Racial Fractionalization and School Performance*

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Abstract. The literature on racial "peer effects" suggests that diversity improves at least some students' school performance. However, a literature in economic development posits that diversity may negatively affect school performance by undermining the efficient provision of education. This article empirically tests this claim, which we call the "public goods channel," by examining the relationship between racial diversity and student performance in Ohio's school districts. We find that moving from a completely homogenous school district to one in which two racial groups have equal population shares is associated with a 7–17.5 percentage point decline in the passage rate on the state math exam, holding per pupil spending across districts constant. These results suggest that racial diversity is negatively associated with school performance but that the public goods channel is not responsible for this relationship.

I

Introduction

Parents and policymakers have long been concerned about racial diversity's affect on school performance. Racial diversity's impact on African-American students' academic achievement was at the heart of the 1954 U.S. Supreme Court decision in *Brown v. Board of*

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Education (Armor 1995). "White flight," where white families move to segregated communities or enroll their children in private schools, was another historical manifestation of this concern (Fairlie and Resch 2002). Most recently, public policy debates surrounding ability tracking, charter schooling, open enrollment, and school vouchers have also reflected concern about how these policies will affect school racial composition and academic outcomes (Greene 1999; Renzulli and Evans 2005).

In light of this concern a body of research examines the impact of racial "peer effects" on school performance. Following the *Brown v. Board of Education* decision, early social science research focused on racial isolation's harmful effects on African-Americans' academic performance. Two influential reports were Coleman et al. (1966) and the U.S. Commission on Civil Rights (1967), which found that African-American students' racial isolation in segregated schools lowered their academic achievement. Jencks et al. (1972) found that desegregation improved black children's school performance by 2 to 3 percent; and Guryan (2004) estimates that half of the decline in black dropout rates during the 1970s occurred because of desegregation. In a related line of research Hoxby (2000) finds that black third graders perform substantially worse when surrounded by other black students than when they are in classes that are primarily white. Hanushek, Kain, and Rivkin (2009) isolate the peer composition of racial diversity and find similar results, namely, that having a higher percentage of black classmates lowers black academic achievement. Positive racial peer effects are the conventional channel through which racial diversity is thought to affect school performance.

However, recent research in economic development suggests that diversity might negatively affect education and education-related outcomes. Several papers in this literature find that greater diversity is associated with worse political-economic outcomes (see, for instance, Easterly and Levine 1997; La Porta et al. 1999; Zak and Knack 2001).[1] This includes those related to schooling. For example, Easterly and Levine (1997) find a negative relationship between the degree of ethnolinguistic fractionalization and the number of years of schooling in a country. Similarly, Alesina, Baqir, and Easterly (1999) examine U.S. school districts and find that racial diversity lowers school spending.

This literature points to policy choices—in particular public goods spending—as the channel through which diversity negatively affects education. According to this reasoning, diverse citizens have diverse and often inconsistent needs. They therefore find it more difficult to agree on the level and kinds of public goods that government should provide. This disagreement in turn leads important public goods, such as education, to be underprovided. If underprovided education means lower educational achievement, this work suggests a channel, which we call the "public goods channel," through which higher racial diversity could lead to lower school performance.

This article empirically tests the public goods channel using data on Ohio school districts. We find that moving from a completely homogenous school district to one in which two racial groups have equal population shares is associated with a 7–17.5 percentage point decline in the passage rate on the state math exam. While our results suggest that racial diversity is negatively associated with school performance, we find that that the public goods channel is not the reason for this relationship. Compared to between countries, there is minimal institutional or policy variation between Ohio's school districts. Most important, the negative relationship between racial diversity and student performance that we find *holds per pupil education spending across districts constant.*

If public goods problems similar to those highlighted in the development literature are at work in the case of Ohio's school districts, they are not responsible for the results we find. Although our analysis cannot document the precise channel through which racial diversity negatively affects student performance, it does exclude this important potential channel of influence and in doing so suggests that racial diversity's affect on net school performance lies elsewhere.

