within a county. It is not statistically different from zero, indicating that it is the relationship between white and black residents that is driving this finding. Column 4 replaces segregation by race and ethnicity with segregation by income. Race and income are often correlated. Instead of segregation by race explaining an increase in variation, it could be that is actually income. However, the coefficient *Income Segregation* is not statistically different from zero. While it might be expected that income segregation should explain variation in revenue at the local level, the model is already controlling for this both through *Median Household Income* and *% Bachelor Degree or higher* as well as the *Standard Deviation of Per Child State Revenue*. Most states have funding formulas that theoretically adjust for the financial capacity of the district.

Table 1: Predicting Variation in Per Child Local Revenue at the County Level

	(1)	(2)	(3)	(4)
White-Black Segregation	0.74**	0.68*		
	(0.27)	(0.27)		
Multi-Group Segregation			0.28	
			(0.19)	
Income Segregation				0.18
				(0.34)
Log Number of Districts	0.07	0.19**	0.20**	0.20**
	(0.04)	(0.05)	(0.05)	(0.05)
% African American		0.00	0.00	0.00
		(0.00)	(0.00)	(0.00)
% Hispanic		0.01*	0.01*	0.01*
		(0.00)	(0.00)	(0.00)
Number of Students		-0.00	-0.00	-0.00
		(0.00)	(0.00)	(0.00)
Std. Dev. in Per Child State		0.00**	0.00**	0.00**
		(0.00)	(0.00)	(0.00)
Std. Dev. in Per Child Federal		0.00*	0.00*	0.00*
		(0.00)	(0.00)	(0.00)
Log of population		-0.27**	-0.26**	-0.27**
		(0.04)	(0.04)	(0.05)
Median Household Income		0.03**	0.03**	0.03**
		(0.00)	(0.00)	(0.00)
% Bachelor Degree or higher		1.41*	1.36*	1.36*
		(0.51)	(0.51)	(0.51)
% Pres Vote Democrat		0.00*	0.00*	0.00*
		(0.00)	(0.00)	(0.00)
Constant	2.25**	2.98**	2.81**	2.91**
	(0.51)	(0.59)	(0.59)	(0.62)
Observations	29,644	29,636	29,636	29,636
Counties	1,893	1,893	1,893	1,893
Year and State Fixed Effects	X	X	X	X
County Random Effects	X	X	X	X

Note: The dependent variable in all models is the *Standard Deviation of Per Child Local Revenue* at the county level in thousands of dollars. The results include state and year fixed effects and county random effects. Robust standard errors that are clustered at the county level are in parentheses. **p<.01, *p<.05

Minority Districts Collect Less

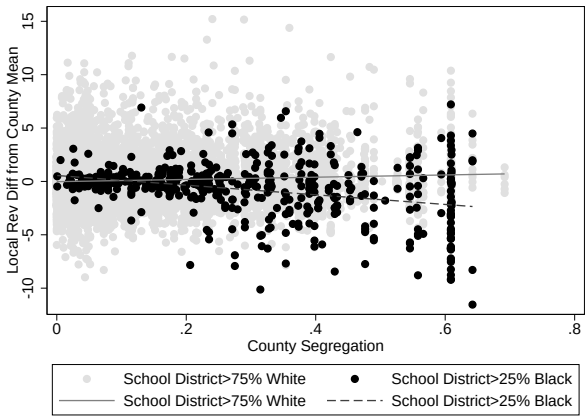
The next question, then, is what are the characteristics of districts that collect less in per child local revenue in a segregated setting? The next set of models tests the hypothesis that districts with larger minority groups collect less per child local revenue. In addition, I test if there are differences in tax burden. While certain districts might collect less in revenue, they could actually be paying a larger share of taxes. I determine a proxy for an average district tax burden by taking the total amount of revenue collected by local property taxes and dividing it by the number of households in the district. This gives a per household average of what is collected in local property tax. I then divide the per household average local property tax revenue by the median household income of the district. This is done for every year within each district. This yields a percent, which approximates the percent of the median household income is collected in property tax. Lastly, I test how school quality, proxied by test scores, is impacted by segregation along racial lines within counties.

In order to understand how one district's revenue compares to another district within the same county, I transform each dependent variable so that it is in relation to the county mean. That is, the dependent variable is the difference between the district per child local revenue and the mean county per child local revenue at time t. A negative number indicates that the district at time t collects less in revenue than the county average, while a positive number would indicate that they collect more than the county average. This is done so that all dependent variables are in reference to the county mean: per child local revenue, per child total expenditures, percent of median household income paid in property taxes, and test scores.

In a simple test of the model, Figure 4 plots the difference between the district and county mean for per child local revenue and the level of White-Black segregation in the county. The districts are color coded depending on the race of the population within the district. Grey shows districts that have over 75 percent white. Black dots show districts that have over 25 percent black. As segregation increases, we can see that there is increased variation in

revenue collected and that districts with a large minority population collect less in revenue in more segregated counties.

Figure 4: Comparison Across Counties 2010

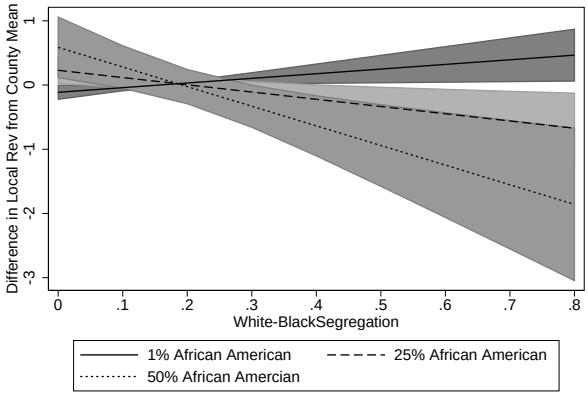


Note: This figure plots the difference between each school district local revenue and its county mean against the level of segregation within the county. School Districts where more than 75% of the residents are white are plotted in gray, and districts with more than 25% of residents are black are plotted in black. As county segregation increases, black districts receive less in local revenue compared to white districts in this simple model.

