

The Influence of Finance and Accountability Policies on Charter School Locations

ROBERT BIFULCO
Syracuse University
426 Eggers Hall
Syracuse, NY 13244-1020
Email: rbifulco@syr.edu

CHRISTIAN BUERGER
Syracuse University
426 Eggers Hall
Syracuse, NY 13244-1020

Acknowledgments: The authors would like to thank the New York State Education Research Consortium and the Research Foundation of the State University of New York for funding the research project on which this article is based, and the New York State Education Department for providing some of the data needed for the project.

Abstract

This paper examines the location of charter schools in New York State. We begin by identifying a set of location incentives created by charter school financing and accountability provisions, some of which are unique to New York and others of which are inherent to charter schools. Estimated Poisson and Tobit regression models reveal that the pattern of charter school locations across districts are highly consistent with incentives created by financing and accountability policies. Particularly, we find that charter schools are significantly more likely to locate in districts with high operating expenses per pupil, and thus, high charter school payments; low teacher costs; and low performance. Charter schools are also more likely to locate in districts with concentrations of college educated adults as well as high levels of diversity in educational attainment. Within districts, charter schools tend to locate near areas with concentrations of low-income and minority students, who otherwise might have constrained educational choices, which suggests that concerns about the costs of enabling low-income students to reach achievement standards do not discourage charter schools from locating near concentrations of disadvantaged students. This analysis will be of interest to state legislators and their staff, state education department officials and charter school authorizers.

1. INTRODUCTION

The effects of state charter school programs depend on supply decisions made by potential charter school operators as well as demand side decisions. Supply decisions include what “markets” to enter, where to locate within a market, how many seats to make available for students, what programs to offer, and how to recruit students. Combined with the educational preferences of parents and students, these supply decisions influence the composition of charter schools, their effects on the enrollments and finances of traditional public schools, and the type of competition charter schools will create and for which schools and districts. Despite their importance, supply decisions have been largely neglected in the study of charter schools.

Among the understudied questions is how finance and accountability provisions influence charter school location decisions. Although the accountability and financing policies that govern charter schools vary widely from state to state, most charter schools have three defining characteristics: enrollments are not guaranteed, parents must choose to enroll in a charter school; charter school funding is determined largely by the number of students the school enrolls; and to retain its charter, the school must meet student performance standards specified in law and its charter. Thus, although there are many reasons people might pursue a charter, all charter school operators must be concerned with reaching achievement standards, attracting enough students to fill their allotted seats, and keeping costs sufficiently low to maintain financial viability. We might expect, then, that charter school operators will tend to choose locations that increase their likelihood of meeting these objectives. Which locations increase the likelihood of reaching achievement standards and enrollment targets, while keeping costs low enough to maintain financial viability depends, we argue, on the specific accountability and financing provisions of the state’s charter school program.

In this paper, we examine how the finance and accountability provisions of New York's charter school program might influence charter school location decisions. We find that patterns of charter school location across districts are highly consistent with policy incentives. Particularly, we find that charter schools are significantly more likely to locate in districts with high operating expenses per pupil, and thus, high charter school payments; low teacher costs; and low performance. Charter schools are also more likely to locate in districts with concentrations of college educated adults as well as high levels of diversity in educational attainment. Within districts charter schools tend to locate near areas with concentrations of low-income and minority students, who otherwise might have constrained educational choices, which suggests that concerns about the costs of enabling low-income students to reach achievement standards do not discourage charter schools from locating near concentrations of disadvantaged students.

The paper is organized as follows. Section 2 describes elements of charter school finance and accountability in New York that might be expected to influence charter school location decisions and compare these to policies elsewhere. Section 3 identifies location incentives faced by charter schools and discusses which of these incentives are common to most charter school programs and which are created by elements of charter school finance and accountability specific to New York. The next sections examine the patterns of charter school locations across New York to determine if these patterns are consistent with policy incentives. Section 4 discusses the data and statistical models used for these analyses, and Section 5 presents our results. The final section discusses the implications of the analysis for policy and future research.

2. CHARTER SCHOOL FINANCE AND ACCOUNTABILITY IN NEW YORK

New York's charter school law was enacted in 1998, and as of the 2009-10 school year, 168 charter schools enrolling more than 44,000 students were open. Among these, 47 charter

schools serving over 14,000 students are located outside of New York City.¹ Charter schools can be authorized by the New York State Board of Regents, the State University (SUNY) Board of Trustees, or local school boards. In this section, we detail provisions of charter school finance and accountability in New York, and compare these to policies in other states. We do not provide a comprehensive description of charter school policies, but rather focus on provisions most likely to influence charter school location decisions.

Finance Provisions

A charter school in New York receives payments from a district for each of its students who reside in that district, and these payments are the charter school's primary source of funding. The amount a district pays per student is linked to the approved operating expenses of the district.² The district where a charter school is located is also required to provide textbooks and software, transportation, health and special education evaluation services to the charter.

The close link between public funding and the number of students served might be considered a defining characteristic of charter schools. Not all states, however, link the per pupil amount that a charter school receives directly to the amount that the local school district spends as in New York. In some states, including Arizona and Minnesota, the per pupil payment charter schools receive is the same regardless of the district where the charter school locates (Shen and Berger 2010). In other states, including Michigan, North Carolina, and Ohio, the per pupil

¹ These totals were computed by the authors using enrollment figures on individual schools provided by the New York State Education Department.

² Per pupil payments are determined by the approved operating expenses of the district from two years earlier divided by a weighted pupil count (also from two years earlier) multiplied by an adjustment factor. Approved operating expenses are total district expenditures excluding expenditures for capital outlay and debt service for school buildings; transportation; lunch programs; tuition payments; and some other miscellaneous expenditures. In the weighted pupil count, aidable summer session pupils, pupils with special education needs, non-disabled secondary pupils, and students in particular disability categories receive additional weights. The adjustment is based on the statewide change in approved operating expenses from three years prior to one year prior.

charter school payment is linked to the state aid that the local district receives rather than to local district spending (Olson and LaFaive 2007; Batdorff 2010; Maloney 2010).

The characteristics of the students actually served, such as the percentages of low-income and limited English proficient students, do not influence the payments that New York charter schools receive. State aid formulas that target larger grants to districts with larger low-income and LEP enrollments might help to increase expenditures in high need districts. State aid is only one of several factors that influence a district's spending, however, and districts that choose to spend more may or may not also have greater student needs. In addition, the basic per pupil payment that a charter school receives is not adjusted for any differences between the needs of their students and the students in the districts from which they draw students.³ This aspect of charter school finance distinguishes New York from several other states, such as Arizona, Colorado, Florida, North Carolina, and Ohio, where LEP students generate higher per pupil awards for charter schools and a small number of states, including Colorado and Ohio, where charter schools receive higher payments for low income students (NAPCS 2012).

The amount that a district spends on capital outlays and debt service for school buildings is not included in the calculation of approved operating expenses that determine charter school payments in New York, and charter schools are not eligible to apply for the largest building aid program offered by the state. As in many other states, however, a number of efforts to help charter schools meet facility needs have been made. The New York City Department of Education provides space for a large number of charter schools for nominal rental fees, and absorb utility and janitorial service costs for those schools (NYC-IBO 2010). Other districts,

³ Charter schools do receive state and federal aid for the excess costs of high cost disabled students. However, these revenues are a small part of the typical charter school's total and do not provide additional funding for regular education students that may require additional resources and services to reach achievement targets.

however, have not been as generous in providing space for charter schools. That state has also used federal funds to provided start-up and facilities grants for charter schools.