II

Data

We collect our data from two sources. The first is the Ohio Department of Education's "Cupp Report."[2] The Cupp Report summarizes all the data the Ohio Department of Education collects on individual local

school districts. The report contains data on student outcomes, student demographics, teacher demographics, district spending, revenue, property valuation, and tax information. Our second data source is the U.S. Census Bureau's special "Census 2000 School District Tabulation." From the 2000 Census report we obtained racial data on school district residents, the mean household income within each school district, and private school enrollment by school district. All variables from the "Census 2000 School District Tabulation" and the "Cupp Report" are for the 1999–2000 school term.[3]

Focusing within one state can be problematic if there is insufficient variation among school districts within the state.[4] Lack of racial diversity or a few significant outliers can lead to imprecise or statistically biased results. This is not a problem with Ohio, which is a large and geographically diverse state containing 612 local school districts. Ohio has several large metropolitan school districts with over 30,000 students and numerous small rural districts with fewer than 1,000 students. While over a quarter of a million students are enrolled in Ohio's five largest city school districts, over 85 percent of students are enrolled in the remaining suburban, exurban, small city, and rural school districts. After removing five small rural school districts due to incomplete data, the final sample contains 607 school districts.[5]

Our independent variable of interest is the degree of racial diversity, or "fractionalization," within a school district. Intuitively, the racial fractionalization index measures the probability that two school district residents drawn randomly will be of different races. The degree of racial fractionalization within a school district is calculated using the following formula:

$$\text{Racial Fractionalization} = 1 - \sum_i (Race_i)^2,$$

where $Race_i$ is the percentage of a school district's population that identifies itself as being of that particular race. The racial classifications we use are those presented by the U.S. Census Bureau to individuals on the census form. There are seven racial classifications in the 2000 Census School District Tabulation: White, Black, Asian and Pacific

Islander, American Indian, Native Hawaiian, Some Other Race Alone, and Two or More Races. A completely racially homogenous school district would have an ethnic fractionalization score of zero. A school district whose population was equally split between two races would have a racial fractionalization score of 0.5.[6] A district where each racial classification was one-seventh of the population would have a score of 0.857.

Admittedly, these racial classifications do not directly correspond to individuals' notions of race. For example, there is no category for "Hispanic." The Census Bureau does not ask individuals if they are "Hispanic" in the context of asking about an individual's race. That information is obtained from questions on place of origin. Alesina, Baqir, and Easterly (1999) provide some evidence that the category "Some Other Race Alone" is, for all intents and purposes, equivalent to Hispanic.[7] In addition, the treatment of multiracial individuals as having a separate racial identity is problematic. Given the impossibility of knowing the proper allocation of multiracial individuals among the basic racial classifications, we keep the category "Two or More Races" separate.[8]

District-level racial fractionalization varies considerably in Ohio. The most racially homogenous district in the state is Jennings Local School District in Putnam County, a primarily rural area located in Northwest Ohio. During the 2000 Census, 1,905 of the district's residents were white and four of the districts residents were Asian, which gave the district a racial fractionalization score of 0.005. The most racially fractionalized school district in the state is its largest, the Cleveland Municipal School District, with a score of 0.567. The average school district in the state has a racial fractionalization score of 0.102 and the standard deviation of this measure of racial diversity is 0.109.

The presence of a large urban school district, such as Cleveland, as the most racially fractionalized school district in the state could lead to the conclusion that racial fractionalization is a proxy for large, predominantly poor, urban school districts. A look at racially fractionalized school districts reveals that this might not be the case. While large urban school districts, such as Akron, Cleveland, Cincinnati, Columbus, Toledo, and Youngstown, are among the most racially

fractionalized school districts in the state, they are sprinkled around middle- to high-income suburban districts, such as Shaker Heights School District in Cleveland. The *Wall Street Journal* recently cited Shaker Heights High School as one of the top feeder schools to elite colleges in the counry (Bernstein 2004) and its racial fractionalization attracts families to the area with a preference for integration (Brand-Williams 2002). The simple correlation between racial fractionalization and median income per taxpayer in a school district is −0.014 and is not statistically significant.[9]

Our dependent variable is the percentage of school district students passing the ninth-grade math proficiency test during 1999–2000 school year. In Ohio, all students must take and pass all five subject areas of the ninth-grade exam to matriculate with a regular diploma.[10] During the 1999–2000 school year, tests were also administered in each of the five subject areas (math, reading, writing, citizenship, and science) at the fourth, sixth, and twelfth grades. Our analysis focuses on the ninth-grade math score because the ninth-grade exam has the greatest importance and the math test is most difficult of the five subject areas.[11] However, we also examined the proficiency test scores from other subject areas and grades to ensure our findings' robustness to alternative definitions of school performance and found qualitatively similar results.[12]