To more formally model this, I include state fixed effects to capture time-invariant differences in state policy and year fixed effects to capture changes over time. I also include the same set of covariates discussed in the previous section. I show results from two different ways of pooling county-level information to show consistency in results: complete pooling with no county-level random intercepts and partial pooling with county-level random intercepts. In order to test the hypothesis that in more segregated counties districts with higher minority populations collect less in local revenue, I include an interaction between residential segregation at the county level and percent black within a school district. I would expect a negative coefficient on this interaction term to show support for my hypothesis. In all models, robust standard errors are shown.

What characteristics predict having a per child local revenue that is below the county mean? Table 2 provides insights. As a model note, Columns 1, 2, an 3 do not include county-level random intercepts. Column 4 includes county-level random intercepts to show

Figure 5: County Level Segregation

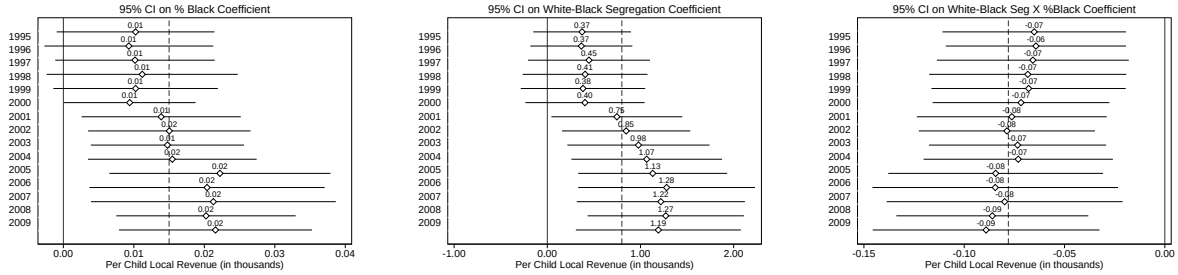


Note: Marginal effect for a change in *White-Black Segregation* for *Per Child Local Revenue*. Results are from Table 2 Column 2.

consistency in results. Column 1 includes only the % Black within the district and the level of segregation at the county but does not include the interaction term between the two. It does include controls for other important factors, like economic conditions and district size. Diversity seems to be driving the results- a one percent increase in black residents is associated with a $14 decrease from the county mean.

However, once the interaction is added, Column 2 tells a slightly different story. The interaction term is negative and significant, indicating that it is in segregated counties that districts with larger black residents collect per child revenue below the county mean. To better understand the relationship, Figure 5 plots the marginal effect of a percentage change in segregation for three different percentages black residents within a district: 1% black residents, 25% black residents, 50 % black residents. When the county is integrated, i.e. *White-Black Segregation* is close to 0, *% Black* within a community does not predict different levels of revenue within a county. But as the county becomes more segregated, districts with larger black populations collect less than their county mean. If I include county-level random intercepts to partially pool county information as shown in Column 4, results remain consistent. This finding is unique to black populations as well. Column 3 changes the segregation measure from *White-Black Segregation* to *Mulit-Group Segregation*. The

Figure 6: Coefficients by Year



Note: Each year represents the coefficient from the model run *only on that year*. The dashed vertical line represents the coefficient from the full model with all years included. The graph on the left shows the coefficient for *%Black* across different years. The middle graph shows the coefficient for *White-Black Segregation*, and the graph on the right shows the coefficients for the interaction term.

interaction is not statistically different from zero. This provides further evidence that not all groups should be treated the same.

As a robustness check to Table 2 Column 2, I run the model separately for each year in the data. Because segregation and diversity are often slow moving over time, there is fear that a few observations could drive results in a panel setting. To mitigate this, I show that the results are consistent within each year. Figure 6 illustrates these results. It plots 95% confidence intervals for the three key variables: *White-Black Seg X % Black*, *% Black*, *White-Black Seg*. Each year represents the coefficient from the model run *only on that year*. The dashed vertical line represents the coefficient from the full model with all years included (Table 2 Column 2). The graph on the left shows the coefficient for *%Black* across different years. The middle graph shows the coefficient for *White-Black Segregation*. For both of these coefficients, earlier years were not statistically significant, but are from 2001 and on. The graph on the right shows the coefficients for the interaction term. In all years, the interaction term was negative, statistically significant and consistent with the full model results.

In addition to understanding which districts collect less revenue at the local level, this section also provides evidence as to whether state and federal funds are able to make up the difference, whether the tax burden is the same, and how this effects quality as proxied by

