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Demand (and Supply) in an Inter-District Public School Choice Program

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Abstract: This study examines parents' demand for sending their children to a public school located outside their residential school district. Using a unique data set that contains information concerning both inter-district transfers and rejections of transfer applications, I am able to identify which school district characteristics attract the greatest demand for incoming transfers. The analyses reveal that mean student test scores are stronger predictors of transfer demand than both students' socio-economic characteristics and school district spending, suggesting that parents care more about outcomes than inputs. In addition, while districts are only supposed to reject transfer students due to capacity concerns, districts' supply decisions are also correlated with differences in student performance across neighboring districts.
[Keywords: school choice, inter-district open enrollment, public school demand]

I. INTRODUCTION

While school choice debates often focus on charter schools and private school voucher programs, intra- and inter-district transferring are currently the most frequently used school choice programs. Many cities have formal intra-district open enrollment programs or magnet school programs that allow students to attend a public school that is not in their local catchment area. The *No Child Left Behind Act* has expanded intra-district public school choice throughout the country, because districts are supposed to allow students to transfer out of any school designated as not meeting state standards for student achievement. In addition, forty states have policies that allow students to apply to transfer to a public school outside of their residential district (Education Commission of the States, 2005). In 1993-94, about 1.8% of all K-12 students attended a traditional public school located outside of their residential school district, and the current percentage is probably greater.[1] Inter-district transfer rates are much higher in states possessing formal inter-district open enrollment programs, which require all districts to consider transfer applications from non-residential students. This paper examines determinants of the demand for transfer spaces in this type of statewide inter-district open enrollment program.

The previous literature explicitly examining participation in inter-district open enrollment has not been able to separate supply side and demand side factors.[2] Since transfer rates reflect the minimum of (1) the supply of transfer spaces and (2) the number of students who would like to transfer, there is a serious identification problem if one regresses transfer rates on explanatory variables. Many of these variables may affect both the supply and demand for transfer spaces. For example, parents might prefer to send their children to schools where students earn high test scores, but those types of schools might be

[1] This estimate is based on survey responses from a nationally representative sample of school districts (*Schools and Staffing Survey, 1994)*. Several states have inter-district choice programs which were fairly new in 1994.

[2] Some studies have used survey approaches to try to separately explain the demand for transferring (Armor & Peiser, 1997) or the supply of transfer spaces (Fowler, 1996). Examining inter-district choice in Massachusetts, Armor & Peiser (1997) find that families with participating children most commonly cited curriculum and academic standards as their reasons for transferring. However, Schneider & Buckley (2002) find that parents' actual concerns, as measured by internet search patterns, may differ from these reported concerns. They found that parents in the Washington D.C. area, especially parent's with college degrees, tend to be more interested in the demographics of the student body at the school than in school facilities, staff, programs, or even student test performance. While Fowler (1996) finds that the majority of districts in Ohio that did not allow incoming transfer students cited capacity concerns, the analyses below reveal that districts often cite capacity concerns when other factors appear more important in their decision.

relatively likely to restrict the supply of incoming transfer students due to concerns over potential negative peer effects caused by incoming students with relatively low test scores.[3] The reduced-form relationship between transfer rates and mean test scores will thus reflect some combination of a positive effect of test scores on demand and a negative effect of test scores on supply.

Using district-level data describing both student transfers and transfer application rejections, I examine the demand for transfer spaces in the nation's oldest statewide inter-district choice program, Minnesota's open enrollment program. Estimated transfer demand may understate actual demand in some cases, because any type of application process is potentially subject to endogeneity whereby individuals are less likely to apply if they anticipate rejection. However, as discussed further below, it appears that few interested individuals were dissuaded from applying to participate in this particular program.

The results concerning the demand to transfer to a non-residential school district are somewhat similar to previous findings concerning preferences in other school choice settings. In the capitalization literature, there is evidence that higher test scores in local public schools lead to higher house values (Black ,1999; Downes & Zabel, 2002; Bayer, Ferreira, & McMillan, 2004) through greater local housing demand from families with school-aged children (Barrow, 2002).[4] Recent studies of parents' preferred school within a district (Hastings, Kane, & Staiger, 2005) or their preferred teacher within a school (Jacob, & Lefgren, 2005) suggest that many parents place strong weight on academic achievement.[5] The results below suggest that inter-district transfer demand is greatest when the mean student score on

[3] Analyzing inter-district open enrollment in Massachusetts, Fossey (1994) finds that, compared to the districts receiving their students, districts that lost at least twenty residential students tended to have lower median family incomes and lower test scores in math and science than the receiving districts. Based on previous evidence, it is unclear whether these effects would be even larger if not for the supply-side decisions of school districts.

