School Choice Participation Rates: Which Districts are Pressured?

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Abstract: School choice policies are intended to provide students in poorly performing schools the option of transferring to a better school. The associated loss of funding to new competitors is expected, in turn, to benefit students who remain in their assigned schools by spurring improved performance among the educators in them. The prospects for such systemic improvement are greatest if in fact student transfers and the market signals they provide are determined by school effectiveness rather than the social and racial characteristics of a district's students. To test this proposition, we employ a series of fixed effects regressions to analyze the relative influence of school effectiveness versus student demographic composition on participation rates in Michigan's charter school and inter-district choice policies. Our results indicate that school effectiveness has no systematic influence on participation rates for either

choice policy, while the loss of students to choice options increases significantly in districts serving high concentrations of low-income students. Therefore, Michigan's school choice policies create financial pressures not on schools that are performing most poorly but rather on those that face the most difficult educational challenges.
Keywords: charter schools; school competition; school effectiveness; social and racial characteristics.

Tasas de participación en la elección de escuela: ¿cuáles son los distritos presionados?
Resumen: Las políticas de elección de escuela tienen por objetivo ofrecer a los alumnos de establecimientos de bajo rendimiento la opción de transferirse a una escuela mejor. A la vez, se espera que la pérdida de financiamiento asociada a favor de los nuevos competidores beneficie a los estudiantes que permanezcan en las escuelas asignadas, estimulando el mejor rendimiento de los educadores de dichas escuelas . Las probabilidades de que se dé esta mejora sistémica son mayores si de hecho las transferencias de estudiantes y las señales de mercado que surjan de éstas son determinadas por la eficacia escolar antes que por las características sociales y raciales del alumnado de un distrito. Para probar esta proposición, se emplean una serie de regresiones de efectos fijos para analizar la influencia relativa sobre las tasas de participación de la eficacia escolar frente a la composición demográfica de los estudiantes en la escuela pública de gestión autónoma (escuela *charter*) en el estado de Michigan y en las políticas de elección inter-distritales. Nuestros resultados muestran que la eficacia escolar no tiene una influencia sistemática sobre las tasas de participación de cada política de elección, mientras que la pérdida de estudiantes en favor de opciones de elección aumenta significativamente en distritos que atienden altas concentraciones de estudiantes de bajos ingresos. Por lo tanto, las políticas de elección escolar del estado de Michigan crean presiones financieras no en aquellas escuelas con rendimiento más pobre sino en aquellas que enfrentan desafíos educativos más complejos.
Palabras clave: escuela *charter*; competencia escolar; eficacia escolar; características sociales y raciales.

As taxas de participação na escolha da escola: Quais são os distritos sob pressão?
Resumo: As políticas de escolha da escola são projetadas para fornecer aos alunos de escolas de baixo desempenho acadêmico a opção de transferência para uma escola melhor. Ao mesmo tempo, espera-se que a associada perda de financiamento para novos concorrentes beneficie os alunos que ficam nas escolas a eles destinadas, estimulando o melhor desempenho dos educadores dessas escolas. A probabilidade de que essas melhoras sejam dadas sistemicamente são melhores se de fato as transferências de estudantes e os sinais de mercado resultantes destas fossem determinadas pela eficácia da escola e não pelas características sociais e raciais dos alunos em um bairro. Para testar esta proposição, foram utilizadas uma série de regressões de efeitos fixos para analisar a influência relativa sobre as taxas de participação de eficácia da escola em contraste com a composição demográfica dos alunos de escolas charter no estado de Michigan e as políticas de escolha interdistrital. Nossos resultados mostram que a eficácia da escola não tem qualquer influência sistemática sobre as taxas de participação de cada escolha política, enquanto a perda de alunos em favor de opções de escolha é significativamente maior nos distritos que servem altas concentrações de estudantes de baixa renda. Assim, as políticas de escolha da escola em Michigan não criam pressão financeira sobre as escolas com o pior desempenho, mas naquelas que enfrentam desafios educacionais mais complexos.
Palavras-chave: escola *charter*; competição escolar; eficácia da escola; características sociais e raciais.

Introduction

Discussions of how school choice will affect students who remain in their assigned public schools have been dominated by two opposing arguments. Choice advocates maintain that if choice policies offer parents expanded options and tie funding to enrollment, then educators in nearby traditional public schools will have an incentive to compete and increase their effectiveness and efficiency by working harder and implementing educational improvements (Chubb & Moe, 1990; Finn, Vanourek, & Manno, 2000; Nathan 1996).[1] Critics, on the other hand, have argued that choice policies are unlikely to benefit all students, but rather create winners and losers relative to the *status quo*, increasing academic, racial, and social class stratification while further concentrating many of the most disadvantaged students in schools depleted of the personnel and resources needed for improvement (See Ladd, 2002 for a review). As charter schools and other choice policies proliferate it is clearly important to gain a better understanding of how they affect the performance of the public school system for better or worse, since, for the foreseeable future, the vast majority of students will remain in traditional public schools (TPSs).

A body of rigorous quantitative studies of school choice policies' competitive effects on TPS performance has begun to take shape in recent years. Thus far, the initial results do not provide much support for the prediction that choice and competition improve TPS outcomes (See e.g., Bettinger, 2005; Bifulco & Ladd, 2006a; Booker, Gilpatric, Gronberg, & Jansen, 2008; Ni, 2009; Sass, 2006; Zimmer & Buddin, 2009). These studies generally test for the existence of a causal relationship between changes in the degree of choice competition TPSs face and the performance of their students on standardized tests, holding constant student background characteristics. Recent surveys of this evidence conclude that the competitive effects are quite mixed and generally small (Arsen & Ni, 2008; Gill & Booker, 2008; Ni & Arsen, 2010; Rouse & Barrow, 2009). Some studies find positive competitive effects, while others find no effect, or negative effects.

Another body of studies, which we discuss in greater detail below, has utilized student-level data to analyze the influence of student and school characteristics on the decisions of active choosers to opt out of their assigned schools (e.g., Bifulco, Ladd, & Ross, 2009). The main objective of these studies is to understand how the re-sorting of students through school choice policies affects racial and socioeconomic stratification in schools and the peer environments encountered by different students.