Table 2: Predicting Variation from the County Mean
in Per Child Local Revenue

	(1)	(2)	(3)	(4)
White-Black seg. county	0.363	0.800*		0.875**
	(0.276)	(0.340)		(0.227)
White-Black seg. county X % Black		-0.077**		-0.078**
		(0.024)		(0.030)
% Black	-0.014*	0.014*	-0.014*	0.023**
	(0.006)	(0.006)	(0.007)	(0.009)
Multi-Group seg. county			0.537	
			(0.378)	
Multi-Group seg. county X % Hispanic			-0.011	
			(0.023)	
% Hispanic	-0.003	-0.002	-0.001	-0.010**
	(0.004)	(0.004)	(0.004)	(0.004)
5 year Δ % Black	-0.040	-0.026	-0.039	-0.027*
	(0.021)	(0.015)	(0.021)	(0.013)
5 year Δ % Hispanic	-0.056**	-0.060**	-0.054**	-0.035**
	(0.016)	(0.018)	(0.015)	(0.012)
Per child state	-0.000**	-0.000**	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Per child federal	-0.000	-0.000	-0.000	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
No. of students	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Median household income	-0.015**	-0.016**	-0.015**	-0.010**
	(0.005)	(0.005)	(0.005)	(0.003)
Log population	-0.373**	-0.379**	-0.366**	-0.495**
	(0.062)	(0.061)	(0.062)	(0.042)
% Bachelor or greater	0.073**	0.073**	0.074**	0.099**
	(0.007)	(0.007)	(0.007)	(0.005)
% Dem. president vote	0.000	-0.001	-0.000	0.001
	(0.006)	(0.006)	(0.006)	(0.002)
% Own home	0.005	0.005	0.006	-0.005
	(0.005)	(0.005)	(0.005)	(0.004)
Constant	3.554**	3.524**	3.473**	4.903**
	(0.642)	(0.671)	(0.651)	(0.581)
Fixed Year & State Effects	X	X	X	X
Random County Intercepts				X
No. Counties	1,985	1,985	1,985	1,985
No. Districts	10,871	10,871	10,871	10,871
No. Obs	162,502	162,502	162,502	162,502

Note: The dependent var is the *difference between district per child local revenue and the county per child local revenue*. School district is the unit of observation. Robust standard errors are reported. **p<.01, *p<.05

test scores. Table 3 displays the results. Models are identical to the specification of Table 1 Column 2 and include state and year fixed effects. The dependent variables are transformed to be the difference from the county mean for a particular district. Column 1 includes revenue raised from all level- local, state, and federal. When state and federal dollars are in the mix, the interaction term is not significant. Districts with high minority populations that are in segregated counties are not worse-off when it comes to total expenditures than districts in more integrated places.

While districts with higher percentage of black residents collect less in per child revenue, does that mean that they are paying less? As a way to better understand the differences in tax burden, I construct a measure that takes the total revenue collected from property taxes within each district and year and divides it by the number of households in that district. This gives a per household measure of what they contribute to property taxes. Then, I divide per household property tax contribution by the median household income to get the percent of household income that is spent on property taxes. While this measure is crude, it does provide at a basic level information about tax burden (per household property tax) compared to median household income. In 1995, the mean "tax burden" was 2.82%.

Table 3 Column 2 reports the results from the model using the difference in "tax burden" between the district and county as the dependent variable. While the interaction was never significant in any models, % Black is positive and statistically significant. That is, a percentage point increase in black residents within a district results in an increase to the "tax burden" or an increase in the share of property taxes paid relative to median household income.

Because district resources can play a larger role in what is collected in property taxes, further analysis was conducted by looking at urban, suburban, and rural/town districts separately. One possibility is that urban districts have more commercial buildings than rural districts, which could influence property tax burdens. Table A7 in the appendix shows the results from four separate models. The first model is identical to Table 3 Column 2

but includes two additional variables *urban district* and *suburban district* to indicate the type of geographic area of the school district. The coefficient on *Urban district* is positive and statistically significant, indicating that districts that are in an urban environment have a larger tax burden. However, even controlling for urban environment, *% Black* is still positive and statistically significant. This is true when running separate models by each geographic type, with the exception of rural and town school districts (shown in Columns 2-4 in Table A7).

While test scores are limited in what they measure, they are one way to compare proficiency in math and reading. The George W. Bush Institute compiled Global Report Cards from 2004 to 2009, which create comparable test scores across the United States at the district level (Green and McGee 2011).[10] Because there is only five years of data, interpretation of results are limited. However, I do find that in both math and reading a negative relationship between test scores and % Black in the district. The effect is even greater in segregated counties. This is illustrated by Figure 7, which plots the marginal effect of a change in *White-Black Segregation* at the county-level for three different districts that have different percentages of black residents (1%, 25%, and 50%). When a county is integrated, test scores are closer to the county mean for each group. But as segregation increases, districts with small populations of black residents perform greater than the mean, while districts with higher populations perform below the mean.

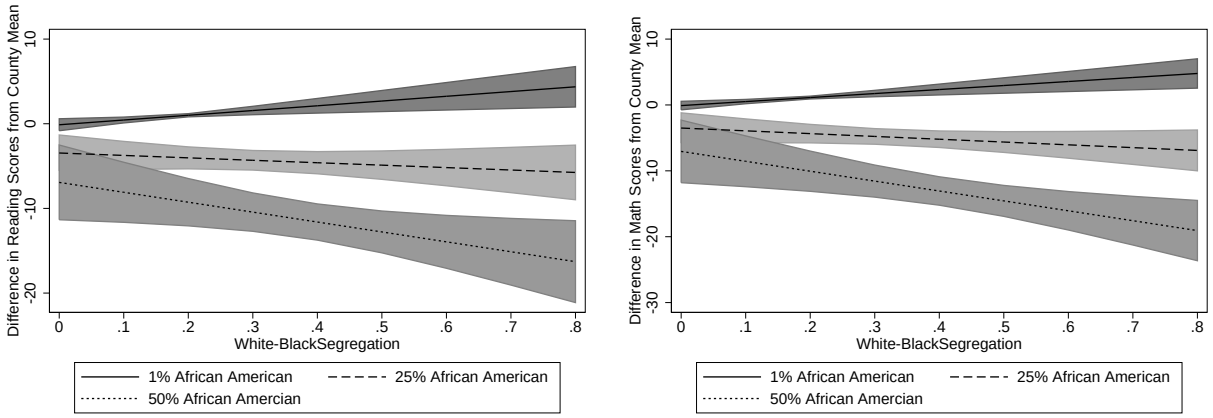
[10]They use the National Assessment of Educational Progress (NAEP) exam to estimate the distribution of state education quality, which they use to shift distributions of district quality data within each state. These scores are based on tests from a random sample of 4th through 8th graders.