Finally, it is worth noting that districts in New York are required to provide transportation equally to all pupils in like circumstances regardless of whether they attend public or charter schools. Only a handful of other states require districts to provide transportation to charter school students.⁴ In several other states, charter schools are eligible for reimbursement for student transportation on the same basis as districts.⁵ Many state charter school laws, however, do not provide for transportation of charter school students (NAPCS 2012).

Accountability Provisions

The charter school law in New York requires that the charter school application specify the student achievement goals. Both statewide authorizers have careful prescribe the content and form that student achievement goals must take. Guidance from the State Education Department for charter schools authorized by the Board of Regents states that each charter must formulate at least: one *absolute* student achievement goal each for math and English language arts (ELA), which provides for the expected percent of students in each grade achieving proficiency on State assessments; one *comparative* goal each for ELA and math that addresses outperforming the district of location by a stated percent on State assessments; and one *growth* goal that addresses the expected percent of academic growth on State assessments. Each charter school that the SUNY Trustees authorizes is required to enter into an accountability agreement that defines one goal for each of ELA, mathematics, science, and social studies. The achievement bar is high in that a school is expected to have 75 percent of its students who have been enrolled for at least two years score “proficient” or higher on state assessments.

⁴ These include Connecticut, Massachusetts, Mississippi, New Hampshire, New Jersey, Ohio, and Pennsylvania.

⁵ These include Arkansas, Colorado, Florida, Iowa, Louisiana, Maine, Mississippi, Missouri, Ohio, and Oklahoma.

Comparing the accountability standards for charter schools in New York to those in other states is difficult, but there is reason to believe that New York has relatively demanding standards. Since the performance standards for charter schools are formulated in terms of percent of students achieving proficiency on state exams, the rigor of New York's proficiency standards is relevant. Peterson and Hess (2005) compare proficiency standards in different states to proficiency standards on the NCES National Assessment of Educational Progress. They find large differences among states, and that the rigor of New York State's standards is near the median of states examined. In a multistate comparison of charter school accountability laws and practices, the Center for Education Reform (CER) rated New York as a state that holds charter schools strictly accountable, pointing out that New York is one of the few states that have closed charter schools for performance reasons (CER 2007). The National Alliance of Public Charter Schools identifies New York as one of only a few states that uses both performance-based charter contracts and comprehensive school monitoring and data collection processes (NAPCS 2012).

3. LOCATION INCENTIVES

Reasons for establishing a charter school vary widely, which makes predicting supply choices difficult. Given the terms under which charter schools are authorized and financed, however, all charter schools have to concern themselves with three key objectives: reaching student achievement standards specified in their charter agreements; attracting enough students to fill their allotted seats; and keeping costs low enough to maintain financial viability. We expect that charter schools will tend to make supply decisions that increase the likelihood of meeting these objectives. Given this assumption, we can identify several incentives that charter school financing and accountability provisions create for charter school operators.

Incentives to locate in (or near) inefficient districts

Districts where approved operating expenses are high relative to the costs of reaching student achievement standards would presumably provide an attractive market for prospective charter school operators. Such a district would be expected to have concentrations of low cost students that could generate relatively high per pupil revenues, which, all else equal, would make it more likely that the charter school could meet achievement standards while maintaining financial viability. The incentive to locate in high spending districts is created by the policy linking charter school per pupil payments to district spending, which is something only New York and few other states do.

A substantial literature in education finance maintains that how much districts need to spend in order to achieve student performance standards depends on wages in the metropolitan area and the characteristics of students served (Downes and Pogue 1994; Reschovsky and Imazeki 1998; Duncombe and Yinger 2000, 2005). Thus, in addition to high spending districts, charter schools in New York have incentive to locate in schools with low teacher wages and few high need students, such as English language learners or low income students. The strength of the incentive to locate in areas with few high need students will depend on the stringency of charter school performance standards, including both how demanding the standards are and how they are enforced by authorizing agencies.

A high level of spending in a district with relatively low costs is likely to allow the district to operate schools that are attractive to students and parents. Thus, attracting a sufficient number of students to enroll in charter schools might be difficult, offsetting the incentive for charter schools to locate in these types of districts. Districts that have high spending-to-cost ratios because they use resources inefficiently are more likely to be attractive to prospective

charter school operators. Thus, we would expect to see a larger concentration of charter schools in districts with high spending-to-cost ratios only if those districts also have lower than expected levels of student achievement or other features that might make them less attractive to parents.

Incentive to locate in areas attractive to high achieving students

By positioning itself to attract high achieving students, a charter school makes it likely that it will be able to reach student achievement standards. The more demanding the student achievement standards, the stronger this incentive will be. Also, schools that offer high achieving peers are attractive to parents both because such peers might have positive spill-over effects and because parents might use the achievement level of students as a proxy indicator of instructional quality. Of course, high achieving students often have other attractive schooling options either because they live in areas with high quality public schools or have access to private or magnet schools. Thus, a charter school which positions itself to attract high achieving students may face more competition and have a harder time filling seats, which might weaken the strength of this incentive.

Incentive to locate near low performing schools

Parents whose children attend low performing schools are more likely to be dissatisfied with their current school and to find a charter school attractive. Thus, locating near a low performing school might make it more likely that a charter school will fill its seats. Of course, many of the students attracted to a charter school for this reason might be high need and/or low achieving students themselves, which will make meeting student achievement standards without high levels of spending a challenge. If, however, a charter school operator believes it can offer a cost-effective model for educating high need students, then locating near low performing schools will be attractive. Also, ample evidence demonstrates that students from educationally

advantaged backgrounds, for instance, students whose parents are college educated, are more likely to use school choice programs to opt out of low performing schools than are educationally disadvantaged students⁶ Thus, a charter school operator might reasonably expect that it will be able to attract relatively advantaged, high achieving students from low performing schools.

Evidence that these considerations may influence charter school locations is provided by a study in Washington, D.C. Henig and MacDonald (2002) found that charter schools were more likely to locate in census tracts with high proportions of African-American and Hispanic residents than in predominantly white census tracts. However, among census tracts with concentrations of nonwhite residents, charter schools tended to locate in those with middle income and high home ownership rates. This location pattern suggests a strategy of targeting the more advantaged students within groups of traditionally disadvantaged students.

Incentive to locate near diverse schools

The preceding discussion suggests that a strategy targeting advantaged students who would otherwise attend schools with concentrations of disadvantaged students might be attractive to charter school operators. Such a strategy, if successful, would make reaching achievement standards, attracting a sufficient number of students, and keeping per pupil costs low each more likely. Thus, many charter school operators might look to locate near schools with diverse populations of students that include significant concentrations of both educationally disadvantaged groups and more advantaged, higher achieving student groups.