This paper investigates a key and unresolved aspect of the systemic effects of choice competition by examining the characteristics of districts that experience the greatest competitive challenges under state-level school choice policies. Variations in the level of competitive pressure across districts are determined jointly by the responses to choice policies by actors on both the demand and supply sides of the education market. In assessing choice policies' systemic effects, it is important to know whether the treatment (competition) is applied primarily where the prior public school performance is weakest. This issue has been submerged in recent studies of choice policies' competitive effects, yet the prospects for these policies to enhance overall TPS effectiveness are diminished if choice participation is not greatest where preexisting school effectiveness is lowest. Insofar as choices are based on considerations other than school quality, choice policies can create

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[1] Formally, school effectiveness is defined as student achievement (or other desired outcome) controlling for the incoming achievement of students. School efficiency, also referred to as productivity, is defined as student achievement (or other desired outcome) per dollar spent, controlling for the incoming achievement of students. In this paper, we use the terms school effectiveness and school performance interchangeably.

the wrong type of competition. Alternatively, if TPS administrators believe that student choices are being driven by factors beyond their control, they may not respond to new competitors.

Our empirical work focuses on Michigan, which passed a charter school law in 1993 and established a statewide inter-district choice policy in 1996. Participation rates in both choice policies are high by comparison to other states, and many Michigan districts, especially those in urban areas, have experienced strong budgetary pressures associated with the loss of students to school choice competitors.

Conceptual Background and Previous Studies

The prediction that competition will induce improved public school performance turns on a set of anticipated behavioral responses by households and schools which have been modeled formally by Hoxby (2003). In the first instance, students (and parents) are expected to select higher quality schools, defined as schools that more efficiently produce desired student outcomes. School personnel, in turn, have an incentive to improve their performance lest they lose students and resources to other schools. In practice, however, choice participation rates may be influenced by a host of considerations, and the primacy of TPS efficiency (or effectiveness) has yet to be established. In general, student transfers generated by a choice policy will be a function of the combined actions of participants on the demand and supply sides of the educational market subject to the rules embedded in the choice policies themselves and features of the local context in which they are implemented.

Consider first the demand side of the education market. Choice participation rates will be a function of the nature and extent of parents' dissatisfaction with their children's assigned public schools. Any local education system reflects the history of past household choices. Some parents have changed their residence to gain access to more desirable TPSs. Others have chosen to send their children to private schools at their own expense, or to educate their children at home. Families make the best choices they can given their preferences, subject to their incomes and the prices of alternative options. Some households remain dissatisfied with their local district schools, and the average level of dissatisfaction in a district is likely to decline with average family income. While families have preferences regarding many school attributes (including school safety, proximity, extracurricular activities, and facility conditions), we focus on school academic effectiveness, on the one hand, and student socioeconomic or racial composition, on the other, because these factors have long been at the center of choice policy discussions (Carnoy, et al., 2005; Friedman, 1962; Levin, 2009).

The relative importance of assigned school quality and demographic composition in families' school choices remains unresolved. Previous research indicates that although parents commonly cite school quality as a primary reason for choosing a given charter school, their actual choices can be largely predicted by student racial and SES composition (Holme & Richards, 2009; Lacireno-Paquet & Brantley, 2008; Weiher & Tedin, 2002). Even when parents highly value school academic quality in selecting schools, they often lack good information about it. In such situations they may use more visible features, including student demographics as proxies for school quality (Fiske & Ladd, 2000; Schneider & Buckley, 2002).

Previous studies offer suggestive insights regarding the influence of assigned school effectiveness as opposed to student racial or social class characteristics in family school choices. Several studies of parental choice have shown that student demographics matter. White students and students from higher-income families tend to use charter schools and inter-district choice to opt out of schools with high concentrations of disadvantaged students, while low-income students of color sometimes transfer from mostly White and more affluent districts to districts with greater

percentages of children from their own backgrounds (See e.g., Bifulco & Ladd, 2006b; Bifulco, Ladd, & Ross, 2009; Holme & Richards, 2009; Ni, forthcoming). Results from studies examining whether students are moving from lower to higher-performing schools are, however, mixed (e.g., Koedel, Betts, Rice, & Zau, 2009; Weiher & Tedin, 2002).

Only a few studies have directly compared the combined effect of assigned school student composition and academic effectiveness on parental choices. Each of these studies point to the strong influence of assigned school demographic characteristics, but the influence of school quality is inconsistent or unclear. Booker, Zimmer, & Buddin (2005) observed charter school students in California and Texas who were in a regular public school the previous year. In Texas, charter school students came from regular public schools with below average achievement and with achievement levels below their peers in those schools. This result, however, might reflect a supply-side feature of the Texas charter school program, namely the strong preference given to authorizing charter schools for at-risk students. Their findings for California were more mixed. In addition, in regressions designed to explain a student's decision to move to a charter school, the results for assigned school math and reading scores were inconsistent.[2] Meanwhile, Bifulco, Ladd and Ross (2009) find that students' decisions to opt out of their assigned schools are positively correlated to an index of attendance zone disadvantage, but since zone disadvantage embodies both social and academic features—defined as the percent of parents with no college and the percent of students with low achievement—the influence of assigned school academic outcomes alone is unclear.

On balance, while past demand-side studies of the determinants of family school choices have documented patterns of student re-sorting under choice policies, such studies do not provide clear evidence on our central research question of whether choice participation rates are inversely related to district academic effectiveness. Yet even if such studies were more conclusive on this point, they overlook important supply-side considerations that contribute to inter-community variations in choice participation rates. Whatever families' schooling demands, if they are to become effective, there must be a corresponding supply of schools.

The actions of schools on the supply side of the education market will be shaped by a range of considerations beyond simply meeting consumer demand. Among them are the rules and regulations governing choice policy implementation. Charter school and inter-district choice policies are designed so differently they are likely to elicit very different supply side responses. The supply of charter schools, for example, will turn on provisions in state laws that stipulate which entities can grant charters (e.g., school districts versus state-level agencies) and whether the number of charters is limited. Moreover, state laws may restrict the establishment of charter schools to certain districts or provide incentives to influence charter location. In decisions about where to establish charter schools, charter authorizers and charter management organizations may take account of many considerations aside from the academic effectiveness of local traditional public schools (Gulosino & Lubienski, 2011; Gulosino & d'Entremont, 2011). And they may be strongly swayed by political pressure to open charter schools in some communities or avoid the establishment of new competitors in other local areas. Location decisions will also be influenced by practical considerations such as the availability of buildings, transportation access, or whether an area possesses sufficient population density to sustain a new school. Thus far, however, we have relatively little systematic information on the determinants of supply-side behavior in the education market.