Our regressions include standard control variables the education literature uses to account for family, community, and school influences that might also contribute to school performance (Hanushek 2002). Table 1 presents a full list of our variables and descriptive statistics. We include median income per tax return in the school district and the percentage of individuals over 25 with at least a bachelor's degree to account for family and background effects. An additional explanatory variable that captures both peer and parental factors is the percentage of district children eligible for free or reduced-price lunch. School-related inputs are district spending per pupil, the student-to-teacher ratio, the average salary of classroom teachers, and the percentage of classroom teachers with up to four years of experience. Finally, attendance is included to account for the fact that school districts with higher attendance rates have higher test scores (Lamdin 1996).

Table 1

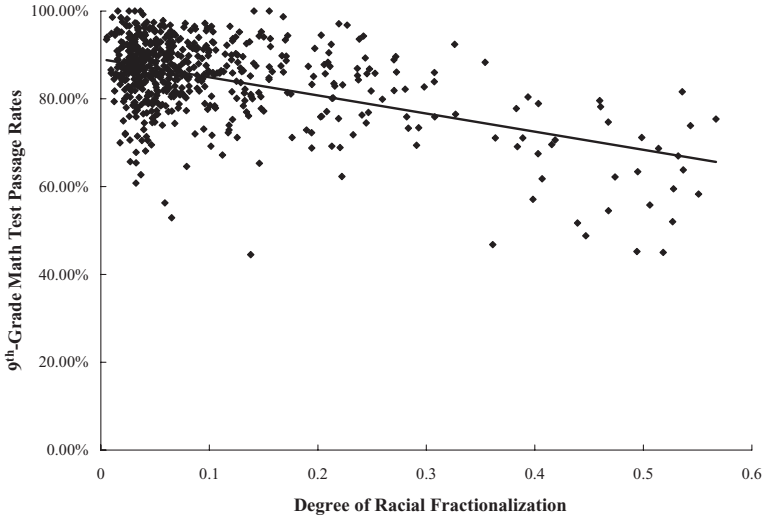
Variable Definitions and Summary Statistics

Variable	Definitions	Mean (S.D.)
Racial Fractionalization 2000	See text for definition	0.101 (0.109)
Racial Fractionalization 1990	See text for definition	0.077 (0.096)
Black	% of black district residents	0.037 (0.091)
Math	% of district students passing 9th-grade math test	0.769 (0.117)
Science	% of district students passing 9th-grade science test	0.827 (0.096)
Reading	% of district students passing 9th-grade reading test	0.928 (0.054)
Citizenship	% of district students passing 9th-grade citizenship test	0.857 (0.081)
Writing	% of district students passing 9th-grade math test	0.936 (0.050)
Graduation Rate	% of fall 1996 9th-grade class graduating in Spring 2000	0.863 (0.090)
Spending per Pupil	School district spending per pupil	$6,662 (1,142)
Attendance	% of district students in attendance on an average day	0.948 (0.013)
Teacher Inexperience	% of teachers with 4 or fewer years of experience	0.227 (0.080)
Pupil/Teacher Ratio	Enrollment divided by the number of classroom teachers	18.28 (2.045)
Average Teacher Salary	Average salary of classroom teachers in the district	$39,320 (4,908)
Income	Median income per tax return filed within district	$30,571 (6,411)
College	% of district residents 25 & older with at least a bachelor's degree	0.172 (0.122)
Free or Reduced Lunch	% of district students eligible for free or reduced-price lunches	0.212 (0.143)
Mean/Median Ratio	Mean household income within a school divided by the median household income	1.214 (0.104)
Elderly	% of district residents over 65 and older	0.131 (0.034)

Note: All observations are for the 1999–2000 school year unless otherwise noted.

Figure 1

Racial Fractionalization and School Performance



III

OLS Results

Figure 1 plots the raw relationship between district passage rates on the ninth-grade math test and racial fractionalization. The relationship is clearly negative. School district passage rates are lower in more racially fractionalized communities and vice versa. To isolate this relationship econometrically we estimate the following model using ordinary least squares (OLS):

$$SCHOOLQUALITY_i = \beta_0 + \beta_1 RACIALFRACTIONALIZATION_i + \beta_3 Z_i + \varepsilon_i,$$

where $SCHOOLPERFORMANCE_i$ is the passage rate on the ninth-grade math proficiency test in district i for the 1999–2000 school year; $RACIALFRACTIONALIZATION_i$ is the degree to which the residents of school district i are divided among different racial categories; and Z_i is a vector of control variables representing school, community, and

family influences for each district. β_1 is our coefficient of interest and measures the impact of racial fractionalization on school performance.