Table 3: Predicting Variation from the County Mean for Different Outcomes

	(1) Per Child Expenditures	(2) % Med HH Inc Property Tax	(3) Math Test Scores	(4) Reading Test Scores
White-Black seg. county	0.380*	0.026	6.526**	5.959**
	(0.179)	(0.082)	(1.803)	(1.962)
% Black	0.024*	0.004*	-0.142**	-0.139**
	(0.011)	(0.002)	(0.051)	(0.048)
WB seg. county X % Black	-0.007		-0.431**	-0.353**
	(0.028)		(0.098)	(0.100)
% Hispanic	0.002	-0.003	-0.064**	-0.079**
	(0.003)	(0.004)	(0.016)	(0.020)
5 year Δ % Black	-0.067	-0.007	-0.173	-0.127
	(0.036)	(0.007)	(0.106)	(0.114)
5 year Δ % Hispanic	-0.049**	0.006	-0.273*	-0.296*
	(0.011)	(0.011)	(0.122)	(0.143)
No. of students	0.000*	0.000**	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Median household income	0.000	-0.005*	0.030	0.026
	(0.003)	(0.002)	(0.017)	(0.018)
Log population	-0.578**	-0.226**	-0.571*	-0.610*
	(0.081)	(0.034)	(0.216)	(0.274)
% Bachelor or greater	0.034**	0.008*	0.327**	0.337**
	(0.006)	(0.004)	(0.022)	(0.024)
% Dem. president vote	-0.000	0.004*	0.020	0.014
	(0.003)	(0.002)	(0.045)	(0.047)
% Own home	-0.023**	-0.010**	0.124**	0.140**
	(0.006)	(0.003)	(0.025)	(0.023)
Per child state		-0.000**		
		(0.000)		
Per child federal		-0.000**		
		(0.000)		
Per child expenditures			-0.264**	-0.260**
			(0.039)	(0.044)
Constant	5.877**	2.800**	-7.786*	-8.322*
	(0.853)	(0.428)	(3.234)	(3.276)
Fixed Year & State Effects	X	X	X	X
Years Included	1995-2010	1995-2010	2004-2009	2004-2009
No. Counties; No. Districts	1,905; 10,871	1,904; 10,886	1,896; 10,556	1,896; 10,556
No. Observations	159,392	160,912	58,625	59,284

Note: The dependent variables are all transformed so that they are the difference between the district and the county mean. School district is the unit of observation. The results include state and year fixed effects. Robust standard errors are reported. **p<.01, *p<.05

Figure 7: The effects of county-level segregation on test scores



Note: Marginal effect for a change in *White-Black Segregation* for Reading (left) and Math (right). Results are from Table 3 Columns 3 and 4.

Discussion and Conclusion

In her presidential address at the annual American Education Research Association conference, Ladson-Billings (2006) stated "One of the earliest things one learns in statistics is that correlation does not prove causation, but we must ask ourselves why the funding inequities map so neatly and regularly onto the racial and ethnic realities of our schools." The effects that diversity and segregation have on public goods have long been an important topic in political science, as has understanding the effects of municipal fragmentation. But how do these two fit together? It is important to understand the ways in which boundaries influence communities. In counties with multiple school districts, racial white-black segregation leads to more variation in per child local revenue. This is even after controlling for economic factors within the district. State and federal support do not erase this finding when focusing on spending on current expenditures and instructional support.

In trying to understand the characteristics of districts where funding is less, I find districts with larger black residents in segregated counties collect less in local revenue than in integrated counties. But this does not mean that they contribute less on a per household bases. An increase in a percentage point in black residents is associated with an increase

in tax burden, or an increase in amount of property tax paid given the median household income. Furthermore, quality of schools, as proxied by test scores, is also related to racial segregation. An increase in the percentage of black residents is associated with lower test scores, but this is even more true in segregated counties.

While states have worked to combat inequality in funding for public education, variation still exists. If states want to help achieve better equality in financing, it is important to look beyond economic conditions within the district. Fragmentation of districts along racial lines contribute to differences in revenue and different tax burdens. While limited in interpretation, segregation also appears to be hurting academic success as well. Diversity and segregation have important implications for public goods not only within a political jurisdiction but also between jurisdictions.

References

Alesina, A., Baqir, R., and Easterly, W. (1999). Public goods and ethnic divsions. *Quarterly Journal of Economics*, 114(4).

Alesina, A., Baquir, R., and Hoxby, C. (2004). Political jurisdictions in heterogeneous communities. *Journal of Political Economy*, 112(2):348–396.

Alesina, A. and Zhuravskaya, E. (2011). Segregation and the quality of government in a cross-section of countries. *American Economic Review*, 101(5):1872–1911.

Almond, G. and Verba, S. (1963). The civic culture: Political attitudes and democracy in five countries. *Princeton: Princeton University*, 3.

Almquist, Z. W. (2010). Us census spatial and demographic data in R: The UScensus2000 suite of packages. *Journal of Statistical Software*, 37(6):1–31. `http://pdkpoll2015.pdkintl.org/wp-content/uploads/2016/08/pdkpoll48_2016.pdf`.

Berkman, M. and Plutzer, E. (2005). *Ten thousand democracies: Politics and public ppinion in America's school districts*. Georgetown University Press.