Glomm, Harris, and Lo (2005) make a more general argument of this kind. They argue that a diverse population is likely to have a dispersed distribution of parental preferences for different types of educational programs. As a result, schools or districts that serve diverse populations will have a difficult time satisfying the preferences of all of their parents, creating a

⁶ For a brief review of this evidence see Bifulco, Ladd, and Ross (2009)

demand for charter schools that can differentiate their offerings from the local school or district. They also present evidence, consistent with their argument, that charter schools in Michigan are more likely to locate where populations are diverse in terms of race and adult education levels.

Incentive to avoid high cost students

Enrolling students from low-income families, with limited English proficiency or learning disabilities, or that otherwise demand additional resources, will increase the costs of the charter school and make it more challenging to reach student achievement standards. Because it does not compensate charter schools for serving high need students, New York's method of financing charter schools creates a clear incentive to avoid serving high cost students. Thus, we might expect that charter schools will serve fewer low-income, LEP, learning disabled and high school students than the local district. Lacireno-Paquet *et al.* (2002) present evidence from Washington, D.C. that suggests that this type of financial incentive can influence charter school enrollments. Specifically, they find that charter schools are less likely than regular public schools to serve students whose language or special education needs make them more costly to educate. Interestingly, only charter schools that they classified as market-oriented, rather than mission-oriented, showed this tendency, suggesting that this type of financial incentive influences the supply decisions of some types of charter school providers more than others.

4. RESEARCH QUESTIONS, DATA AND METHODS

Whether and how the incentives just discussed influence the location and enrollments of charter schools in New York is an open question. Groups choose to open charter schools for a variety of reasons, and factors other than the incentives outlined above can be expected to influence charter school supply. For instance, the set of civil society networks and institutions and/or the political dynamics within a community might influence the desire and capacity to

establish charter schools. Within a district, idiosyncratic factors that influence the distribution of available space appropriate for housing a school might influence location choices. Thus, one question is whether or not the influence of the incentives created by charter school financing and accountability provisions is swamped by the other factors that influence charter school location.

Also, the preceding discussion suggests that charter school operators face tradeoffs created by finance and accountability provisions. Particularly, choices that increase the likelihood of meeting student performance standards at costs low enough to maintain financial viability often conflict with choices that increase the likelihood of attracting sufficient enrollments. So, for instance, the incentive to locate in districts with high spending to cost ratios and in neighborhoods attractive to high achieving students must be weighed against reasons that make locating near low performing schools attractive. Thus, an important question is which of the incentives discussed above have the largest influence on the location of charter schools.

To address these questions we conduct two sets of analysis. The first examines the distribution of charter schools across districts and the second examines the location of charter schools within districts. Both the districts chosen and the more specific locations within a district can affect who has access to charter schools and which schools are exposed to charter school competition. Focusing on the districts where charters are located allows us to examine the effect of financial considerations that only vary across districts, i.e. per pupil payments and teacher wages, while looking at choices within district allows us to examine the effects of other cost and demand factors on location holding those financial considerations constant.

Location Across Districts

A common approach to investigating the location choices of firms and non-profit organizations is to estimate the expected number of organizations in a community as a function

of local market characteristics. Glomm, Harris, and Lo (2005) and Downes and Greenstein (1996) have used this approach to examine the location of charter and private schools in Michigan and California. Here, we focus on determining whether any of the factors suggested by the above discussion of incentives help to predict the districts where New York charter schools have located. Specifically, we estimate a regression model:

$$CH_i = f(E_i, P_i, C_i, D_i, N_i, \varepsilon_i) \quad (1)$$

where CH_i is the number of charter schools, or alternatively the number of students enrolled in charter schools, in district i , E_i is approved operating expenditures for district i , P_i is a measure of student performance in the district, C_i are indicators of educational costs in the district (including teacher wages and student need indicators), D_i are measures of the diversity of the population in the district, N_i is a control for the number of school age children and ε_i is a random error term capturing the effects of factors not included in the regression.

The considerations in the previous section suggest that charter schools will tend to locate in districts where they have an opportunity to collect per pupil revenues that are high relative to per pupil costs; where they can compete for students with relatively inefficient districts, that is where student performance is low controlling for district cost and spending; and in districts with diverse student bodies. Also, the number of charter schools a district can support is obviously influenced by the size of the district, and so it is important to include the number of school age children in the district as a control.

The data used to estimate this regression were drawn from several sources. Counts of charter schools and of the number of charter school students residing in each district were provided by the New York State Education Department (NYSED). The average operating expenditures in a district were calculated using data drawn from Annual Financial Reports also

provided by NYSED.⁷ Data used to construct measures of student performance in the district were drawn from New York State School Report Cards, and measures of child poverty rates, mean years of education, educational and racial diversity, and public and private school enrollment were computed using data from district tabulations of the 2000 U.S. Census. The measures of educational and racial diversity are versions of a Herfindahl index. In the case of educational diversity a Herfindahl index was constructed using 16 different years of education categories and the racial diversity measure was calculated based on the distribution of the population across 6 different racial categories. In both cases, the Herfindahl index was subtracted from 1 and multiplied by 100, so that the resulting measure of diversity ranges from 0 to 100 with higher values indicating more diversity. Finally the measure of teacher wages in each of New York's metropolitan areas is the 2005 Labor Market Comparable Wage index produced by the National Center for Education Statistics.⁸

Several issues arise in estimating and interpreting the proposed regression. The first issue concerns sample selection. The charter schools in the state are spread across 15 different districts, all of which are located in metropolitan areas within the state. Also the measure of teacher wages that we use is only available for metropolitan areas. Thus, we limit the sample to districts located in metropolitan areas. New York City has made exceptional efforts to encourage and support charter schools, and in fact, over two thirds of the charter schools in the state are located in New York City. Thus, the decision of a charter school to locate in New York

⁷ The measure of average operating expenditures used in this analysis is the district's charter school tuition amount. Although the State Education Department was not able to provide the charter school tuition amounts for the years needed for this analysis (1999, 2000 and 2001), we were able to replicate charter school tuition amounts provided for later years using data drawn from the Annual Financial Reports, and applied the same formulas to data for the earlier years to calculate the average operating expenditures.

⁸ See <http://nces.ed.gov/edfin/adjustments.asp>. This measure is determined by wages paid for comparable occupations in the local labor market and thus reflects the underlying costs of teachers rather than district decisions about teacher salaries.

City is not comparable to the decision to locate in other districts in the state, and so, we exclude New York City from our sample.

A second issue is that the model defines a potential market for a charter school as a district. Charter schools can, however, enroll students from multiple districts and thus, the characteristics of surrounding districts might influence a charter school's choice of location. Therefore, in addition to estimating the effect of various factors on the number of charter schools located in a district, we also estimate the effect of the same factors on the number of students from a district enrolled in charter schools.⁹

Third, the count of charter schools only occurs in non-negative integer values and both the count and enrollment variables have a preponderance of zero values, which raise questions about the proper form of the function $f(\cdot)$ and the distribution of ε_i in equation (1). The most common choices for count variables are to specify $f(x) = \exp(x\beta)$ and to assume a Poisson distribution of the error term, which we do in the analyses below.¹⁰ When charter school enrollment is used as the dependent variable, we use a Tobit model to adjust our estimates for the preponderance of districts with zero charter enrollment.