Table 2 presents our results estimating this model. Column 1 contains our baseline regression. This model does a good job, explaining nearly 60 percent of the variation in passage rates on the ninth-grade math proficiency test across school districts. The coefficient on racial fractionalization is sizeable, negative, and statistically significant at the 1 percent level. Recall that racial fractionalization theoretically varies from complete homogeneity at zero to perfect heterogeneity at one. This makes interpreting the coefficient on racial fractionalization straightforward. The coefficient on racial fractionalization in column 1 (−0.2989) suggests that moving from a racially homogeneous school district to the Mount Healthy School District, which has a fractionalization score of 0.498, is associated with a nearly 15 percentage point decline in the passage rate on the ninth-grade math proficiency test. Calculated at the mean, this represents a more than one standard deviation decline in the average district's passage rate. Notably, racial fractionalization is negatively associated with district passage rates *holding school spending constant*. This suggests that racial fractionalization's negative association with school performance found here is independent of lower education spending per the public goods channel emphasized in the development literature. Diversity harms educational outcomes, but the mechanism by which it does so is not the public goods channel.

In column 2 we control for additional socioeconomic variables that might influence school performance to see how this affects our results. This includes controls for the percentage of district residents with at least a bachelor's degree and the percentage of district students eligible for free or reduced-price lunch. The percentage of school district residents over 25 with at least a bachelor's degree is obtained from the 2000 Census School District Tabulation and the percentage of district students eligible for free or reduced-price lunch is obtained from the Cupp Report.

Both of these variables are statistically significant at the 1 percent level. As expected, the greater the percentage of school district residents with at least a bachelor's degree, the higher the district's passage rate on the ninth-grade math exam. Conversely, the higher the

Table 2

Racial Fractionalization and District Math Scores

	1	2	3
Constant	−2.61***	−1.72***	−1.65***
	(6.71)	(4.14)	(3.99)
Racial Fractionalization 2000	−0.2989***	−0.2610***	−0.2590***
	(6.97)	(5.92)	(5.98)
Expenditure per Pupil	−0.0092**	−0.0056	−0.0068
	(2.16)	(1.32)	(1.50)
Income	0.0063***	0.0009	0.0015
	(8.14)	(0.81)	(1.35)
Attendance	3.51***	2.76***	2.71***
	(8.65)	(6.65)	(6.52)
Pupil/Teacher Ratio	−0.0053**	−0.0038*	−0.0035*
	(2.55)	(1.89)	(1.77)
Average Teacher Salary	0.0019*	0.0003	−0.00006
	(1.72)	(0.22)	(0.05)
Teacher Inexperience	−0.1309***	−0.1247***	−0.1219***
	(2.71)	(2.69)	(2.65)
College		0.1936***	0.2002***
		(4.15)	(3.38)
Lunch		−0.2187***	−0.2058***
		(4.13)	(3.92)
Mean/Median Ratio			−0.0386
			(0.75)
Elderly			0.2615**
			(2.56)
Number of Observations	607	607	607
R-squared	0.59	0.61	0.62

* Indicates significance at the 10% level, ** at 5% level, and *** at the 1% level.
Note: Expenditure per Pupil, Income, and Average Teacher Salary in thousands of dollars. Absolute value of heteroskedasticity-corrected t-statistics in parentheses.

percentage of students eligible for free or reduced-price lunch, the lower a school district's passage rate on the exam. Racial fractionalization's effect falls slightly when we introduce these additional variables but remains statistically significant at the 1 percent level. Here, moving from a completely homogeneous district to the middle of the racial fractionalization spectrum (0.5) is associated with a 13 percentage point decline in district passage rate. Calculated at the mean, this represents more than a standard deviation decline in school performance.