[4] Figlio and Lucas (2004) also find that house values rise as a result of schools receiving higher ratings from accountability systems.

[5] Jacob & Lefgren (2005) find that there is a positive correlation between parents' classroom assignment requests and teachers' value-added effectiveness, especially within schools serving low income populations. In the intra-district choice setting, Hastings, Kane, & Staiger (2005) find that the students most sensitive to schools' mean test scores are those students in high income families. Other studies of school choice have suggested that parents may not be choosing schools that produce greater value-added achievement (Cullen, Jacob, & Levitt, 2003, 2005) and that the racial composition of students may influence their preferences (Henig, 1990; Lankford & Wyckoff, 2001; Schneider & Buckley, 2002).

standardized tests in a district is much greater than in a neighboring district.[6] Relative values of student test scores are slightly stronger predictors of demand than relative values of socio-economic variables. Test scores have statistically significant effects on demand even if one controls for socio-economic measures and school spending per pupil. While reliable estimates of school productivity would incorporate value-added measures of student progress, this finding is consistent with parents caring about whether a school district produces higher than expected mean student test scores due to productive schools and/or positive peer effects.

Yet the effects of test scores on transfer demand do not tell the entire story; students' academic performance is also correlated with supply-side decision making. While Minnesota's districts are not permitted to selectively admit transfer applicants, they are allowed to reject one or more applicants due to capacity concerns. Analyses of rejection patterns confirm that, controlling for transfer demand levels, districts are more likely to reject applicants when the districts are at historically high levels of enrollment. However, regardless of whether a district has historically high enrollments, it is much more likely to reject transfer applicants if it has substantially greater mean student test scores than a neighboring district.

The next section describes Minnesota's open enrollment program in more detail, followed by a section discussing which factors might influence the demand and supply of transfer spaces. After describing the data, I discuss the potential endogeneity of transfer applications and then describe the empirical methods and results. I conclude with a discussion of the implications of these findings for the design of school choice programs.

II. BACKGROUND ON INTER-DISTRICT OPEN ENROLLMENT

Various types of inter-district transferring have existed for decades. The first inter-district transferring began in the South in the 1960's, as an effort to promote desegregated schooling. "Freedom of choice" plans resulted in small percentages of African American students transferring to new schools,

[6] Throughout this article, district X is considered a "neighboring district" to district Y if they are contiguous, sharing a geographic border at any location.

while very few white students changed schools. "Coercion and intimidation on the part of white educators, parents, and students dissuaded many African-Americans from even applying for transfers to white schools (Wells, 1993, 63)." Although court orders replaced these "freedom of choice plans" with mandatory busing, some current programs continue to allow students residing in the suburbs to transfer to urban schools with high concentrations of minority students. Less formal arrangements of inter-district transferring have existed for years, as districts make agreements with one another. More subtle inter-district transferring has involved parents falsifying residential information so that their children may attend school in a different district. Beginning in the early 1990's, some states adopted formal, statewide inter-district open enrollment programs which have significantly increased rates of inter-district transferring. This paper analyzes demand for inter-district transferring in Minnesota, which was the first state to establish this type of program.

Minnesota's inter-district open enrollment program became statewide in 1991, and participation rates rose steadily throughout the early 90's. In 1991, the average district lost about 2 percent of its residential students to open enrollment, by 1997 this average climbed to 7 percent, and in 2000 the average was 6 percent. Under the program, all students are entitled to attend their residential school district, but they may also apply directly to other school districts if they would like to transfer. Students are free to simultaneously apply to several non-residential school districts, and there are not any application fees. Once a student transfers into a district, the student is entitled to remain in that district through high school graduation.

Districts may not selectively accept transfer applications. However, the law allows districts to reject applications due to strains on capacity. If there is more than one school at the appropriate grade level, transfer applicants may rank their choices of specific schools on their transfer application and it is then up to district administrators to decide the highest ranked school in the district that has sufficient capacity to serve the student. The district administrators may reject the application entirely if they feel that there is not sufficient capacity in any of the listed buildings or in the district overall. If the district feels that it has room for some but not all of the transfer applicants during a particular year, then it is

supposed to randomly choose applicants to fill the available spaces. State oversight of these rejections is fairly loose. Districts do not have to provide any evidence of capacity constraints, and the state only recently began collecting annual information from the districts concerning open enrollment rejections.