A fourth issue concerns variation across charter schools which might influence supply decisions. Jeffrey Henig and his colleagues have argued that market-oriented charter schools might have different objectives than mission-oriented charters (Henig and MacDonald 2002; Lacireno-Paquet *et al.* 2002). So, in addition to estimating our model for all charter schools, we

⁹Downes and Greenstein (1996) address this issue by including the characteristics of the surrounding districts in their model of the number of private schools in a district. Given the limited variation we have in charter school location, we are unable to implement Downes and Greenstein's approach. They find, however, that the characteristics of neighboring districts "are not the primary determinants of the location of private schools", which suggest that omitting characteristics of neighboring districts might be a minor issue.

¹⁰ A Poisson distribution assumes that the mean and variance of the error term are equal. However, a quasi-maximum likelihood estimator for the model is consistent regardless of whether the true distribution is Poisson, and in any case, specification tests fail to reject the null hypothesis that the mean and variance are equal.

also estimate separate models of charter schools affiliated with national Educational or Charter Management Organizations (CMOs). Also, charter school authorizers in New York have the opportunity to exercise influence over the supply of charter schools, and so we also estimate our models separately for charter schools approved by SUNY and by the Board of Regents.

A fifth issue concerns potentially endogenous relationships. Each of the independent variables we propose to examine is potentially influenced by the presence of charter schools. To address this issue we regress the number of charter schools in 2009-10 on measures of the other variables in or near 2000. Except for five charter schools opened in 1999, all charter schools in New York State were open in the year 2000 or later, and using district characteristics in 2000 to predict charter school penetration as of 2010 should minimize simultaneity problems.

A final issue is that many factors that might influence the location of charter schools, some of which were discussed earlier, are omitted from the regression. Omitting potentially relevant variables is unavoidable given the difficulty of collecting measures and the need to use a parsimonious model. As a result, the relationships we estimate cannot be interpreted as causal. Nevertheless, if none of the factors we examine are associated with the number of charter schools in a district, then that would suggest that any effect of the incentives created by the finance and accountability provision outlined above are overwhelmed by other influences on charter school supply decisions, and that institutional, political or idiosyncratic factors are more telling. Conversely, if we do find that locations across districts are consistent with the incentives we have identified, it suggests that these incentives may well have important effects.

Location within Districts

Per pupil revenues and teachers wages are constant across locations within a district. Thus, we would expect the location of charter schools within a district to be influenced primarily

by demand factors and student needs. Demand for charter schools is likely to be highest where parents are least satisfied with other public school options, that is, in areas where there are: low levels of student achievement; concentrations of students with otherwise constrained educational choices, including low-income and minority students; and diverse populations. The incentive to locate in these areas, however, may be offset by the fact that such locations are likely to attract higher proportions of disadvantaged students who may require extra resources to reach student achievement standards. Thus, the key question to address in an examination of charter school locations within districts is whether charter schools tend to locate in areas where demand is strongest or in areas likely to attract mostly low-cost students.

To begin addressing this question, we look at the location of charter schools in the three districts outside New York City that have more than two charter schools--Albany, Buffalo and Rochester.¹¹ Specifically, we compare the characteristics of census tracts that have and do not have a charter school located nearby, where nearby is defined as within the tract itself or in an adjacent census tract. To further examine the location of charter schools within districts, we use the sample of all census tracts located in districts with charter schools to estimate this regression:

$$C_{ji} = g(X_{ji}, S_{ji}, \alpha_i, \nu_{ji}) \quad (2)$$

where C_{ji} is a categorical variable that takes on the value of 0 for census tracts that do not have any charter schools nearby, 1 for tracts with exactly one charter school nearby, and 2 for tracts with multiple charter schools nearby, X_{ji} is a vector of characteristics of the population in tract j in district i , S_{ji} are characteristics of students enrolled in the non-charter, public schools that are located in the tract or an adjacent tract, α_i is a district fixed effect, and ν_{ji} is a random error term. Following Henig and MacDonald (2002), we specify the regression as an ordered probit,

¹¹ As of the Fall of 2010, there were 12 charter schools in Albany, 15 in Buffalo and 6 in Rochester.

and we include district fixed effects to ensure that all relationships are estimated based on comparison of census tracts within the same district. We compute robust standard errors clustered by district.

The dependent variable in this regression is measured as of the fall 2010 and all right-hand side variables are measured in or around 2000. Data on characteristics of tract residents are from the 2000 U.S. Census. Characteristics of the traditional public schools are computed using students in all traditional public schools located within the tract or an adjacent tract. In cases, where no school is located in the tract or an adjacent tract, measures were computed using students in the non-charter, public school located nearest the centroid of the tract. The measures of school characteristics are averages drawn from the 1999, 2000 and 2001 School Report Cards.

5. EMPIRICAL RESULTS

First we discuss results of the analysis of charter school locations across districts and then the analysis of location within districts that have charter schools.

Location Across Districts

Table 1 presents descriptive statistics for the variables used in the district level analysis. With a very small number of exceptions charter schools in New York State are located in larger central cities or in inner ring suburbs with concentrations of minority and low income students. Thus, districts where charter schools are located tend to be much larger, with higher rates of child poverty, lower levels of adult education, more educational and racial diversity, and substantially lower levels of student achievement than other districts located in New York's metropolitan areas.

The pattern of charter school location detailed in Table 1 does not allow us to say much about the efficacy of incentives created by charter school finance and accountability provisions.

Since charter school finance and accountability rules create countervailing incentives, it would be useful to know which of the variables listed in Table 1 are independently associated with the number of charter schools, after controlling for the other variables. Also, the comparison of districts with and without charter schools ignores the considerable amount of variation in the number of charter schools across districts that have at least one charter school. To help us assess whether finance and accountability incentives might be influencing which districts have the highest concentrations of charter schools, Table 2 presents the results of the regression analyses described above.

The first column of Table 2 presents the results of a Poisson regression to predict the number of charter schools located in a district. The results of this regression are highly consistent with hypotheses about the incentives created by charter school finance and accountability provisions. All of the coefficient estimates have the expected sign, and most are statistically significant.¹²

Controlling for the costs of providing education and mean student performance, districts with higher per pupil operating expenditures, and thus, higher charter school payments, have greater concentrations of charter schools. The estimated coefficient on the log of average operating expenditures can be interpreted as an elasticity, and implies that a one percent increase in per pupil expenditures is associated with an eight percent increase in the number of charter schools in the district. So, if a district were to increase per pupil spending by 11.9 percent, we would expect the number of charter schools in the district to double. Also, holding district spending and the costs of education constant, districts with lower mean student performance have more charter schools, which suggests that charter schools are more likely to establish in

¹² The majority of charter schools are elementary schools, and we ran similar models as those presented in Table 2 using the number of elementary charter schools and students as the dependent variable and obtained similar results.

relatively inefficient districts. Finally, holding the per pupil payments constant, locations with higher teacher wages have fewer charter schools. Each of these findings support the expectations that charter schools are more likely to open where the costs of education, particularly teacher salaries, are low relative to the payments charter schools can generate, and where traditional public schools are not using relatively high per pupil expenditures efficiently.