In addition to being fractionalized by race, it is possible that individuals might be fractionalized by class or income. To account for possible stratification of individuals by income, we control for the ratio between the mean and median income in a school district in the third column of Table 2.[13] We also include the percentage of district residents over 65 to control for the role of senior citizens in monitoring school performance. While a large body of literature has shown a negative association between the percentage of elderly residents in a school district and school spending (Button 1992; Berkman and Plutzer 2004; Brunner and Balsdon 2004), it is possible that there is a positive relationship between the percentage of senior citizens in a school district and school performance, holding its effect on school spending constant. Senior citizens frequently own their homes outright and thus do not have property taxes held in escrow. As such, they face large tax payments twice a year. While, as the literature shows, these large out-of-pocket tax payments depress senior support for spending, it is likely that they also increase senior monitoring of school officials. Thus, holding the negative effect of senior citizens on school district spending constant, we expect that districts with a larger percentage of senior citizens will have higher test passage rates.

The inclusion of these variables does not change our main finding of a strong negative relationship between racial fractionalization and school performance. The coefficient on racial fractionalization is nearly identical to its size in the second specification and remains significant at the 1 percent level. Moving from complete racial homogeneity to a racial fractionalization score of 0.5 is associated with a 13 percentage point decline in math test passage rate. The income fractionalization variable is not statistically significant. However, the

percentage of district residents over 65 is positively associated with higher test scores.

IV

Sensitivity Analysis

It is possible that the direction of causation runs not only from racial fractionalization to school performance but also runs from school performance to racial fractionalization. School districts could become racially fractionalized if household migration in response to school performance is not uniform by race. While it is clear that public school performance is important in intraurban migration (Jud and Bennett 1986), there is little evidence that racial groups systematically differ in their response to school performance.[14]

However, differences across racial groups in response to school performance are not necessary to generate changes in fractionalization. Even if blacks and whites have similar residential mobility responses to school district performance, school district racial fractionalization can change solely because the racial composition of new district residents differs from the current composition. Consider the case of a racially diverse suburban school district surrounding a racially homogenous city school district. Since a large portion of intrametropolitan moves are "up and out" (Bier 2001), the suburban district could become even more fractionalized over time even if blacks and whites moved out of the district at the same rate. This is because the composition of new residents would differ from the composition of exiting residents.

Even if school performance might lead to changes in racial fractionalization, in addition to racial fractionalization leading to changes in school performance, the direction of this change is not obvious. Household mobility in response to school district performance could either increase or decrease fractionalization depending on its current racial composition. A situation where a large number of white residents moved and were replaced by black residents could result in a school district becoming less fractionalized if black households already comprised a majority share of households in the school district.

Ohio school districts were more racially fractionalized in 2000 than in 1990. The average school district in 1990 had a racial fractionalization score of 0.077. In 2000 it had a racial fractionalization score of 0.101. The correlation between a school district's 1990 graduation rate and the change in racial fractionalization among district residents from 1990 to 2000 is *positive* (0.0515).[15] It appears that better school districts in 1990, as measured by graduation rates, actually became more fractionalized, although the correlation between these two variables is not statistically significant.[16] This provides some evidence that endogeneity, if present, is not biasing our estimates upward.

Still, to ensure endogeneity is not inflating our results we reestimate our equations using lagged values of school district fractionalization.[17] We reestimate each of the specifications in Table 2 using racial fractionalization in 1990 instead of racial fractionalization in 2000. Table 3 contains these results, which suggest that, if anything, endogeneity is biasing the estimates in Table 2 *downward*. This is consistent with the fact that better performing school districts in 1990 saw increases in racial fractionalization over the subsequent decade.

The fact that the relationship between racial fractionalization and school performance is consistent across all specifications in Table 2 provides some assurance that the association between the two variables is not spurious. The results using the lagged racial fractionalization variable in Table 3 provide additional confidence that this relationship is genuine. However, two possible concerns remain. We attempt to address these here.

First, racial fractionalization might have different effects on different types of districts. For example, small school districts might be able to mitigate any negative effects of racial diversity through higher levels of social capital. School district size is negatively associated with social capital (Fischel 2006), and higher levels of social capital have been found to lead to better overall government performance (Knack and Keefer 1997; Rice 2001). If this is the case, racial fractionalization should have a smaller effect in school districts containing fewer residents and students. On the other hand, larger school districts might be able to offer more choices within the school district, possibly mitigating the negative effects of racial fractionalization. One possible manifestation of this is that larger school districts often have several

Table 3

Racial Fractionalization and District Math Scores: Using Lagged Fractionalization