Berry, C. R. and West, M. R. (2008). Growing pains: The school consolidation movement and student outcomes. *The Journal of Law, Economics, & Organization*, 26(1):1–29.

Bischoff, K. (2008). School district boundaries and racial residential segregation: How do boundaries matter? *Urban Affairs Review*.

Blalock, H. M. (1967). *Toward a theory of minority-group relations*. Wiley.

Blumer, H. (1958). Race prejudice as a sense of group position. *The Pacific Sociological Review*, 1(1):3–7.

Bobo, L. (1988). Group conflict, prejudice, and the paradox of contemporary racial attitudes. In *Eliminating racism*, pages 85–114. Springer.

Borman, G. D. and Dowling, N. M. (2008). Teacher attrition and retention: A meta-analytic and narrative review of the research. *Review of educational research*, 78(3):367–409.

Cascio, E., Gordon, N., Lewis, E., and Reber, S. (2008). From brown to busing. *Journal of Urban Economics*, 64(2):296–325.

Chambers, S. (2006). *Mayors and schools: Minority voices and democratic tensions in urban education*. Temple University Press.

Clotfelter, C. T. (2011). *After "Brown": The rise and retreat of school desegregation*. Princeton University Press.

CQ Press (2016). *Presidential general election, All States, 1992-2012 all counties*. Washington, DC: CQ Press. Retrieved from `http://library.cqpress.com/elections`.

Dahl, R. A. and Tufte, E. R. (1973). *Size and democracy*, volume 2. Stanford University Press.

Danielson, M. N. (1976). *The politics of exclusion*. New York: Columbia University Press.

EdBuild (2017). Fractured: The breakdown of americas school districts.

Fischel, W. A. (2009). *Making the grade: the economic evolution of American school districts*. University of Chicago Press.

Gelman, A. and Hill, J. (2007). *Data analysis using regression and multilevelhierarchical models*, volume 1. Cambridge University Press Cambridge.

Glass, I. (2015). *The Problem We All Live With (Transcript)*. `https://www.thisamericanlife.org/radio-archives/episode/562/transcript`.

Green, J. P. and McGee, J. B. (2011). *George W. Bush Institute Global Report Card*. `http://globalreportcard.org/about.html`.

Hanushek, E. A. (2011). The economic value of higher teacher quality. *Economics of Education review*, 30(3):466–479.

Henig, J. R., Hula, R. C., Orr, M., and Pedescleaux, D. S. (2001). *The color of school reform: Race, politics, and the challenge of urban education*. Princeton University Press.

Hooker, C. P. and Mueller, V. D. (1970). The relationship of school district organization to state aid distribution systems. part ii: Generalizations to state finance models.

Hopkins, D. J. (2009). The diversity discount: When increasing ethnic and racial diversity prevents tax increases. *The Journal of Politics*, 71(01):160–177.

Hoxby, C. (2000). Does competition among public schools benefit students and taxpayers? *American Economic Review*, 90(5):1209–1238.

Hoxby, C. M. (1998). How much does school spending depend on family income? the historical origins of the current school finance dilemma. *The American Economic Review*, 88(2):309–314.

Imazeki, J. (2005). Teacher salaries and teacher attrition. *economics of education Review*, 24(4):431–449.

Katznelson, I. and Weir, M. (1988). *Schooling for all: Class, race, and the decline of the democratic ideal*. Univ of California Press.

Kenny, L. W. and Schmidt, A. B. (1994). The decline in the number of school districts in the us: 1950–1980. *Public Choice*, 79(1-2):1–18.

Key, V. (1949). *Southern politics in state and nation*. University of Tennessee Press.

Ladson-Billings, G. (2006). From the achievement gap to the education debt: Understanding achievement in us schools. *Educational Researcher*, 35(7):3–12.

Lankford, H., Loeb, S., and Wyckoff, J. (2002). Teacher sorting and the plight of urban schools: A descriptive analysis. *Educational evaluation and policy analysis*, 24(1):37–62.

Lassen, D. D. and Serritzlew, S. (2011). Jurisdiction size and local democracy: Evidence on internal political efficacy from large-scale municipal reform. *American Political Science Review*, 105(02):238–258.

Lewis, J. H. and Hamilton, D. K. (2011). Race and regionalism: The structure of local government and racial disparity. *Urban Affairs Review*, 47(3):349–384.

Logan, J. R., Xu, Z., and Stults, B. J. (2014). Interpolating us decennial census tract data from as early as 1970 to 2010: A longitudinal tract database. *The Professional Geographer*, 66(3):412–420.

Macartney, H. and Singleton, J. D. (2018). School boards and student segregation. *Journal of Public Economics*, 164:165–182.

Marschall, M. J. (2005). Minority incorporation and local school boards. *Besieged: School boards and the future of education politics*, pages 173–198.

Massey, D. S. and Denton, N. A. (1993). *American apartheid: Segregation and the making of the underclass*. Harvard University Press.

Missouri Department of Education (2014). *District Report Card*. Accessed: 10/08/2018; `https://apps.dese.mo.gov/MCDS/Reports/SSRS_Print.aspx`.

Morgan, D. R. and Watson, S. S. (1995). The effects of mayoral power on urban fiscal policy. *Policy Studies Journal*, 23(2):231–243.

National Center for Education Statistics (2012). *Table 98. Number of public school districts and public and private elementary and secondary schools: Selected years, 1869-70 through 2010-11*. `https://nces.ed.gov/programs/digest/d12/tables/dt12_098.asp`.

National Center for Education Statistics (2013). *School District Geographic Relationship Files*. http://nces.ed.gov/programs/edge/geographicReferenceFiles.aspx.