The discussion above suggests that the child poverty rate would have two countervailing effects on the concentration of charter schools in a district. Because the residential choices of low-income families are constrained, we would expect that poor children are more likely to be poorly served by the traditional public schools they can access. Thus, there is likely to be more demand for charter schools in places with greater concentrations of poverty. Students from poor families, however, are more likely to require additional services to reach student performance standards and thus increase the costs of providing education, discouraging the establishment of charter schools. Consistent with the presence of these offsetting incentives, the coefficient on the child poverty rate is very close to zero and statistically insignificant.

A large body of literature suggests that college educated parents are more likely to take advantage of expanded school choice options, especially when they would otherwise be assigned to schools with concentrations of less advantaged students (Bifulco, Ladd, and Ross 2009). Also, the ability to attract students with college educated parents will make it more likely that a charter school can meet student performance targets. Thus, we expect more charter schools where there are both concentrations of college educated parents, but also considerable diversity in educational levels among parents. The results in the first column of Table 2 are consistent with this expectation. The coefficient on mean years of education indicates that a one year increase in the average level of education in the community, which is an increase of more

than one standard deviation, is associated with a 93 percent increase in the number of charter schools. Also the positive coefficient estimate for educational diversity indicates that a one standard deviation increase in diversity is associated with a 92 percent increase in the number of charter schools. Controlling for educational diversity, the amount of racial diversity in a district does not have a statistically significant relationship with the concentration of charter schools.

The second column of Table 2 presents the results of a similar regression except the count of charter schools in the district is replaced with the number of students in the district who are enrolled in charter schools. The results of this model are largely consistent with the results in column 1. Particularly, districts that generate higher payments for charter schools, that have lower teacher wages, and lower levels of student performance have more students enrolled in charter schools. The estimated coefficients on the mean years of education and on the educational diversity index have the same sign as in column 1, but the estimates are much less precise and not statistically significant. More generally the model explains less of the variation in charter school enrollments than in the number of charter schools.

Table 3 examines whether or not the pattern of locations across districts is different for different types of charter schools. The first two columns compare the location patterns of charter schools that are affiliated with CMOs to those that are not.¹³ In general, both sets of charter schools show location patterns similar to those for the full set. The influence of per pupil operating expenditures (and thus per pupil charter school payments) and of teacher wages on the concentration of charter schools is somewhat less strong for charter schools affiliated with CMO's. The reasons why are uncertain. It might be the case that national management organizations provide cost advantages or access to financial reserves that allow charter schools to operate even where purely financial considerations of revenues and costs are less favorable.

¹³ Of the 47 upstate charter schools in operation in the fall of 2010, 13 were affiliated with an EMO or CMO.

Even for charters affiliated with CMO's, however, they locate more frequently in districts with relatively high spending per pupil and relatively low teacher wages.

The last two columns of Table 3 compare an estimated model of the number of SUNY authorized charters with a model to predict the number of charters authorized by the Board of Regents.¹⁴ Generally the location patterns of these two sets of charter school are quite similar with each other and with the patterns for charter schools as a whole. The one exception is that the educational diversity in a district does not help to predict the number of charter schools authorized by the Regents.

Location within Districts

Table 4 focuses on districts with the greatest concentration of charter schools—Albany, Buffalo, and Rochester, and compares the characteristics of census tracts that have charter schools located nearby to those that do not. Across all three districts, charter schools tend to locate near census tracts with relatively high rates of child poverty, high percentages of black children among those enrolled in school, low percentages of white children, and greater racial diversity. The bottom panel of Table 4 compares the characteristics of the non-charter, public schools located near the tract. Measures of school characteristics are averages drawn from the 1999, 2000 and 2001 School Report Cards. The differences between tracts located nearby charter schools and those not are less marked for these school characteristics than for the characteristics of tract residents. Nonetheless, charter schools in Buffalo and Rochester do tend to locate near public schools with relatively high percentages of black students and relatively low percentages of white students.

¹⁴ Of the 47 charter schools outside New York City, 24 are authorized by SUNY and 21 are authorized by the Board of Regents. There are two charter schools in Buffalo, NY authorized by the local school board.

The comparisons presented in Table 4, especially the top panel, suggest that demand factors are driving charter school location decisions within districts. Specifically, the incentives to locate near families whose schooling options might otherwise be constrained, including low-income and minority families and to locate near racially diverse neighborhoods appear to outweigh any disincentive to locate in areas that will attract concentrations of low-income, high-cost students. As discussed above, such a location strategy makes sense if charter school operators believe they can offer cost-effective models for educating high need students, or if they expect to be able to attract the relatively advantaged and high achieving students from schools that otherwise have concentrations of disadvantaged students.

In their study of Washington, D.C., Henig and MacDonald (2002) also found that charter schools tended to be located in census tracts with high shares of minority students. They found that within high minority areas, charter schools tended to locate in areas with relatively high socioeconomic status, suggesting a strategy of trying to attract relatively advantaged students from high minority areas. We do not find strong evidence that such a strategy is prevalent in these districts. It is true that the percentage of adults who are college educated in the tracts that have charter schools nearby is very similar to that in tracts that do not have charter schools nearby, and higher than expected given the concentration of low income and minority students in these tracts. However, in analyses not shown, we examined the number of charter schools located near tracts with populations that are more than 70 percent black, more than 35 percent poor, and less than 15 percent college educated. In each district, these tracts were as likely or more likely to have a charter school located nearby as other tracts, which suggests that charter schools are not avoiding locations near the greatest concentrations of educationally disadvantaged children.

To further examine the location of charter schools within districts we estimated a regression of the number of charter schools nearby a census tract on variables describing the population in the tract as well as characteristics of nearby non-charter, public schools. The results of the analysis are presented in the first column of Table 5. The variables that show statistically significant independent effects on the number of charter schools located in or nearby a tract are the number of students in the tract enrolled in private schools, the child poverty rate among tract residents, and the percent of school aged children in the tract who are black. The coefficient estimates indicate that a one standard deviation increase in the log of private school enrollment is associated with a 0.104 increase in the probability that a tract will have at least one charter school located nearby; a one standard deviation increase in the child poverty rate is associated 0.066 increase in the probability of having a charter school nearby; and a one standard deviation increase in the percent black residing in the tract is associated with a 0.105 increase in the probability of having a nearby charter school. These findings confirm that demand factors play an important role in influencing where charter schools open. Because they often face greater constraints on where they choose to live than other groups, black students and students from poor families are more likely to be dissatisfied with the traditional public schools to which they have access. Also, large private school enrollments indicate that there is strong demand for alternatives to district run public schools.

Table 5 also allows us to examine whether, controlling for the characteristics of tract residents, the characteristics of the district schools located near a tract influence the likelihood of having a charter school nearby. Note that the characteristics of the public schools located near a tract are different than, and not necessarily highly correlated with, the characteristics of tract residents. The results reported in Table 5 indicate that, after controlling for characteristics of

tract residents, the composition of nearby schools does not significantly influence the location of charter schools. This result may reflect the fact that the average characteristics of the traditional public schools nearest a tract do not necessarily represent the characteristics of the traditional public schools that serve the majority of students in that tract.