When a student transfers to a non-residential district, the residential district experiences a financial loss equal to the non-compensatory aid per pupil that it receives from the state. The receiving district gains an amount equal to the non-compensatory state aid per pupil that it receives from the state. In 1999-2000, the year of this paper's analyses, non-compensatory aid per student equaled about $4,000, varying across districts by only a couple of hundred dollars. While the financial award was far less than the average district's per pupil spending in Minnesota (about $7,000), this financial award usually exceeds the marginal cost of serving these additional students due to economies of scale.[7]

In addition to the inter-district open enrollment program, Minnesota offers a variety of other types of school choice programs. Minnesota offers charter schools which are legally independent from public school districts, receive state funding but no local funding, and may be started by one or more licensed teachers.[8] The majority of the charter schools existing during 2000 were located in the two school districts that serve the twin cities of Minneapolis and St. Paul. These two districts also offer a wide array of intra-district school choice, such as magnet schools that are attended by students from various neighborhoods within each city. Since these extensive charter school and magnet school programs are mostly limited to two school districts, the presence of these programs likely has only a minor effect on this paper's district-level analyses. In order to further ensure that the availability of outside choice options does not bias the results, additional analyses of this paper's models add control variables based on the local presence of charter schools and private schools.

[7] Even when special education students transfer, the residential district must compensate the receiving district for special needs such as transportation, so that the net marginal cost of receiving a special education student may not be much larger than for another student.
[8] Charter school policy information provided by the Education Commission of the States at http://mb2.ecs.org/reports/Report.aspx?id=65.

3. **THEORETICAL SOURCES OF THE DEMAND AND SUPPLY OF TRANSFER SPACES**

3.1 Demand

Demand for inter-district choice occurs when a family chooses to reside in one school district but wants their child to attend public schools in a different district. This section presents a simple model of a household's location decision and the ensuing decision of whether to apply to transfer to other districts. While the theoretical framework focuses on district-level characteristics, ignoring heterogeneity across schools within the same district, some of the empirical analyses below verify that within-district school heterogeneity does not significantly influence the supply or demand for transfer spaces in Minnesota.

Define Q_j as a vector of attributes of the educational services offered by school district j. Let H_j equal a vector of all other attributes of the housing, services, and location offered by district j. For simplicity, assume that all of the housing within district j is homogenous and assume that households only have one child. Define c_{jk} as the transportation costs, in terms of both time and private expenditures, associated with living in district j and sending a child to school in district k. Consider household i's indirect utility function, $v_{irk}(Q_k,H_r,c_{rk})$, where the household resides in district r and receives educational services from district k. Households may have heterogeneous preferences, particularly with regards to the types of school district characteristics that they value.

If a household resides in district r, then they are guaranteed the option of setting $Q_k=Q_r$. The household must first choose where to live, in light of these characteristics and the equilibrium house prices and tax rates. Suppose that there are three districts: district A, district B, and district C. Without loss of generality, assign district B and district C so that $v_{iAB}>v_{iAC}$. Define $p_k \in [0,1]$ as the expected probability of being allowed to send a child to district k while living in another district. We can then define a household's expected indirect utility from living in district A, bar, $\bar{v}_{iA}$, as follows:

$$\bar{v}_{iA} = v_{iAA} \text{ if } v_{iAA}>v_{iAB}>v_{iAC}$$

(1) $$= p_B v_{iAB} + (1 - p_B)v_{iAA} \text{ if } v_{iAB}>v_{iAA}>v_{iAC}$$

$$= p_B v_{iAB} + p_C(1 - p_B)v_{iAB} + (1-p_C)(1-p_B)v_{iAA} \text{ if } v_{iAB}>v_{iAC}>v_{iAA}$$

Assuming that a household is risk neutral, it will choose to reside in district r if:

(2) $$\bar{v}_{ir} > \bar{v}_{is} \ \forall r \neq s$$

The equilibrium supply and demand in this model is complicated, because this household location decision is influenced by the endogenously determine transfer application acceptance probabilities. The analyses in this paper will measure the transfer demand for each district after residential location decisions and these endogenous transfer acceptance probabilities have reached a long-run equilibrium. After the residential location decision, the household must decide whether to apply to transfer to other districts. The household residing in district r will apply to transfer to district j if $v_{irj}>v_{irr.}$ This assumes that there are not any application costs, which is true for the program examined in this paper.