	1	2	3
Constant	−2.63***	−1.76***	−1.70***
	(6.56)	(4.18)	(4.02)
Racial Fractionalization 1990	−0.3481***	−0.2974***	−0.2978***
	(6.68)	(5.49)	(5.55)
Expenditure per Pupil	−0.0074*	−0.0043	−0.0055
	(1.77)	(1.01)	(1.22)
Income	0.0061***	0.0010	0.0016
	(7.92)	(0.90)	(1.45)
Attendance	3.55***	2.82***	2.76***
	(8.52)	(6.67)	(6.53)
Pupil/Teacher Ratio	−0.0053***	−0.0039*	−0.0037*
	(2.58)	(1.96)	(1.83)
Average Teacher Salary	0.0015	−0.00004	−0.0004
	(1.37)	(0.03)	(0.32)
Teacher Inexperience	−0.1628***	−0.1532***	−0.1501***
	(3.46)	(3.38)	(3.33)
College		0.1759***	0.1828***
		(3.71)	(3.04)
Lunch		−0.2146***	−0.2011***
		(4.04)	(3.83)
Mean/Median Ratio			−0.0395
			(0.78)
Elderly			0.2696***
			(2.62)
Number of Observations	607	607	607
R-squared	0.59	0.61	0.62

* Indicates significance at the 10% level, ** at 5% level, and *** at the 1% level.
Note: Expenditure per Pupil, Income, and Average Teacher Salary in thousands of dollars. Absolute value of heteroskedasticity-corrected t-statistics in parentheses.

different types of high schools that focus on different constituencies. The Columbus City School District, for example, offers the traditional geographically based high schools, but also offers specialty high schools that focus on the arts, Africentric learning styles, English as a second language, career education, and college preparatory. To determine if the effect of diversity on school performance varies by district size we break the sample into four different size groupings based on student enrollment.[18]

Table 4 presents our results from the quartile analysis; they support the former intuition that smaller school districts are better able to overcome the negative relationship between racial fractionalization and test scores. While racial fractionalization still has a negative impact on the districts in the lowest quartile in terms of student enrollment, the magnitude of the effect is smaller and statistically insignificant. This provides some evidence in support of the proposition that smaller school districts are able to overcome the negative effects of fractionalization.[19]

Another potential problem that Alesina, Baqir, and Easterly (1999) discuss is the possibility that ethnic fractionalization might be a proxy for the percentage of the population that is black. Given that the share of black residents is highly correlated with racial fractionalization this is certainly plausible. At the same time, the implications of the racial fractionalization variable and the percentage of residents that is black are very different. Racial fractionalization treats a school district with racial shares of 60 percent white, 30 percent black, and 10 percent "some other race only" as equivalent to a school district that is 60 percent black, 30 percent "some other race only," and 10 percent white. Conversely, the percentage black variable treats the two situations as being quite dissimilar.

As Alesina, Baqir, and Easterly (1999) suggest, if percentage black is the "true" variable reducing school performance, including it in the regressions in Table 3 should cause the coefficient on racial fractionalization to go to zero. Table 5 shows the results of controlling for the percentage of district residents that are black. Including it does lower the coefficient on racial fractionalization in all three specifications compared to the results in Table 3, but the variable remains statistically significant at conventional levels across the board. Using the coeffi-

Table 4

Racial Fractionalization and District Math Scores: Quartile Analysis

	Smallest	2nd	3rd	Largest
Constant	−1.8734**	−1.8227**	−1.6396**	−0.6936
	(2.15)	(1.99)	(1.97)	(1.10)
Racial Fractionalization 1990	−0.1893	−0.2973**	−0.1735**	−0.2236**
	(1.52)	(1.99)	(2.14)	(2.06)
Expenditure per Pupil	0.0062	−0.0097	−0.0028	−0.0426***
	(0.63)	(0.88)	(0.41)	(3.88)
Income	−0.0008	0.0001	0.0045*	0.0001
	(0.31)	(0.04)	(1.87)	(0.08)
Attendance	2.95***	2.85***	2.50***	1.81***
	(3.36)	(3.06)	(2.98)	(3.02)
Pupil/Teacher Ratio	−0.0030	−0.0040	0.0017	−0.0077**
	(0.69)	(0.88)	(0.57)	(2.07)
Average Teacher Salary	0.0007	0.0015	−0.0014	0.0042*
	(0.25)	(0.65)	(0.63)	(1.91)
Teacher Inexperience	0.1628	−0.0461	−0.2533***	−0.0805
	(1.35)	(0.58)	(3.20)	(0.99)
College	0.1666	0.0993	0.1809	0.3649***
	(1.37)	(0.74)	(1.58)	(3.02)
Lunch	−0.1471	−0.2824**	−0.0572	−0.2922***
	(1.34)	(2.56)	(0.74)	(2.61)
Mean/Median Ratio	−0.1064	0.0039	−0.0284	−0.0365
	(0.93)	(0.03)	(0.45)	(0.38)
Elderly	0.3297	0.2588	0.2618	0.4365**
	(1.36)	(1.12)	(1.36)	(2.20)
Number of Observations	152	152	152	151
R-squared	0.39	0.43	0.60	0.85