The second and third columns of Table 5 estimate the same regression model separately for charter schools associated with a national CMO and unaffiliated charter schools. The results suggest that the two types of schools make significantly different location choices. The results indicate that both types of charter schools locate near areas with relatively high percentages of black children. However, controlling for the percent black in the tract, tracts with relatively high child poverty rates are significantly less likely to have a CMO affiliated charter school nearby, but significantly more likely to have a non-affiliated charter school nearby. This result is consistent with the pattern found by Henig and MacDonald (2002) in their analysis of charter schools in Washington D.C. and suggests that considerations of the cost of serving high need students might play a larger role in influencing the location choices of charter schools run by CMO's than it does for other charter schools. Also, the number of students in a tract who attend a private school is a significantly stronger predictor of whether the tract will have a CMO affiliated charter school nearby than of whether it will have an unaffiliated charter school nearby. This result suggests that CMO's might be more likely than non-affiliated charter school operators to use private school enrollments as an indicator of demand.

The last two columns of Table 5 estimate the same regressions separately for charters authorized by SUNY and by the Board of Regents. Child poverty rates are the strongest predictor of whether a tract will have a SUNY authorized charter school nearby, while the percent of children in the tract who are black is the strongest predictor of whether there is a

Regents authorized charter nearby. Charter schools authorized by SUNY are also more likely to locate in or near census tracts that have relatively high public and private school enrollment and relatively high levels of racial and educational diversity. These same factors are not associated with the location of charter schools authorized by the Regents. Thus, although both types of charters locate near disadvantaged students, there do appear to be systematic differences in the geographic distribution of SUNY and Regents authorized charters within districts.

In sum, our examination of the location of charter schools within districts suggests that demand factors are more important in influencing locational choices than are considerations of the costs of enabling high need students to achieve performance standards. Particularly, charter schools tend to locate near areas with relatively high percentages of minority and low-income students, who might otherwise have a constrained set of schooling options, and in areas with relatively large private school enrollments. The one suggestion that some charter schools consider the costs of educating high need students in choosing a location within a district is the finding that holding the racial composition of a tract constant, a tract with relatively low poverty rates is more likely than a high poverty tract to have a CMO-affiliated charter school nearby.

6. IMPLICATIONS FOR POLICY AND RESEARCH

Patterns of charter school location in New York are consistent with the incentives created by charter school finance and accountability policies. Because charter school funding is tied so directly to the number of students they are able to attract, we would expect charter schools to locate in areas where demand is high, which is what we find. Controlling for costs and revenues, charter schools are more likely to be established in districts with relatively low performance, relatively diverse student populations and relatively high percentages of college educated parents. Within districts, charter schools tend to locate in areas where there are concentrations of

students with otherwise constrained educational choices, including low-income and minority students, and where there are substantial private school enrollments indicating demand for alternatives to traditional public schools.

Beyond these demand factors, there is also evidence that considerations of revenue and costs influence charter school locations. Particularly, holding demand factors constant, charter schools are more numerous in districts that face relatively low teacher wages and provide relatively high per pupil payments. These results are consistent with evidence from other studies, both in New York (UFT 2010) and elsewhere (Lacireno-Paquet *et al.* 2002), showing that charter schools serve fewer high cost students than the traditional public schools in the same districts, including lower proportions of high school, LEP, and disabled students.

Evidence that charter school supply decisions, and specifically their location choices, respond to financial incentives has important policy implications. First, it suggests that policy makers can influence the supply of charter schools by raising or lowering per pupil payments. For instance, a potentially fruitful way to encourage charter schools to serve larger shares of high cost students, including high school, LEP and disabled students, if that is a policy goal, is to increase the per pupil payments for those categories of students. Also, a state might encourage the establishment of charter schools in high wage areas by offering additional forms of support, either in the form of increased per pupil payments or perhaps facility assistance. Second, while policies like that in New York that tie per pupil payments to district spending levels can be expected to attract charter schools to high spending and inefficient districts, policies that do not link charter school payments to district spending may have different effects. For instance, in states that provide the same per pupil payment regardless of where a charter school locates, we might expect more charter schools to locate in districts where spending is low relative to costs.

Another implication of the analyses presented here is that holding charter schools accountable for student achievement standards does not appear to discourage charter schools from locating in areas accessible to low-income students. The relatively high demand among this group of students, which otherwise might have relatively constrained educational choices, appears to outweigh any concern that attracting large concentrations of low-income students might make it more difficult to achieve student performance targets. This is a significant finding, given that charter school authorizers in New York appear to be more forceful than many states in holding charter schools accountable for student performance. Nonetheless, it is possible that if student performance standards are raised, or per pupil payments are lowered, charter schools might have stronger incentives to locate in areas attractive to high achieving students and to avoid locating near and serving disadvantaged students. Also, the form that performance standards take might influence location decisions. If charter schools are required to show higher levels of student performance than nearby public schools that might encourage schools to locate near low-performing schools, whereas if the focus is on absolute performance standards the incentive could be to locate in areas with more high achieving students.

The analyses presented here provide support for the idea that the incentives created by finance and accountability policies influence the location of charter schools. They also provide some indication of how charter schools in New York have been making choices in the face of countervailing incentives. Of course, any implications that the analyses presented here have for charter school policy are merely suggestive. Cross-sectional analyses of charter school locations in a single state are not sufficient to establish causal policy effects. At least two types of studies would help push beyond the descriptive analysis presented here to provide more definitive policy guidance. First, multistate studies are a logical next step. The discussion above suggests that

different charter school finance and accountability policies will create different incentives for charter school operators and lead to different supply responses. Studies that compare patterns of charter school location across states with different charter school policies would provide a more definitive test of that hypothesis. Also, studies that examine changes in state policies and their effect on charter school location patterns would be useful. Second, studies that examine the effect of state policies on other supply decisions, such as what programs to offer and how to advertise and recruit students, can provide a fuller picture of how state policies interact with supply decisions to shape charter school programs.

REFERENCES

- Batdorff, Meagan. 2010. North Carolina. In *Charter School Funding: Inequity Persists*, edited by Meagan Batdorff, Larry Maloney, and Jay May Jay, pp. 160-167. Muncie, Indiana: Ball State University.
- Bifulco, Robert, Helen F. Ladd, and Stephen L. Ross. 2009. The effects of public school choice on those left behind: Evidence from Durham, North Carolina. *Peabody Journal of Education* 84(2): 130-49.
- Center for Education Reform (CER). 2007. Charter facts & stats. Available <http://charterschoolresearch.com/>. Accessed 21 May 2012.
- Downes, Thomas A., and Shane M. Greenstein. 1996. Understanding the supply of non-profits: Modeling the location of private schools. *Rand Journal of Economics*, 27(3): 365–390.
- Downes, Thomas A., and Thomas F. Pogue. 1994. Adjusting school aid formulas for the higher cost of educating disadvantaged students. *National Tax Journal*, 67(2): 89-110.
- Duncombe, William, and John M. Yinger. 2000. Financing higher student performance standards: The case of New York State. *Economics of Education Review* 19(5): 363-386.
- Duncombe, William, and John M. Yinger. 2005. “How much more does a disadvantaged student cost?” *Economics of Education Review* 24(5): 513-532.
- Glomm, Gerhard, Douglas T. Harris, Te-Fen Lo. 2005. Charter school location. *Economics of Education Review* 24(4): 451-457.