One exception is Glomm, Harris, & Lo's (2005) study of Michigan charter school location. Utilizing district-level data, they find that the number of charter schools increases in districts with

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[2] In Texas, assigned school reading scores were significant, but not math; In California, math was significant but not reading.

more diverse populations in terms of race and parental education, while the results for district effectiveness and efficiency are mixed. Although suggestive, the number of charter schools in a district is not a reliable measure of charter school participation rates. Moreover, Glomm, et al. do not account for the fact that many Michigan students attend charter schools that are located outside their district of residence. As we will note, more than one-third of Michigan's charter schools draw the majority of their students from districts other than the district in which the charter school is located.

In the case of inter-district choice, supply-side actions will also be shaped by a host of considerations aside from the relative effectiveness of different public schools. Districts' supply of openings for nonresidents will depend on the rules in a state's inter-district choice policy. How much funding do nonresident students bring with them to a district? What criteria may districts utilize in determining which nonresidents students they admit? Districts' capacity to admit nonresident students, moreover, will be heavily influenced by the pace of their recent enrollment growth. Declining-enrollment districts are likely to have excess capacity, while rapidly growing districts are not. Districts may also anticipate how nonresident students are likely to change the racial or socioeconomic composition of its students. Community resistance to altering a local district's established racial or social composition may create supply-side restrictions on openings for inter-district transfers.

In short, despite strong predictions that school choice participation will be highest in districts where students' assigned schools are least effective, the evidence thus far is not nearly as robust as one might expect. Past demand-side studies of family school choices are inconclusive regarding the influence of school effectiveness. And such studies fail to recognize a range of supply-side factors that could substantially influence inter-community variations in the school choice participation rates.

In this paper, we analyze the determinants of inter-community variations in the proportion of district residents who participate in school choice policies. The issue is important, because it defines which districts experience the greatest financial pressure from choice policies. That financial pressure, in turn, is supposed to be the stimulus for improved district performance. We do not directly model family decision making or ask which students are leaving a given district and why. Rather we conduct a reduced-form, district-level analysis that implicitly embodies the decisions of actors on the demand and supply sides of the education market. We focus on the relative influence of district academic effectiveness and student composition on students' participation rates in Michigan's two mature choice policies—charter schools and inter-district choice.

Michigan School Choice Context

Passed in 1993, Michigan's charter school law authorizes several agencies to grant charters, including local and intermediate school districts, community colleges, and state universities. Most charters in Michigan have been granted by the governing boards of state universities. Charter schools have no geographic boundaries; students are free to attend any charter school in the state on a space available basis. Random selection by lottery, with certain exceptions, must be used if the number of applicants exceeds available space. Charter schools can serve any grades but most in Michigan serve students only in the K-8 range.

Originally, no limit was imposed on the number of charters that could be issued by any of the authorizing boards. However, in 1996, following a proliferation of charters issued by the board of Central Michigan University, the state legislature imposed a cap of 150 on the total number of schools that may be chartered by the state's 15 public universities. Since there is no cap on the number of schools chartered by other organizations, however, the number of charter schools has

continued to grow. By 2005, the state hosted 226 charter schools that enrolled about 95,000 students (or 5.9 percent of the state's public school population).

In 1996, the Michigan legislature created an inter-district choice program, commonly known as the "schools of choice" program. Every district (school board) can decide each year whether to admit nonresident students and specify the number of available slots by school building and grade level. Districts can also specify whether or not students transferring in must reside within the county where the district is located. Districts cannot prohibit students who live within their boundaries from attending another district that admits them. Once admitted, nonresident students can continue attending a district's schools until they graduate. Districts are not required under the law to provide transportation for out-of-district students; some districts provide transportation, others do not. By 2005, more than 400 out of 552 school districts accepted inter-district choice students. About 65,000 students (or 4.1 percent of the state's public school population) participated in inter-district choice.

Michigan's finance system, established with the passage of Proposal A in 1994, has facilitated the development of the state's school choice programs. Michigan's districts and charter schools receive almost all their discretionary operational revenues in the form of per-pupil foundation grants. The amount of the grants is determined by the state and districts have essentially no authority to raise local taxes to generate additional school funding. Each charter school receives per-pupil funding approximately equal to the district in which it is located. For inter-district choice students, the revenue follows automatically to the districts where they enroll. Districts receive the lesser of the foundation allowance of the resident district or the enrolling district. Enrolling districts are prohibited from charging tuition in any form to make up any revenue differences. Proposal A creates relatively strong fiscal incentives for schools to compete for students. With the declining value of real per-pupil foundation grants in all Michigan public schools since 2002, the only way for schools to increase their revenue is to attract more students.

Where Does School Choice Take Place?

Table 1 shows the uneven growth of participation in Michigan's two school choice programs across different types of communities.[3] By 2007, more than 11% of the state's public school students attended charter schools or district schools outside their district of residence through inter-district choice. In Michigan, school choice remains primarily an urban phenomenon. Central city and low-income suburban districts (generally adjacent to central cities) have experienced the sharpest enrollment losses due to choice competition. Some urban districts, including the state's largest, Detroit, have lost roughly a third of their resident students to charter schools and inter-district choice combined. No one familiar with Michigan schools doubts that school administrators in Michigan's urban districts are acutely aware of the financial impacts that the state's school choice policies have had on their districts. By contrast, neither choice policy poses much threat to high-

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[3] We define a five-way classification of school district community types. *Central city* districts are those that the National Center for Education Statistics (NCES) classifies as serving large cities and mid-sized cities. *Rural* includes districts classified by NCES as outside a metropolitan statistical area (MSA) plus those within an MSA with population density less than 20 people per square mile. Suburban district are those classified by NCES as "serving an MSA but not primarily its central city" and having population density greater than 20 people per square mile. The suburban classification is disaggregated based on median home value (MHV) in the 2000 U.S. Census—*Low-income suburb*: $32,500 <MHV< $75,000; *Middle-income suburb*: $75,001≤MHV<$170,000; *High-income suburb*: MHV≥$170,000. Low-income suburban districts are very similar to Michigan's central cities in racial composition and student poverty rates.

income suburban school districts. Rural areas on average have very low participation rates in charter schools, but rates of inter-district choice participation above the statewide average.