National Fair Housing Alliance (2006). Unequal opportunity- perpetuating housing segregation in america. http://www.nationalfairhousing.org/LinkClick.aspx?fileticket=sRQLf%2BEOJL0%3D&tabid=3917&mid=5321.

NCES (1993-2012). *Local Education Agency (School District) Universe Survey*. U.S. Department of Eduation, National Center for Education Stisatistics. 1993-94 v.1a, 1996-97 v.1a, 1997-98 v.1a, 2000-01 v.1a, 2001-02 v.1a, 2004-05 v.1c, 2005-06 v.1a, 2007-08 v.1b, 2008-09 v.1a, 2009-10 v.2a, 2013-14 v.1a. https://nces.ed.gov/ccd/pubagency.asp.

Oates, W. E. (1969). The effects of property taxes and local public spending on property values: An empirical study of tax capitalization and the tiebout hypothesis. *Journal of political economy*, 77(6):957–971.

Odden, A. R. and Picus, L. O. (2014). *School finance*. McGraw-Hill, 5 edition.

Oliver, J. E. (2010). *The paradoxes of integration: Race, neighborhood, and civic life in multiethnic America*. University of Chicago Press.

Peterson, P. E. (2010). *Saving schools: From Horace Mann to virtual learning*. Harvard University Press.

Poterba, J. M. (1996). Demographic structure and the political economy of public education. Technical report, National Bureau of Economic Research. https://core.ac.uk/download/pdf/6853448.pdf.

Putnam, R. D. (2007). E pluribus unum: Diversity and community in the twenty-first century the 2006 johan skytte prize lecture. *Scandinavian Political Studies*, 30(2):137–174.

Putnam, R. D. (2016). *Our kids: The American dream in crisis*. Simon and Schuster.

Reardon, S. F. and Owens, A. (2014). 60 years after brown: Trends and consequences of school segregation. *Annual Review of Sociology*, 40.

Reynolds, D. R. (2002). *There goes the neighborhood: Rural school consolidation at the grass roots in early twentieth-century Iowa*. University of Iowa Press.

Scott, J. and Holme, J. J. (2016). The political economy of market-based educational policies: Race and reform in urban school districts, 1915 to 2016. *Review of Research in Education*, 40(1):250–297.

Strang, D. (1987). The administrative transformation of american education: School district consolidation, 1938-1980. *Administrative Science Quarterly*, pages 352–366.

Theil, H. (1972). *Introduction to Demand and Index Number Theory (revised)*. Graduate School of Business and Department of Economics, University of Chicago.

Theobald, N. D. and Gritz, R. M. (1996). The effects of school district spending priorities on the exit paths of beginning teachers leaving the district. *Economics of education review*, 15(1):11–22.

Tiebout, C. M. (1956). A pure theory of local expenditures. *The Journal of Political Economy*, pages 416–424.

Trounstine, J. (2018). *Segregation by Design: Local Politics and Inequality in American Cities*. Cambridge University Press.

Tyack, D. B. (1974). *The one best system: A history of American urban education*, volume 95. Harvard University Press.

US Census Bureau (1990). *Census 1990 School District Tabulation Data Download*. `https://nces.ed.gov/surveys/sdds/dlmain90.asp?&state=-1&table=3HC`.

US Census Bureau (1993-2011). *Public ElementarySecondary Education Finance Data*. `https://www.census.gov/govs/school/`.

US Census Bureau (2000). *Census 2000 School District Tabulation (STP2) Data Downloa*. https://nces.ed.gov/surveys/sdds/downloadmain.asp.

US Census Bureau (2010). *American Community Survey 2007-2011*. http://nces.ed.gov/programs/edge/tables.aspx?ds=acs&y=2011.

Weiher, G. (1991). *The fractured metropolis: Political fragmentation and metropolitan segregation*. SUNY Press.

A Appendix

This section provides additional tables referenced in the main text.

Table A1: Summary Statistics at county level of data for 1995, 2000, and 2010

	1995		2000		2010	
	Mean	N	Mean	N	Mean	N
St. Dev. Per Child Local	1.29	1,844	1.31	1,893	1.65	1,901
St. Dev. Per Child State	0.96	1,852	1.17	1,894	1.37	1,915
St. Dev. Per Child Federal	0.27	1,852	0.35	1,894	0.59	1,915
White-Black Seg. County	0.12	1,883	0.10	1,910	0.08	1,945
% Black	4.83	1,884	4.90	1,911	5.56	1,946
% Hispanic	6.08	1,884	7.02	1,911	9.44	1,946
Median HH Income (thous)	48.71	1,884	50.96	1,911	47.79	1,946
Log population	10.36	1,884	10.43	1,911	10.48	1,946
% Bachelor or greater	14.93	1,884	16.01	1,911	20.19	1,946
% Pres Dem Vote	43.51	1,884	39.54	1,910	38.92	1,946
% Own Home	75.43	1,884	76.18	1,911	76.97	1,946
No. of students	15,910	1,884	16,905	1,911	17,535	1,946

Note: This table presents county level data for select years of the data set. It includes counties that have independent school districts. The standard deviation of per child local, state, and federal are in thousands of dollars.