- Henig, Jeffrey R., and Jason A. MacDonald. 2002. Locational decisions of charter schools: Probing the market metaphor. *Social Science Quarterly* 83(4): 962-980.
- Lacireno-Paquet, Natalie., Thomas T. Holyoke, Michele.M. Moser, and Jeffrey R. Henig. 2002. Creaming versus cropping: Charter school enrollment practices in response to market incentives. *Educational Evaluation and Policy Analysis*, 24(2): 145-158.
- Maloney, Larry (2010): Ohio. In *Charter School Funding: Inequity Persists*, edited by Meagan Batdorff, Larry Maloney, and Jay May Jay, pp. 168-174. Muncie, Indiana: Ball State University.
- National Alliance for Public Charter Schools (NAPCS). 2012. Measuring Up to the Model: A Tool for Comparing State Charter School Laws. Available <http://www.publiccharters.org/law/ViewComponent.aspx?comp=21>). Accessed 21 May 2012.
- New York City Independent Budget Office (NYC-IBO). 2010. *Comparing the level of public support: Charter schools versus traditional public schools*. New York: New York City Independent Budget Office.
- Olson, Ryan S. and Michael D. LaFaive. 2007. *A Michigan school money primer for policymakers, school officials, media and residents*. Midland, Michigan: Mackinac Center for Public Policy.
- Peterson, Paul E., and Frederick M. Hess. 2005. Johnny can read ... in some states: Assessing the rigor of state assessment systems. *Education Next*, 5(3): 52-53.
- Reschovsky, Andrew, and Jennifer Imazeki. 1998. The development of school finance formulas to guarantee the provision of adequate education to low-income students. In *Developments in School Finance, 1997: Does Money Matter?*, edited by William. J. Fowler Jr., pp. 121-148. Washington, D.C.: National Center for Educational Statistics.
- Shen, Yilan, and Alexander Berger. 2011. *Charter school finance*. Available <http://www.ncsl.org/documents/educ/charterschoolfinance.pdf>. Accessed 21 May 2012.
- United Federation of Teachers (UFT). 2010. *Separate and unequal: The failure of New York City charter schools to serve the city's neediest students*. Available <http://www.uft.org/files/attachments/uft-report-2010-01-separate-and-unequal.pdf> . Accessed 11 June 2012

Table 1: Description of Variables Used in Analysis of Charter School Location Across Districts

	Districts with Charter Schools		Districts without Charter Schools	
	Mean	(SD)	Mean	(SD)
Number of Districts	14		474	
Number of Charter Schools	3.36	(4.31)	0	(0)
Charter School Enrollment ¹	922	(1724)	3	(18)
Average Operating Expenditures ²	7152	(1343)	7020	(2088)
Mean Student Performance ³	-1.16	(1.26)	0.22	(0.95)
Teacher Wage Index ⁴	105.78	(12.25)	106.43	(12.86)
Child poverty rate ⁵	14.79	(6.71)	6.58	(4.45)
Mean Years of Education ⁵	13.16	(0.95)	13.7	(0.89)
Educational Diversity ^{5,6}	90.16	(2.61)	86.65	(3.54)
Racial diversity ^{5,7}	55.32	(21.43)	23.53	(20.11)
Enrollment in public and private schools ⁵	17,484	(18860)	3,429	(3085)

All variable values are for the year 2000 except counts of charter schools and charter school enrollments which are for the 2009-10 school year

1. Number of students residing in the district enrolled in a charter school
2. Tuition amount for charter school students residing in district, calculated using fiscal data obtained from State Education Department and formulas provided in the charter school legislation.
3. Computed by converting mean score of each district in the state into a standard scores with a mean of zero and standard deviation of one using statewide test specific means and standard deviations, and then averaging the standard scores for grade 4 ELA, grade 4 math, grade 8 ELA and grade 8 math.
4. Teacher comparable wage index for consolidated metropolitan statistical area obtained from National Center for Education Statistics, <http://nces.ed.gov/edfin/adjustments.asp>
5. Measure from the district tabulations of the 2000 U.S. Census
6. $(1 - \text{Herfindahl index}) * 100$, where Herfindahl index is constructed using 16 different years of education categories, values range from 0 to 100 with higher numbers indicating more diversity.
7. $(1 - \text{Herfindahl index}) * 100$, where Herfindahl index calculated using 6 different racial categories, values range from 0 to 100 with higher numbers indicating more diversity.

Table 2: Analysis of Charter School Location Across Districts

	Count of Charters (Poisson)	Log of Charter Enrollment (Tobit)
Log of Avg Operating Expenditures	8.433** (1.458)	24.319** (9.451)
Mean Student Performance	-1.752** (0.611)	-3.893* (2.281)
Teacher Wage Index	-0.148** (0.035)	-0.370** (0.182)
Child poverty rate	0.018 (0.078)	0.35 (0.333)
Mean Years of Education	0.937** (0.301)	1.386 (2.318)
Educational Diversity	0.354** (0.115)	0.613 (0.534)
Racial diversity	-0.017 (0.024)	-0.022 (0.091)
Log of enrollment	1.196** (0.402)	4.491** (1.838)
Constant	-83.095** (15.082)	-244.807** (90.719)
Log-likelihood Value	-48.276	-71.847
R-squared	0.929	0.404

All variables defined as in Table 1. R-squared is computed as the square of the correlation between the dependent variable and the predicted value of the the dependent variable. Figures in parentheses are robust standard errors. ** indicates statistically significant at 0.05 level and * indicates statistically significant at the 0.10 level.

Table 3: Analysis of Charter School Location Across Districts, By Affiliation and Authorizer

	Count of Charters			
	Affiliated with a CMO	Not Affiliated with a CMO	Authorized by SUNY	Authorized by the Regents
Log of Avg Operating Expenditures	4.534** (2.376)	10.134** (1.711)	9.046** (2.158)	5.080** (1.893)
Mean Student Performance	-0.752 (0.482)	-2.319** (0.942)	-1.826* (1.111)	-1.855** (0.681)
Teacher Wage Index	-0.095** (0.046)	-0.167** (0.038)	-0.148** (0.048)	-0.091** (0.046)
Child poverty rate	0.024 (0.061)	0.040 (0.101)	0.120 (0.085)	-0.023 (0.086)
Mean Years of Education	0.887 (0.560)	1.092** (0.387)	1.498** (0.371)	0.735* (0.415)
Educational Diversity	0.421** (0.215)	0.361** (0.116)	0.594** (0.143)	-0.003 (0.089)
Racial diversity	0.032 (0.024)	-0.036 (0.033)	-0.015 (0.039)	-0.014 (0.029)
Log of enrollment	1.052** (0.475)	1.243** (0.481)	0.062* (0.356)	1.543** (0.461)
Constant	-49.610** (15.804)	-100.718** (20.790)	-90.777** (22.921)	-63.687** (17.763)
Log-likelihood Value	-22.133	-33.094	-28.195	-29.068
R-squared	0.794	0.945	0.902	0.897

All regressions are Poisson models, and all independent variables are defined as in Table 1. R-squared is computed as the square of the correlation between the dependent variable and the predicted value of the the dependent variable. Figures in parentheses are robust standard errors. ** indicates statistically significant at 0.05 level and * indicates statistically significant at the 0.10 level.