Table 1
Percent of resident students participating in Michigan's two school choice programs in selected years

Community type	2002	2005	2007
Charter school attendance			
Central city	14.7	21.1	25.4
Low-income suburb	5.4	12.2	12.8
Mid-income suburb	2.0	2.9	3.6
High-income suburb	0.8	1.2	1.2
Rural	1.4	1.9	2.0
Total	4.2	5.9	6.5
Transferring in through inter-district choice			
Central city	0.5	1.0	1.2
Low-income suburb	7.7	12.3	17.3
Mid-income suburb	3.3	5.4	6.3
High-income suburb	0.6	1.3	1.8
Rural	3.6	5.3	6.0
Total	2.6	4.1	4.9
Transferring out through inter-district choice			
Central city	3.7	6.0	8.5
Low-income suburb	5.6	9.0	10.5
Mid-income suburb	2.0	3.5	4.2
High-income suburb	0.4	0.8	0.9
Rural	3.8	5.5	6.4
Total	2.6	4.1	4.9
Combined % of students lost to two choice programs*			
Central city	17.9	26.1	32.7
Low-income suburb	3.3	9.0	6.0
Mid-income suburb	0.7	1.0	1.5
High-income suburb	0.6	0.8	0.3
Rural	1.5	2.1	2.3
Total	4.2	5.9	6.5

*Calculated as resident students attending charter schools plus net loss to inter-district choice as a percentage of resident students.

At first glance, one might surmise that the pattern of school choice activity across Michigan communities indicates higher participation rates where school academic performance is weakest. The top panel of Table 2 displays the average percentage of students meeting the proficient performance levels on the Michigan Educational Assessment Program (MEAP) tests in 4th and 7th grade math and reading through 1995-2005.[4] Variations in achievement levels across community

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[4] The 7th grade math scores pertain only to the 1995-2000 period, since this test was discontinued between 2000 and 2005.

types mirror school choice participation rates. Central city and low-income suburban districts have low levels of student achievement and high choice participation, while high-income suburbs have relatively high levels of student achievement and low levels of choice participation. Based on this sort of simple comparison—indeed the sort of casual inference that is sometimes made by state policy makers and in media accounts—it would appear that choice activity is concentrated in areas where traditional public schools are least effective.

Such a conclusion would be premature, however, since both school choice participation and standardized test scores are highly correlated with student demographic characteristics (e.g., poverty and race) which also vary systematically across community types. As shown in the bottom panel of Table 2, among community types, central city and low-income suburban districts have the highest rates of students of color (except Asians), students with disabilities, and students receiving free or reduced-price lunch. So it remains unclear whether levels of choice activity are driven primarily by schools' academic effectiveness or the demographic characteristics of their students.

Table 2
Percent of students reaching proficiency on the MEAP exam and student characteristics, by community type, 1995-2005

	Central city	Low-income suburb	Mid-income suburb	High-income suburb	Rural
4th Grade math	54.9	51.6	71.2	81.3	66.0
4th Grade reading	49.0	45.7	63.1	73.6	58.0
7th Grade math*	37.1	34.1	59.1	72.9	53.9
7th Grade reading	38.0	34.3	54.0	66.2	49.7
% Free-reduced lunch	56.8	58.7	22.8	6.9	35.9
% African-American	42.0	40.1	5.8	2.5	1.2
% Hispanic	8.7	6.0	3.0	1.3	2.3
% Asian	1.8	1.1	1.3	3.6	0.4

*Figures for 7th grade math correspond to 1995 to 2000, when the test was discontinued.

Method

In order to disentangle the influences of different factors on choice participation rates across school districts, we employ fixed effects regressions to estimate the following equation:

$$\% \text{ Choice}_{it} = \beta_1 * \text{Performance}_{it} + \mathbf{D}_{it}\mathbf{B_2} + \mathbf{R}_{it}\mathbf{B_3} + \gamma_i + I_t + \varepsilon_{it} \qquad (1)$$

The dependent variable, % Choice$_{it}$, measures (a) the percentage of resident students attending charter schools or (b) the net outflow of inter-district choice students as a percentage of resident students, respectively, for school district i in year t. Student performance is measured variously as the percentage of students reaching proficiency in math or reading. $\mathbf{D}_{it}$ is a vector of student demographic characteristics of district i in year t, including the percentages of students who are eligible for free or reduced priced lunch, who have disabilities, and who are African-American, Hispanic, and Asian. $\mathbf{R}_{it}$ is a vector of resource allocation characteristics of district i in year t,

including per pupil expenditure, the percentage of current operating expenditures devoted to instruction, and the average pupil-teacher ratio.

We control district-specific characteristics that are unobserved but related to choice participation rates in $_i$. For example, it is reasonable to expect charter schools to attract students from areas where parents have particular preferences and tastes for their children's education or from communities where parents are more motivated or better informed. These unobserved district characteristics will cause estimation bias if not controlled. Fixed effects regressions overcome this problem by removing $_i$, the time-invariant unobserved district characteristics that influence choice participation rates. A set of year dummies, I_t, is included to capture any systematic influence not accounted for by the observable inputs that vary over time but are common to all districts. $_{it}$ is the idiosyncratic error term. The estimated influence of school performance on school choice participation will be captured by the coefficient $\hat{\beta}_1$, while the influence of student demographic characteristics will be captured by the vector of coefficients of $\hat{B}_2$. We refer to our performance variables as measures of effectiveness, but since Equation (1) controls for expenditures, the performance variables can also be interpreted as measures of district efficiency.

One might imagine that families' school choices in any given year will be based on the information available in the previous year. In addition, it is possible that school choice generates changes in district student composition in unobserved ways, which in turn could change its performance levels. To rule out this possibility of reverse causation and to model decision making such that it is based on prior period information, we also estimate Equation (1) using one year lags of all the predicators, including performance, demographic information, and district resource allocation characteristics.

One challenge arises in the estimation of Equation (1) for charter school participation. Since charter school enrollment is measured as the percentage of public school students residing in school district i who attended charter schools, the variable only takes on nonnegative values. Therefore, its distribution is highly skewed toward zero, with a large proportion of observations clustered at zero, since many districts had no students attending charter schools. Consequently, estimation by regular linear regression will result in negative predicted values and distort the relationship between charter participation rates and school effectiveness and student characteristics. To solve this problem, we round the percentage of charter enrollment to the nearest 1 so that it takes on only nonnegative integer values and we can easily interpret it as the number of students attending charter schools for every 100 students residing in a district. Accordingly, the dependent variable becomes a count variable, which suggests the use of Poisson fixed effects regressions. However, one strong assumption associated with Poisson regressions is that the mean and variance of the outcome variable are equal. This condition does not hold for our sample mainly because many rural districts have very low enrollments in charter schools. Indeed, although 295 of Michigan's 553 districts are rural, only 6.7% of Michigan's charter school students lived in rural districts in 2005.