Table A2: Summary Statistics at district level of data for 1995, 2000, and 2010

	1995		2000		2010	
	Mean	N	Mean	N	Mean	N
Per Child Local (thous)	4.96	11,387	4.95	11,777	5.98	11,205
Per Child State (thous)	4.59	11,467	5.69	11,838	6.22	11,528
Per Child Fed (thous)	0.54	11,467	0.66	11,838	1.51	11,528
White-Black Seg. District	0.08	11,001	0.07	11,377	0.07	11,465
White-Black Seg. County	0.15	10,986	0.13	11,365	0.11	11,465
% Black	3.81	11,454	3.87	11,838	4.67	11,528
% Hispanic	6.07	11,454	7.194	11,838	9.84	11,528
5 year Δ %Black	0.14	11,454	0.13	11,453	0.41	11,379
5 year Δ %Hispanic	0.93	11,454	.92	11,453	1.28	11,379
Median HH Income(thous)	56.16	11,467	57.91	11,838	54.35	11,528
Log population	8.74	11,455	8.78	11,838	8.92	11,528
% Bachelor or greater	17.08	10,877	19.00	10,899	22.75	11,528
% Pres Dem Vote	45.75	11,046	43.23	11,423	44.14	11,528
% Own Home	75.31	11,466	75.91	11,838	76.98	11,528
No. of students	2,629	11,467	2,744	11,838	2,960	11,528
% Property Tax	2.82	11,395	2.58	11,788	1.31	11,508

Note: This table presents district level data for select years of the data set. It includes school districts that are independent school districts.

Table A3: School District type by region in 2010

	Midwest	Northeast	South	West	Total	Percent
State Dependent	0	5	0	19	24	0.19
County Dependent	0	0	324	14	338	2.62
City Dependent	0	114	70	18	202	1.56
Town Dependent	2	423	0	0	425	3.29
Independent	4,753	2,162	2,738	2,281	11,934	92.35
Total	4,755	2,704	3,132	2,332	12,923	

Note: This table shows the number of school districts within each region by fiscal dependence for the 2010 school year. It only includes elementary school districts, secondary school district, and elementary-secondary school districts.

Table A4: Predicting Variation at the County Level

	(1) Per Child Total Expen.	(2) Per Child Current Expen.	(3) Per Child Instructional	(4) Per Child Capital
White-Black County Segregation	0.17	0.49*	0.33**	-0.42**
	(0.22)	(0.23)	(0.12)	(0.15)
Log No. Districts	0.39**	0.42**	0.19**	0.23**
	(0.07)	(0.07)	(0.03)	(0.06)
% Black	0.01**	0.01*	0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
% Hispanic	0.01**	0.01*	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Total No. Students	-0.00**	-0.00	-0.00*	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Std Per Child State	0.00**	0.00**	0.00**	0.00**
	(0.00)	(0.00)	(0.00)	(0.00)
Std Per Child Federal	0.00**	0.00**	0.00**	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Total Log. Population	-0.27**	-0.38**	-0.18**	0.01
	(0.04)	(0.04)	(0.02)	(0.02)
Median Household Income	0.02**	0.01**	0.00	0.02**
	(0.00)	(0.00)	(0.00)	(0.00)
% Bachelor or higher	0.00**	0.00	0.00*	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
% Pres Vote Democrat	-0.01**	0.00*	0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Constant	3.65**	5.03**	2.39**	-0.31
	(0.58)	(0.59)	(0.33)	(0.30)
Year and State Fixed Effects	X	X	X	X
County Random Effects	X	X	X	X
Observations	29,636	26,167	29,636	29,636

Note: The dependent variable in all models is the standard deviation in per child expenditures of that category at the county level in thousands of dollars. The results include state and year fixed effects and county random effects. Robust standard errors that are clustered at the county level are in parentheses. **p<.01, *p<.05

Table A5: Predicting Variation from County Mean by Year

	(1) 1995	(2) 1996	(3) 1997	(4) 1998	(5) 1999	(6) 2000	(7) 2001	(8) 2002
White-Black seg. county	0.250	0.228	0.285	0.251	0.281	0.293	0.611	0.702*
	(0.268)	(0.280)	(0.338)	(0.345)	(0.348)	(0.331)	(0.361)	(0.345)
% Black	0.011	0.009	0.011	0.012	0.011	0.010*	0.014*	0.015*
	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)	(0.005)	(0.006)	(0.006)
White-Black seg. county X % Black	-0.063*	-0.061*	-0.064*	-0.067*	-0.068**	-0.071**	-0.076**	-0.078**
	(0.024)	(0.024)	(0.025)	(0.026)	(0.025)	(0.022)	(0.024)	(0.022)
% Hispanic	-0.000	-0.001	-0.002	-0.001	-0.003	-0.004	0.001	0.001
	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)
5 year Δ % Black	-0.013	-0.013	-0.017	-0.016	-0.015	-0.012	-0.017	-0.019
	(0.012)	(0.009)	(0.012)	(0.012)	(0.012)	(0.010)	(0.013)	(0.023)
5 year Δ % Hispanic	-0.023	-0.032*	-0.029*	-0.040**	-0.034*	-0.024	-0.050*	-0.069*
	(0.014)	(0.013)	(0.013)	(0.012)	(0.014)	(0.015)	(0.022)	(0.027)
Per child state	-0.000**	-0.000**	-0.000**	-0.000**	-0.000**	-0.000*	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Per child federal	-0.000	-0.000	-0.000*	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
No. of students	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Median household income	-0.016**	-0.016**	-0.019**	-0.019**	-0.017**	-0.015**	-0.016**	-0.016**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Log population	-0.366**	-0.355**	-0.372**	-0.341**	-0.344**	-0.333**	-0.375**	-0.366**
	(0.073)	(0.069)	(0.073)	(0.074)	(0.061)	(0.060)	(0.070)	(0.074)
% Bachelor or greater	0.072**	0.069**	0.072**	0.068**	0.069**	0.074**	0.077**	0.075**
	(0.009)	(0.010)	(0.009)	(0.008)	(0.007)	(0.007)	(0.007)	(0.008)
% Dem. president vote	0.006	0.005	0.004	0.005	0.003	0.003	-0.006	-0.006
	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
% Own home	0.006	0.004	0.006	0.006	0.004	0.006	0.005	0.007
	(0.006)	(0.007)	(0.006)	(0.006)	(0.005)	(0.006)	(0.007)	(0.007)
Constant	3.298**	3.627**	3.929**	3.868**	3.697**	2.881**	3.795**	3.570**
	(0.873)	(0.912)	(0.958)	(1.019)	(0.862)	(0.850)	(0.933)	(1.000)
Observations	10,694	10,702	10,711	10,716	10,730	10,720	10,693	10,672