Table 4: Comparison of Census Tracts With and Without Charter Schools Nearby

	Albany		Buffalo		Rochester	
	With a Charter	Without a Charter	With a Charter	Without a Charter	With a Charter	Without a Charter
Characteristics of Census Tracts¹						
Number of tracts	30	10	61	63	40	69
Number enrolled in public school	559.6	581.3	673	596.6	622.5	643.7
Number enrolled in private school	105.7	89.6	130.1	105.9	66.1*	86.8
Child poverty rate	18.9*	11.3	24.4*	19.6	27.3**	18.6
Median income	45,656	54,113	36,101	38,984	33,775**	41,357
Income diversity ²	13.4	13.6	11.5	9.7	13.3	11.1
% black enrolled in school	34.0*	15.7	39.4**	25.5	49.9**	30.7
% hispanic enrolled in school	7.2	4.1	9.4	7.2	17.7**	11.4
% white enrolled	55.1**	78.9	51.0**	67.1	32.0**	55.7
Racial diversity ³	45.9**	28.7	33.9	27.7	57.6**	47.7
% of adults with college education	41.4	41.4	27.7	27.0	28.3	30.2
Educational diversity ⁴	89.4	89.2	88.4	87.3	88.3	87.7
Characteristics school nearest the tract⁵						
Mean performance ⁶	637.4	634.4	637.3	639.1	632.9	632.3
% low performing ⁷	55.5	59.4	53.6	52.2	59.3	59.9
% black	61.3	59.4	53.0*	44.5	65.8**	55.6
% Hispanic	8.1	8.8	8.4	7.4	17.4	16.3
% white	28.1	28.2	36.6**	45.6	14.9**	25.9
Racial diversity ⁸	61.8	59.0	55.3	54.0	58.0**	67.7
% limited English proficient	3.8**	5.1	4.4	5.6	7.3	7.2
% free-lunch eligible	62.4	60.4	65.7	63.3	79.3*	77.2
% students with disabilities	21.6	19.8	14.9	16.8	14.5	13.1

Nearby charters defined as a charter located in the census or an adjacent census tract. * indicates different from tracts in the same district without a nearby charter at 0.10 significance level and ** indicates different from tracts without a nearby charter at the 0.05 significance level.

1. All measures computed using data from the 2000 U.S. Census.
2. $(1-\text{Herfindahl index}) \times 100$, computed using percentage of households in five income categories, higher values indicate more diversity.
3. $(1-\text{Herfindahl index}) \times 100$, computed using percentage of children enrolled in school in six Census racial categories, higher values indicate more diversity.
4. $(1-\text{Herfindahl index}) \times 100$, computed using percentage of adults in 16 education categories, higher values indicate more diversity.
5. Measures are averages for students enrolled in non-charter, public elementary schools that are located in the tract or in an adjacent tract. In cases where no elementary school is located in the tract or an adjacent tract, measures are computed using students from the nearest elementary school.
6. Average of mean score on statewide grade 4 ELA and grade 4 Math exams for the 199, 2000 and 2001 school years.
7. Average of percent scoring at level 1 or level 2 on statewide grade 4 ELA and grade 4 Math exams for the 1999, 2000 and 2001 school years.
8. $(1-\text{Herfindahl index}) \times 100$, computed using percentage of students in 5 racial/ethnic categories.

Table 5: Charter School Location Across Census Tracts Within Districts, By Affiliation and Authorizer

	All Charter Schools	Affiliated with a CMO	Not Affiliated with a CMO	Authorized by SUNY	Authorized by the Regents
Variables describing the Tract					
Log of enrollment public	0.032 (0.251) {0.006}	-0.393 (0.562) {-0.011}	0.224 (0.261) {0.024}	0.450* (0.245) {0.005}	-0.157 (0.262) {-0.015}
Log of enrollment private	0.403** (0.158) {0.104}	0.953*** (0.296) {0.035}	0.218 (0.164) {0.030}	0.472** (0.215) {0.006}	0.129 (0.113) {0.016}
Child poverty rate	1.223* (0.633) {0.066}	-1.983* (1.154) {-0.015}	1.914*** (0.712) {0.056}	2.903*** (0.663) {0.008}	0.400 (0.785) {0.010}
% black	0.943**** (0.260) {0.105}	1.088**** (0.205) {0.017}	0.669** (0.317) {0.040}	0.377 (0.616) {0.002}	1.021**** (0.155) {0.053}
Racial diversity	0.004 (0.003) {0.039}	0.003 (0.003) {0.004}	0.004 (0.004) {0.020}	.008** (0.003) {0.004}	0.004 (0.005) {0.020}
% of adults with college education	0.604 (0.575) {0.040}	-2.321 (1.510) {-0.022}	0.642 (0.558) {0.023}	0.571 (0.489) {0.002}	0.753 (0.769) {0.024}
Educational diversity	0.015 (0.012) {0.021}	0.048 (0.040) {0.01}	0.009 (0.019) {0.007}	0.034*** (0.011) {0.003}	0.008 (0.018) {0.006}
Variables describing nearby schools					
Mean student performance	0.004 (0.024) {0.016}	-0.039 (0.029) {-0.025}	0.023 (0.019) {0.056}	0.005 (0.015) {0.001}	0.012 (0.031) {0.025}
% black	0.240 (1.130) {0.020}	2.462 (2.286) {0.029}	-0.548 (1.041) {-0.025}	0.942 (1.897) {0.004}	0.160 (0.800) {0.006}
Racial diversity	0.005 (0.006) {0.038}	0.004 (0.007) {0.004}	0.001 (0.005) {0.005}	0.009 (0.008) {0.003}	0.005 (0.005) {0.016}
% limited English proficient	-0.271 (1.216) {-0.011}	1.800 (1.637) {0.011}	-0.450 (1.231) {-0.010}	-1.129 (1.019) {-0.002}	-0.404 (1.608) {-0.008}
% free-lunch eligible	0.701 (0.926) {0.046}	-0.324 (1.434) {-0.003}	0.880 (0.800) {0.031}	0.096 (1.099) {0.000}	1.088 (1.642) {0.034}
% students with disabilities	-0.305 (2.104) {-0.008}	-2.230 (2.211) {-0.008}	0.730 (1.821) {0.010}	0.666 (2.082) {0.001}	-1.693 (1.427) {-0.020}
Baseline probability of having at least one charter nearby	0.376	0.125	0.311	0.252	0.201
Log-likelihood Value	-350.002	-145.541	-287.696	-191.143	-256.071
Pseudo R-squared	0.190	0.273	0.240	0.425	0.129

All regressions are order probit models estimated using 479 census tracts located in districts with at least two charter schools, and include controls for district fixed effects. All independent variables are defined as in Table 4. Regression coefficients reported along with robust standard errors, clustered by district, in parentheses. Figures in brackets are estimated marginal effects of a one standard deviation change in the independent variable on the probability of having at least one charter school located nearby calculated at the sample means of the independent variables. . *** indicates statistically significant at 0.01 level, ** indicates statistically significant at 0.05 level, and * indicates statistically significant at the 0.10 level.