The violation of this equal variance and mean condition is commonly designated as an overdispersion problem. Applying Poisson regression models to such data can cause substantial underestimation of coefficient standard errors and produce inappropriately significant results (Osgood, 2000). Negative binomial regression is the best known and most widely available method in modeling overdispersed Poisson data (Hilbe, 2007; Osgood, 2000). So, in this analysis, we use negative binomial fixed effects regressions to estimate the determinants of charter school participation.

Inter-district choice participation rates are measured as the net outflow of students from a district (transfers out minus transfers in) as a percentage of district resident students. Since the variable is normally distributed, we estimate Equation (1) for the inter-district choice participation

through linear fixed effects regressions with robust standard errors clustered at the district level. In contrast to charter school participation which is concentrated in Michigan's metropolitan areas, inter-district participation in spread across community types. In 2005, inter-district choice participation rates for central city, suburban and rural districts were 6.0%, 3.0% and 5.5%, respectively.[5]

Data

We utilize a statewide panel dataset of Michigan schools from 1995 to 2005. We have been able to update some variables, including school choice data, through 2007. Financial and resource allocation data (pupil-teacher ratio, per pupil expenditure, percentage of expenditure for instruction) were obtained from the Michigan Department of Education (MDE). Student-level data on students' district of residence as well as the district or charter school they attend come from the Single Record Student Database (SRSD) maintained by the State of Michigan's Center for Educational Performance and Information. Student achievement data—the percentages of students attaining proficient performance levels on the MEAP tests—come from the MDE's Office of School Assessment and Accountability. During the years included in this study, Michigan students were only tested in certain grades and subjects. These include reading and math tests in the 4th and 7th grades. In addition, the 7th grade math test scores are only available from 1995 to 2000 because the test was discontinued between 2001 and 2005. All achievement data were standardized for convenience of interpretation. The merged dataset includes information by district for school choice enrollment, student achievement and demographics, and financial and other district-level factors over the 11 years.

Table 3
Descriptive statistics

	Mean	Std. dev.
% charter school participation*	1.899	3.843
% net gain through inter-district choice	0.997	12.230
% Special education	12.141	3.525
% Free-reduced lunch	30.572	17.027
% African-American	5.409	14.901
% Asian	1.001	1.795
% Hispanic	2.746	4.847
Ln(expenditure per pupil)	8.778	0.227
% Instruction/expenditure	64.340	5.070
Pupil-teacher ratio	20.407	3.285
Ln(district enrollment)	7.286	1.339

*Based on 2003-2005 data.

Our research question suggests that we take districts as the unit of analysis, since it is the school district that experiences and responds to competitive pressure from charter schools and

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[5] The 2005 distribution of Michigan's student population by district of residence is: 22.2% central city, 57.3% suburban, and 20.5% rural. The distribution of inter-district transfers by students' district of residence is: 26.3% central city, 44.9% suburban, and 28.8% rural.

inter-district choice. For each district, we measure charter school participation by the percentage of public school students residing in a district who attend a charter school whether or not the charter school is located in their district of residence.[6] Because this measure requires student-level data, it is only available after 2002, the first year the SRSD was collected in Michigan. Consequently, we restrict our analysis of charter school participation to the relatively short 2003-2005 period. On the other hand, available data enable us to analyze inter-district choice participation for the 1996-2005 period. Descriptive information for all variables included in the models is summarized in Table 3.

Empirical Results

Charter School Participation

For the sake of comparison, we analyze the determinants of charter school participation rates through linear fixed effects regressions before turning to the negative binomial fixed effects regressions discussed above. The linear fixed effects regression results are shown in Table 4. The specification of each model in the table is the same, except that district academic performance is measured by alternative MEAP test scores. In all of the linear models, none of the academic performance or demographic characteristics variables shows any effect on charter school participation. However, as we explained earlier, linear regression estimates are likely to be misleading because the dependent variable—charter school participation—is not normally distributed.

Table 5 presents the results of the models explaining charter school participation rates through the negative binomial fixed effects regressions. The results are strikingly consistent across all specifications. In none of the specifications is the charter participation rate significantly influenced by the districts' performance in math or reading. On the other hand, charter participation rates are significantly influenced by districts' socioeconomic status. Charter participation rates increase with the share of a district's students who are from low-income families. The coefficient on the % free-reduced lunch variable is 0.022 across all the specifications, implying that a one percentage of increase in the share of low-income students in a district is associated with a 2.2 percent increase in charter school participation among district residents. Alternatively, a one standard deviation increase in the percentage of low-income students in a district increases charter school participation by approximate 37 percent. Charter participation is not strongly influenced by districts' racial composition, however. Although in all specifications charter participation increases with the percentage of a district's students who are African-American or Asian, and decreases with the share who are Hispanic, none of the coefficients is statistically significant.

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[6] To assume that students attending a charter lived in the district where the charter school is located would distort the analysis. More than one-third of Michigan's charter schools draw the majority of their students from districts other than the district in which the charter school is located. (School-level choice participation rates are not available because the SRSD only identifies the resident districts of charter school students.)

Table 4
Determinants of charter school participation rates across Michigan school districts: Fixed effects regressions

	Model 1	Model 2	Model 3
4th Grade math MEAP	-.049 (.104)	--	--
4th Grade reading MEAP	--	.046 (.08)	--
7th Grade reading MEAP	--	--	.182 (.116)
% Special education	.042 (.055)	.038 (.054)	.042 (.057)
% Free-reduced lunch	.066 (.039)	.066 (.039)	.068 (.039)
% African-American	.03 (.034)	.034 (.034)	.033 (.034)
% Asian	.121 (.207)	.112 (.204)	.132 (.203)
% Hispanic	-.059 (.063)	-.06 (.063)	-.057 (.06)
Ln (expenditure per pupil)	8.204** (3.059)	8.166** (3.033)	7.654** (2.849)
% Instruction/expenditure	.078 (.044)	.079 (.045)	.071 (.044)
Pupil-teacher ratio	.162 (.109)	.163 (.108)	.165 (.109)
Ln(district enrollment)	6.428 (5.56)	6.508 (5.582)	6.818 (5.567)
Observations	1514	1513	1515
R-squared	0.12	0.12	0.13

Dependent variable is the number of students in every 100 students residing in a district who attend charter schools. Robust standard errors clustering at district level are in parentheses.* $p<0.05$, ** $p<0.01$.