* Indicates significance at the 10% level, ** at 5% level, and *** at the 1% level.
Note: Expenditure per Pupil, Income, and Average Teacher Salary in thousands of dollars. Absolute value of heteroskedasticity-corrected t-statistics in parentheses.

Table 5

Racial Fractionalization and District Math Scores: The Impact of % Black

	1	2	3
Constant	−2.4711***	−1.7014***	−1.6382***
	(5.89)	(3.76)	(3.65)
Racial Fractionalization	−0.1617**	−0.1346**	−0.1390**
1990	(2.32)	(2.14)	(2.26)
Expenditure per Pupil	−0.0050	−0.0025	−0.0035
	(1.24)	(0.59)	(0.80)
Income	0.0056***	0.0009	0.0014
	(8.25)	(0.82)	(1.31)
Attendance	3.34***	2.71***	2.66
	(7.68)	(5.94)	(5.86)
Pupil/Teacher Ratio	−0.0049**	−0.0036*	−0.0034
	(2.40)	(1.89)	(1.72)
Average Teacher Salary	0.0019*	0.0004	0.00010
	(1.84)	(0.39)	(0.09)
Teacher Inexperience	−0.1214***	−0.1166***	−0.1147***
	(2.75)	(2.69)	(2.65)
College		0.1705***	0.1817***
		(3.66)	(3.12)
Lunch		−0.1937***	−0.1798***
		(3.96)	(3.59)
Mean/Median Ratio			−0.0425
			(0.86)
Elderly			0.2452**
			(2.51)
Black	−0.3082***	−0.2748***	−0.2693***
	(4.47)	(4.49)	(4.64)
Number of Observations	607	607	607
R-squared	0.62	0.64	0.64

* Indicates significance at the 10% level, ** at 5% level, and *** at the 1% level.
Note: Expenditure per Pupil, Income, and Average Teacher Salary in thousands of dollars. Absolute value of heteroskedasticity-corrected t-statistics in parentheses.

cient on racial fractionalization in column 3, moving from a completely racially homogeneous district to one with a fractionalization score of 0.5 is associated with a nearly 7 percentage point fall in the passage rate on the math proficiency exam.

V

Concluding Remarks

Our analysis finds a strong negative relationship between racial diversity and school performance. Moving from a racially homogeneous school district to one in which there are two racial categories with equal population shares is associated with a 7–17.5 percentage point decline in the passage rate on the ninth-grade math test. This finding is important given that the majority of the scholarly literature focuses only on racial diversity's effect on racial subgroups, as opposed to racial diversity's overall effect on school performance (see, for example, Hoxby 2000; Hanushek, Kain, and Rivkin 2009).

Notably, we find this result *holding education spending per pupil constant.* More racially diverse school districts have worse outcomes per dollar spent. While our empirical approach cannot identify the precise channel through which greater racial diversity within a community lowers school performance, this finding is inconsistent with the view that the negative relationship between racial fractionalization and educational outcomes results from underprovided education. Our analysis finds evidence for a negative "diversity effect" on school performance independent of the public goods channel that deserves further exploration.[20]

Notes

1. There have been several extensions and criticism of this literature. For example, Leeson (2008) extends this research by considering the private institutional mechanisms that socially-distant individuals use to capture the gains from widespread exchange. He also (Leeson 2005) endogenizes fractionalization and shows how bad institutions can increase fractionalization, which in turn limits intergroup exchange. Bates (2000), Collier (2001), and Darity and Tripplett (2008) provide theory and evidence to suggest that racial fractionalization is not the critical factor creating poor economic performance.

Rather, it is *violent ethnic conflict*, either because of bad political and economic institutions, or because one group is large enough to dominate over another, that harms economic performance. In this article our concern is not with the state of this literature, per se, but rather with the implications of the empirical work of Alesina, Baqir, and Easterly (1999) for school performance.