Note: The dependent variable in all models is the *difference between district per child local revenue and the county per child local revenue*. School district is the unit of observation. State fixed effects are included. **p<.01, *p<.05

Table A6: Predicting Variation from County Mean by Year

	(1) 2003	(2) 2004	(3) 2005	(4) 2006	(5) 2007	(6) 2008	(7) 2009
White-Black seg. county	0.837*	0.905*	0.974*	1.116*	1.047*	1.080*	1.019*
	(0.378)	(0.409)	(0.411)	(0.485)	(0.457)	(0.424)	(0.447)
% Black	0.015**	0.016*	0.023**	0.021*	0.022*	0.020**	0.022**
	(0.005)	(0.006)	(0.008)	(0.009)	(0.009)	(0.006)	(0.007)
White-Black seg. county X % Black	-0.072**	-0.073**	-0.086**	-0.084*	-0.078*	-0.082**	-0.088**
	(0.022)	(0.024)	(0.027)	(0.032)	(0.031)	(0.025)	(0.029)
% Hispanic	0.001	-0.002	-0.001	-0.001	-0.002	-0.003	-0.004
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)
5 year Δ % Black	-0.043*	-0.055*	-0.045	-0.049	-0.073*	-0.080**	-0.061**
	(0.021)	(0.025)	(0.025)	(0.027)	(0.029)	(0.027)	(0.021)
5 year Δ % Hispanic	-0.094**	-0.100**	-0.092**	-0.103**	-0.119**	-0.120**	-0.128**
	(0.025)	(0.027)	(0.030)	(0.029)	(0.024)	(0.026)	(0.030)
Per child state	-0.000**	-0.000**	-0.000**	-0.000**	-0.000**	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Per child federal	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
No. of students	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Median household income	-0.018**	-0.017**	-0.017**	-0.017**	-0.015*	-0.012*	-0.012*
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.005)
Log population	-0.353**	-0.373**	-0.394**	-0.411**	-0.413**	-0.412**	-0.403**
	(0.070)	(0.072)	(0.059)	(0.058)	(0.054)	(0.061)	(0.056)
% Bachelor or greater	0.077**	0.071**	0.068**	0.067**	0.066**	0.070**	0.065**
	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)	(0.007)	(0.006)
% Dem. president vote	-0.007	-0.006	-0.005	-0.006	-0.005	-0.005	-0.003
	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.007)	(0.006)
% Own home	0.011*	0.006	0.007	0.004	0.002	-0.001	0.003
	(0.005)	(0.005)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)
Constant	3.133**	4.083**	4.379**	4.751**	4.623**	4.238**	3.950**
	(0.883)	(1.028)	(0.794)	(0.749)	(0.759)	(0.754)	(0.777)
Observations	10,660	10,551	10,533	10,538	10,546	10,486	10,440

Note: The dependent variable in all models is the *difference between district per child local revene and the county per child local revenue*. School district is the unit of observation. State fixed effects are included. **p<.01, *p<.05

Table A7: Percent of Median Household Income to Property tax

	(1) All	(2) Urban	(3) Suburban	(4) Town/Rural
White-Black County Segregation	-0.003	-0.020	-0.083	0.132
	(0.083)	(0.461)	(0.276)	(0.066)
% Black	0.004*	0.006*	0.008**	0.003
	(0.002)	(0.003)	(0.002)	(0.002)
Per child state	-0.000**	-0.000**	-0.000**	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
per child federal	-0.000**	-0.000	-0.000	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
% Hispanic	-0.003	0.004	0.005	-0.005
	(0.004)	(0.006)	(0.003)	(0.005)
5 year Δ % Black	-0.007	0.002	-0.021	0.004
	(0.007)	(0.010)	(0.015)	(0.007)
5 year Δ % Hispanic	0.006	-0.043	0.007	0.006
	(0.011)	(0.025)	(0.012)	(0.012)
Urban district	0.301**			
	(0.062)			
Suburban district	0.066			
	(0.047)			
No.of students	0.000**	0.000**	0.000*	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Median household income	-0.005*	-0.000	-0.004	-0.006**
	(0.002)	(0.006)	(0.003)	(0.002)
Log population	-0.243**	-0.074	-0.252**	-0.391**
	(0.035)	(0.061)	(0.047)	(0.053)
% Bachelor or greater	0.007	-0.000	0.008*	0.007
	(0.004)	(0.005)	(0.004)	(0.004)
%Dem. president vote	0.004*	-0.002	0.002	0.006*
	(0.002)	(0.005)	(0.003)	(0.002)
% Own home	-0.009**	-0.016**	-0.007	-0.008*
	(0.003)	(0.005)	(0.004)	(0.004)
Size of district	0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Log No. Districts	0.043	0.114	-0.039	0.085
	(0.044)	(0.183)	(0.057)	(0.046)
Constant	2.872**	2.177*	3.255**	3.838**
	(0.432)	(1.004)	(0.725)	(0.605)
Year and State Fixed Effects	X	X	X	X
Observations	160,348	8,247	35,543	116,558

Note: The dependent variable in all models is the difference between the district and county in the percent of the median household income that is paid on average to property tax. Robust standard errors are in parentheses. **p<.01, *p<.05