Table 5
Determinants of charter school participation rates across Michigan school districts: Negative binomial fixed effects regressions

	Model 1	Model 2	Model 3
4th Grade math MEAP	-.058 (.043)	--	--
4th Grade reading MEAP	--	-.057 (.04)	--
7th Grade reading MEAP	--	--	.013 (.041)
% Special education	-.001 (.018)	0 (.018)	-.004 (.018)
% Free-reduced lunch	.022** (.008)	.022** (.008)	.022** (.008)
% African-American	.005 (.02)	.009 (.02)	.01 (.021)
% Asian	.089 (.076)	.096 (.077)	.074 (.076)
% Hispanic	-.029 (.035)	-.028 (.035)	-.03 (.035)
Ln(expenditure per pupil)	1.639** (.621)	1.596** (.618)	1.624** (.623)
% Instruction/expenditure	.019 (.017)	.02 (.017)	.023 (.017)
Pupil-teacher ratio	.02 (.015)	.02 (.014)	.014 (.014)
Ln(district enrollment)	1.507** (.347)	1.548** (.345)	1.37** (.317)
Observations	892	892	895

Dependent variable is the number of students in every 100 students residing in a district who attend charter schools. Standard errors are in parentheses.* $p<0.05$, ** $p<0.01$.

Charter participation in Michigan also increases significantly in larger enrollment school districts. This could reflect the preferences of households (seeking smaller, more intimate and responsive educational organizations) or charter school authorizers and managers seeking locations in districts with many potential students.[7] Participation rates in Michigan's charter schools also

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[7] One independent source of evidence that households value smaller educational organizations in which they may exercise greater influence comes from Brasington's (2004) study of the impact of school consolidation on housing values. In models that controlled for school service quality, property tax rates, and other determinants of property values, he found that consolidation lowers the value of single-family homes by about 3.5 percent or roughly $3,000 for the average home. An alternative explanation for our enrollment size

increase significantly in districts with higher per pupil expenditures. However, participation rates are unaffected by key district resource allocation decisions, including the percentage of operating expenditures devoted to instruction and pupil-teacher ratios. In each case, the signs and significance of these variables are consistent across all three models.

In sum, our analysis of the determinants of charter school enrollment in Michigan in 2003-2005 indicates that participation rates are largely driven by factors over which local districts have little control, while they are not affected by factors over which districts do exercise control. In Michigan, the rate of districts' enrollment loss to charter schools is unrelated to their academic performance. Districts' enrollment loss is similarly unrelated to aspects of their instructional operations such as class size and how intensively they focus their spending on instruction. Meanwhile, the results clearly point to the conclusion that charter participation rates are determined by the social characteristics of districts' students. Students are more likely to choose charter schools when their district of residence enrolls high concentrations of low-income students.

Inter-district Choice Participation

Available data permit us to perform more intensive analysis of inter-district choice transfers over the 1996-2005 period. The results of the fixed effects regressions for Michigan's inter-district choice are shown in Table 6. We also estimated a set of parallel models using lagged predictor variables which are presented in Appendix Table A-1. The estimates derived from lagged predictors are similar to the results shown in Table 6.[8]

Several key findings from our analysis of inter-district choice participation are consistent with our findings concerning charter school participation. District academic performance does not significantly influence the net flow of inter-district student transfers in any of the model specifications presented in Table 6. Meanwhile, as with charter school enrollment, students on balance use inter-district choice to leave districts with high concentrations of low-income students. A one percentage increase in the share of low-income students in a district corresponds to an 8-9 percent increase in the net outflow of students through inter-district choice.

The impacts of other district characteristics on net inter-district flows are also similar to our charter school findings. Net student flows under Michigan's inter-district choice policy are not significantly related to districts' student racial composition. Variables characterizing districts' racial composition are uniformly insignificant across the Table 6 models. Students also tend to leave large districts. As in the case of charter participation, the net flow of inter-district transfers is unrelated to districts' pupil-teacher ratios or their share of spending devoted to instruction, while it is significantly related to districts' per-pupil expenditures. Lower-expenditure districts tend to gain students through inter-district choice. This likely reflects districts' supply-side decisions regarding the number of openings they provide to nonresident students. Low-revenue districts may seek to supplement funding by attracting nonresident students, while high-revenue districts are more reluctant to admit nonresident students who bring with them per-pupil funding from districts that is less than their

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result is that it represents an urban effect. However, after the state's largest district, Detroit, most large districts in Michigan are suburban. Only six of Michigan's 20 largest districts are central cities and several central city districts are relatively small.

[8] This suggests that a reciprocal relationship wherein school choice participation generates changes in district student composition and academic performance is not a problem in our analysis. Our attempts to estimate the charter school models in Table 5 with lagged predictors were unsuccessful. The lagging procedure eliminated a year's worth of observations from a relatively short sample period causing the negative binomial regressions to fail to converge.

own. Finally, in contrast to the charter participation models, net inter-district transfers flow away from districts with high concentrations of costly and difficult to educate students with disabilities.

Table 6
Determinants of districts' net outflow of students through Michigan's inter-district choice policy: Fixed effects regressions

	Model 1	Model 2	Model 3
4th Grade math MEAP	.008 (.145)	--	--
4th Grade reading MEAP	--	-.005 (.151)	--
7th Grade reading MEAP	--	--	-.045 (.175)
% Special education	.453** (.138)	.463** (.135)	.416** (.148)
% Free-reduced lunch	.083* (.039)	.087* (.039)	.092* (.041)
% African-American	-.136 (.102)	-.137 (.103)	-.156 (.103)
% Asian	-.046 (.159)	-.041 (.16)	-.07 (.145)
% Hispanic	-.077 (.077)	-.082 (.078)	-.093 (.078)
Ln(expenditure per pupil)	27.367** (3.956)	27.187** (3.914)	24.771** (3.734)
% Instruction/expenditure	-.071 (.066)	-.063 (.065)	-.084 (.066)
Pupil-teacher ratio	.019 (.086)	.021 (.087)	.026 (.089)
Ln(district enrollment)	28.709** (3.794)	28.404** (3.744)	28.942** (3.979)
Observations	5181	5181	5184
R^2	0.27	0.27	0.26

The dependent variable is (transfers out minus transfers in) as a percentage of resident students. Robust standard errors clustering at district level are in parentheses. * $p<0.05$, ** $p<0.01$.