2. The Cupp Report was renamed in 2006 to "Finance and Other Data." The most recent version of the publication formerly known as the Cupp Report can be found at <http://www.ode.state.oh.us>.

3. The Cupp Report is not kept historically and is generally published with a two-year lag. Thus the Cupp Report data for the 1999–2000 school year were collected from the Ohio Department of Education's website in early 2002.

4. Many states, for example, have only county-level school districts. The observed level of racial integration across school districts in these states may have less to do with preferences for integration and more to do with the lack of interjurisdictional competition. Clotfelter (1999), for example, finds less across-district segregation but more within-district segregation in the South, where county-level school districts are the norm.

5. Ohio has four "island districts" that serve children living year-round on resort islands in Lake Erie. The small size of these districts means that often times an entire grade level is comprised of only one student. For this reason, the Ohio Department of Education censors data on these school districts due to privacy concerns. College Corner Local School District was removed because it is a combined Ohio/Indiana school district and thus represents a blending of both states' financial and property tax systems.

6. (0.5^2) + (0.5^2) = 0.5.

7. Alesina, Baqir, and Easterly (1999) argue that their racial classification of "Other" is essentially Hispanic, given that the correlation between the two Census Variables is 0.9. They do not include a separate category for multiracial individuals, however, so it is not clear if their "Other" classification is identical to the classification "Some Other Race Alone" or if it also includes multiracial individuals. The high correlation between Hispanic and "Other" suggests that they did not include multiracial individuals with "Other."

8. Exclusion of the category "Two or More Races" from the calculation of the racial fractionalization variable does not change the results presented in the article.

9. The null hypothesis of zero relationship cannot be rejected at the 10 percent level of significance (z critical value of 0.334).

10. Ohio's testing system has subsequently been revamped and the test required for graduation is a new 10^{th}-grade proficiency exam.

11. See, for example, Fisher (2001), who notes that of the 2,678 students unable to graduate with their class because they failed one or more portions of the test, 1,888 failed the math portion.

12. All of the measures of school performance are level scores instead of value-added scores. This could be problematic if value-added scores are a more appropriate measure of school performance. Brasington (1999) tests 37 different measures of school performance and finds that the measures of school performance that are capitalized into home prices are level scores not value-added scores, suggesting that use of level scores is appropriate.

13. The ratio of mean to median income is used here instead of a measure similar to the racial fractionalization variable due to the limited nature of income data for school districts. Here, mean income per school district comes from the 2000 Census and median income by school district comes from the Cupp Report.

14. There is some evidence that blacks and whites do systematically differ in residential location patterns. South and Crowder (1997), using data from the Panel Study of Income Dynamics, provide some evidence of these differences. They find that even after standardizing for racial differences in income, blacks are far less likely to move from central cities to the suburbs than are whites. This could be the result of residential housing discrimination or because of different tastes for urban and suburban living.

15. Graduation rates were used instead of math test scores because Ohio had no standardized statewide testing system in place during the 1989–1990 school year.

16. The null hypothesis of zero relationship cannot be rejected at the 10 percent level of significance (z critical value of 1.27).

17. The Census Bureau prepared the special school district tabulation for the first time for the 1990 Census. Thus school district data such as those used to calculate the racial fractionalization variable are not available for years prior to the 1989–1990 school year. Alesina, Baqir, and Easterly (1999) were able to use data from the 1970 Census because their paper only looked at education spending at the city and county level.

18. Another possible problem with our empirical analysis would be if there was a difference between community racial composition and school racial composition. Since Ohio school districts only count five distinct racial categories, it is impossible to calculate a comparable racial fractionalization score for the students in each school district. However, the data do allow us to tabulate the correlation between the percentage of black community residents and the percentage of black school students. This correlation is 0.96, strongly suggesting that community racial composition and school racial composition are very similar and that a divergence between them is not influencing our results.

19. There is a literature on the effect of school district size on student learning. A number of studies find that there are diseconomies with respect to school district size. See, for example, Niskanen (1998) and Driscoll, Halcoussis, and Svorny (2003).

20. One area of potential exploration is whether there is a difference between communities that are racially diverse at the classroom, school, district, and community levels, and those that are diverse at the community level but segregated at one of the other levels. Unfortunately, our data do not permit such an exploration because of censoring of some racial data at the school and classroom levels.

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