The analysis of inter-district student flows differs, however, from the measurement of charter school participation in one important respect. Net student flows, when used as the dependent variable as in Table 6's models, appropriately measure the intensity of the financial pressure that inter-district choice competition exerts on districts. In this sense it is analogous to the charter participation rates analyzed earlier. In addition, the focus on net student flows enables us to determine whether, for example, the overall movement of students leads to enrollment losses in districts with inferior academic performance. On the other hand, net flows will not accurately reflect

variations across communities in the volume of choice participation—since a district could have an equally large number of students transferring in and out and show no net enrollment change—and the two-way movement of students may mask the influence of district characteristics on student transfers.[9]

A Closer Look at Inter-district Student Flows

        To gain further insight on how district characteristics influence student movement under inter-district choice, we utilize 2005 student-level data from Michigan's Single Record Student Database to compare the characteristics of the resident and educating districts for students who participate in inter-district choice. For each participating student, the value of a given variable in his or her resident (or sending) district is subtracted from the value of the corresponding variable in their educating (or receiving) district (i.e., $X_{receiving} - X_{sending}$). We group all inter-district choice participants by their district of residence and then calculate the average difference in variable values for each district type and for all inter-district choice transfers statewide.

        Table 7 displays the results of this analysis for a set of student characteristics. Statewide in 2005, inter-district choice students transferred on average to districts where the share of low-income students was 7.7 percentage points lower than in their home district. Transfers from central city districts experienced the largest shifts in their classmates' socioeconomic status. On average, they moved to districts where the share of low-income students was 30 percentage points below the level in their district of residence. Statewide, inter-district choice students are also moving to districts where the share of African-American students is 9.5 percentage points lower than in the districts where they live.[10] Central city and low-income suburban district residents are moving, on average, to districts where the percentages of African-American students are an extraordinary 39.2 and 30.9 percentage points less than in their home district, respectively. While choice students are also moving to districts with lower shares of special education students, the differences on this count between educating and resident districts are less stark.

        Table 8 presents a parallel analysis of the educational performance of inter-district choice students' resident and educating districts. We measure districts' educational characteristics in two ways. One is the actual proficiency rate for a district's students on the MEAP exams. However, since district proficiency rates do not account for student characteristics, they are not a reliable measure of academic performance. Consequently, we also use an adjusted performance measure (APM), to determine whether students are moving to more effective districts once we control for student characteristics.

        Following Stiefel et. al. (2005), the APM index for a school district is constructed as the difference between the actual district MEAP proficient rate and the predicted rate, adjusting for differences in student background and other characteristics that are outside a school's control. The predictors included are % African-American students, % Hispanic students, % Asian students, %

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[9] Consider a hypothetical example in which there are three types of school districts: a few that are predominantly African-American, a few more that are predominantly White, and most that are all White. Suppose further that racial considerations strongly influence student transfers such that predominantly African-American districts lose students to predominantly White districts, but all-White districts hoping to preserve this status accept no out-of-district transfers. In such a case, net transfer models such as those in Table 6 may fail to identify a statistically significant relationship between % African-American and net outflows, even though race influences the pattern of inter-district transfers.

[10] This figure is remarkably high in view of the fact that African-American's comprise less than 1.0% of the students in 261 of Michigan's 552 school districts, while they comprise at over 33% of enrollment in only 34 school districts.

free/reduced lunch, district enrollment size, per-pupil current expenditure, and district urbanicity. After controlling for these factors, the APM can be regarded as a measure of school efficiency, as well as effectiveness (Stiefel, et. al., 2005). We standardize the APM indexes to have a mean of 0 and standard deviation of 1.

On average, statewide, students are moving to districts with slightly higher MEAP scores, about three percentage points higher on 4th grade math and reading. This pattern is evident for transfers originating in every community type except middle- and high-income suburbs. As noted, however, the percentage of students reaching proficiency on the MEAP does not represent district effectiveness or efficiency.

Table 7
Characteristics of sending and receiving districts for inter-district choice students in 2005, by sending district type

Sending district type	% Free-reduced lunch			% African-American			% Special ed		
	Sending	Receiving	Diff	Sending	Receiving	Diff	Sending	Receiving	Diff
	(1)	(2)	(2) - (1)	(4)	(5)	(5) - (4)	(7)	(8)	(8) - (7)
Central City	69.4	39.4	-30.0	61.9	22.7	-39.2	17.4	14.0	-3.4
Low-income suburb	71.0	45.6	-25.5	55.5	24.5	-30.9	15.9	15.7	-0.3
Mid-income suburb	31.6	33.3	1.7	14.1	14.6	0.5	14.0	14.8	0.9
High-income suburb	8.8	20.2	11.4	4.3	12.5	8.1	11.9	14.2	2.2
Rural	40.6	35.8	-4.8	2.0	2.2	0.1	13.8	13.2	-0.6
Total	42.8	35.1	-7.7	23.2	13.7	-9.5	14.7	14.2	-0.4

All percentages are weighted by the number of transfer students.

Table 8
MEAP test scores and efficiency of sending and receiving districts for inter-district choice students in 2005, by sending district type

Sending district type	Sending	Receiving	Diff	Sending	Receiving	Diff
	(1)	(2)	(2) - (1)	(4)	(5)	(5) - (4)
	4th Math MEAP % Proficient			*4th Math efficiency (APM)*		
Central city	55	70	15	0.06	-0.16	-0.22
Low-income suburb	58	66	7	0.43	-0.21	-0.64
Mid-income suburb	74	72	-2	-0.13	-0.13	0.00
High-income suburb	86	77	-9	-0.04	-0.10	-0.06
Rural	71	75	4	0.05	0.09	0.04
Total	69	72	3	-0.01	-0.08	-0.07
	4th Reading MEAP % Proficient			*4th Reading efficiency (APM)*		
Central City	71	81	10	0.08	-0.13	-0.21
Low-income suburb	69	79	10	0.24	-0.05	-0.30
Mid-income suburb	84	83	-1	-0.06	-0.12	-0.06
High-income suburb	91	87	-4	-0.20	0.01	0.20
Rural	79	84	5	0.00	0.11	0.10
Total	80	83	3	-0.01	-0.05	-0.05

All percentages are weighted by the number of transfer students.

If we address this by representing academic outcomes with the APM index, then choice students overall are moving to districts that are slightly less efficient than their resident districts. Results on this count, however, vary across community types. Students from central-cities and low-income suburbs—where racial and economic differences with respect to receiving districts are large--are moving on average to districts that are academically less efficient than their home districts. Meanwhile, in rural areas—which are generally characterized by much smaller socioeconomic differences between sending and receiving districts--students move to districts that are slightly more efficient.

Conclusions

Choice policies are intended to provide students who are assigned to poorly performing public schools the option to switch to better schools. This notion has always been central to the advocacy for school choice policies in the United States, and it is widely assumed that choice policy participation is, in fact, greatest in areas where students' assigned public schools are least effective. The common perception that school choice activity tends to be concentrated in urban settings, where the shortcomings of public schools have been extensively documented, tends to reinforce this view. Nevertheless, there has been little rigorous study of whether the conventional wisdom is correct.

Our analysis of Michigan's charter school and inter-district choice policies indicates that the academic performance of public schools in students' districts of residence has virtually no systematic influence on variations across districts in school choice participation. Choice activity, on the other hand, is significantly influenced by the socioeconomic

characteristics of students' assigned public schools. In districts enrolling high levels of low-income students, parents move their children to charter schools and other districts through inter-district choice. In the case of inter-district choice, they also tend to transfer to district with much lower percentages of African-American students. In short, our results indicate that in Michigan, a state with relatively high levels of participation in two long-established school choice policies, the market signals these policies provide to school personnel have very little to do with the student academic outcomes they strive to improve.

Choice participation is jointly influenced by actions on the demand and supply sides of the education market. This study has not attempted to disentangle the influence of parental preferences from the supply side location, programmatic and enrollment decisions of charter school authorizers and managers or the decisions of school districts with regard to the number and type of openings they make available to nonresident students. It is possible, however, that appropriate changes in state laws and guidelines governing the implementation of these choice policies could bring participation rates more closely in line with variations in school performance.

It is also possible that a school-level analysis would reveal a stronger influence of achievement on family school choices than we have found. Such a result, moreover, could stand alongside our finding that at the district level—where the financial pressures arising from choice-induced enrollment loss are realized—choice participation rates are unrelated to academic effectiveness.

In addition, a district-level analysis, such as ours, cannot reveal which students leave their assigned public schools for choice schools. Studies that utilize student-level data are therefore needed to offer more refined analyses of the contours of families' demand for schooling as well as how choice policies influence who goes to school with whom. Available evidence on this question, however, indicates that the sorting process tends to leave traditional public schools with higher concentrations of disadvantaged students, including those who are poor and non-white, and who have disabilities (Ni, 2011; Bifulco et al., 2009).

From a policy standpoint, the fact that district academic effectiveness does not determine choice participation rates might not be cause for concern if charter competition (whatever its determinants) nonetheless improved academic performance in districts exposed to increased competition. Recent research on charter schools' competitive effect on district academic performance in Michigan, however, fails to find positive impacts (Ni, 2009; Bettinger, 2005). On the other hand, charter competition does produce a significant deterioration of districts' financial positions, as reflected in their fund balances, because it causes revenues to decline faster than costs (Arsen & Ni, 2011).

Most of Michigan's urban school districts have experienced acute financial pressure because of the loss of students to charter schools and suburban districts through inter-district choice. For example, about 44,000 students who live in Detroit attended charter schools in 2006. Together with 8,000 students attending suburban schools through inter-district choice, Detroit Public Schools lost about one-third of its students, amounting to an annual loss of about $400 million in revenue to the two choice programs. Our data indicate that other central cities in Michigan, such as Flint, Pontiac, and Benton Harbor have experienced similar proportionate losses.

Educators in these districts are operating in extraordinarily turbulent settings. Fewer than half of the TPS students in these four districts in 2002-03 attended the same school in 2003-04. These four districts enroll about 10 percent of all TPS students in Michigan, but enroll half of TPS students statewide who are black and eligible for free and reduced price

lunch. Large-scale closures of school buildings have been implemented (roughly half of the schools in Detroit Public Schools have been closed since 2002) and teachers and administrators are being relocated from building to building. These and other Michigan districts serving large concentrations of low-income students appear to have entered a self-reinforcing downward spiral, as students move to choice schools, forcing program cuts and school closures, which in turn increase the likelihood that other students will leave, and so on.[11]

There is little question, therefore, that choice policies are helping to shake up established practices in Michigan districts that are responsible for educating large portions of the state's most disadvantaged students. We failed to uncover evidence, however, that these districts were the ones that were least effective in their academic performance once student background characteristics are accounted for.

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[11] In 2009, Michigan's Governor Granholm appointed an outside emergency financial manager, Robert Bobb, to oversee the operation of Detroit Public Schools because the district had failed to eliminate its budget deficit. Mr. Bobb implemented many highly visible and controversial financial and academic reforms, privatized many district administrative and support functions, made sweeping changes in personnel policies, and closed many additional schools, some of which were sold to charter schools. After two years of such changes, however, the district's enrollment continued to plunge while its budget deficit increased from $219 million in 2009 to $327 million in 2011, prompting proposals to convert many more or all of the district's schools to charters or to establish a new authority to manage 'failing' Detroit schools. (Christoff & Dawsey, 2011; Dawsey, 2011a, 2011b; Winerip, 2011).

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Appendix

Table A-1

Determinants of districts' net outflow of students through Michigan's inter-district choice policy: Fixed effects regressions with lagged independent variables

	Model 1	Model 2	Model 3
4th Grade math MEAP	-.056 (.146)	--	--
4th Grade reading MEAP	--	-.008 (.16)	--
7th Grade reading MEAP	--	--	.048 (.194)
% Special education	.402** (.142)	.409** (.141)	.352* (.141)
% Free-reduced lunch	.108** (.033)	.114** (.033)	.089* (.035)
% African-American	-.131 (.13)	-.126 (.131)	-.118 (.129)
% Asian	-.012 (.109)	-.004 (.108)	-.014 (.105)
% Hispanic	-.08 (.083)	-.082 (.084)	-.083 (.087)
Ln(expenditure per pupil)	23.524** (3.254)	23.013** (3.169)	26.174** (3.956)
% Instruction/expenditure	-.069 (.066)	-.06 (.065)	-.065 (.067)
Pupil-teacher ratio	.165 (.108)	.158 (.108)	.159 (.107)
Ln(district enrollment)	21.251** (2.752)	20.726** (2.637)	20.583** (3.087)
Observations	4677	4674	4677
R^2	0.18	0.18	0.18

All independent variables are lagged for one year. See Table 6 for other notes.

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Acknowledgement

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