Note that there are two general cases in which $v_{irj}>v_{irr}$. First, this could be an attempt of household i to free-ride on district k's premium services. In this case, the majority of households prefer district k where housing thus becomes more expensive than in district j. Second, it could be true that $v_{irj}>v_{ijj}$ due to the idiosyncratic preferences of household i, which may have unique reasons for placing a high value on either housing in district j or schooling in district k (or both). Both idiosyncratic preferences and attempts at free-riding could explain why people apply to transfer under an open enrollment program.

With N_j households in the remainder of the state outside district j, the demand to transfer into district j in terms of the number of interested transfer students will equal:

(3) $$D_j = \sum_{i=1}^{N_j} I_1(v_{irj} > v_{irr}) \ ,$$

where $I_1(v_{irj} > v_{irr})$ equals one if $v_{ijk} > v_{ijr}$ and equals zero otherwise.

Note that transfer demand is defined as the number of applicants, so that a household might demand to transfer into district j from district r but also demand to transfer into district k from district r. By using this type of transfer demand, this paper implicitly focuses on estimating which factors make district j preferred to district r, regardless of the relative merits of transferring to either district j or district k.

Equation (3) suggests that there should be high demand to transfer into district j when the characteristics of district j, Q_j, are relatively desirable compared to nearby districts, while the transportation cost of transferring to district j from a less desirable district is low.

3.2 Supply

An administrator in each district must decide how many inter-district transfer students it is willing to accept. Let T_j equal the number of transfer students enrolled in district j. There will be several potentially important factors determining the level of T_j that district j's administrator prefer.

Define $m_j(T_j)$ as the marginal cost from allowing T_j incoming transfer students while maintaining the same quality of educational services for residential students as if there were not any transfer students entering. This marginal cost will include both the direct costs associated with providing services for transfer students, as well as the net cost of any peer effects caused by these transfer students. (Incoming transfer students could create negative peer effects which increase the marginal cost, or these transfer students could create positive peer effects which decrease the marginal cost or even lead to negative net costs.) This marginal cost will also include the costs of compensating for any loss of school district revenue due to capitalization effects. When students are able to transfer into a popular school district, the erosion of the housing premium decreases the housing prices in that district, which in turn leads to a smaller local property tax base (Reback, 2005).

Define $h_j(T_j)$ as an index of the value of any positive reputation effects from admitting transfer students. If there is asymmetric information, transferring may increase the overall popularity of the school district by sending a message to other parents that some parents think that this is a superior school district.

Let $g_j(T_j)$ equal the level of residents' discontent over incoming transfer students. Holding actual school quality constant, there are several reasons why incoming transfer students could decrease

residents' welfare. First, this incoming transferring could decrease local house prices. Second, the residents may perceive that the incoming transfer students lead to more negative peer effects than the actual peer effects.

Finally, define q(T_j) as an index of the state's satisfaction that district j is in compliance with the state's open enrollment law. Even if the other factors imply that the district should not accept many transfer students, the district administrator may be concerned with whether it appears to be following the law's guidelines.

The function measuring the combined impact of these supply-side factors will vary across districts, as some districts' administrators will prioritize certain objectives more than others. Define S_j as the maximum level of T_j that district j's administrator decides to allow. District j's administrator will choose S_j to maximize some function of these factors:

(4) $$f_j(S_j * \text{Subsidy} - m(S_j), g(S_j), h(S_j), q(S_j)).$$

The first term represents the net financial gain to the district, which equals the number of incoming transfers multiplied by the per student subsidy for serving these students minus the marginal cost of serving these students. As mentioned earlier, this subsidy equaled about $4000 per student in Minnesota during this paper's sample period, varying by only a couple of hundred dollars across districts.

3.3 Equilibrium

Unlike most other markets, there is no price mechanism to guarantee that the market for inter-district transfers clears. The actual number of accepted transfer applicants will equal the minimum of the supply and demand for transferring. The number of accepted transfer applicants, T_j^*, will be:

(5) $$T_j^* = \min[S_j, D_j]$$

This simple theoretical analysis highlights some important considerations for empirically analyzing the inter-district transferring market. First, transfer demand may come from both households seeking to enhance school quality without paying a housing premium and from households with idiosyncratic preferences. Second, most variables that may have positive effects on demand may also be associated with lower levels of supply. For example, based on the house price capitalization literature, a district with greater student test scores than a neighboring district would be likely to receive a high level of demand, because these test scores seem to be positively correlated with valued characteristics of school quality (Q_j). On the other hand, concerns over negative peer effects or negative capitalization effects may cause these same districts to provide a relatively low supply of transfer spaces. The theoretical equilibrium relationship between transferring and factors such as student test scores is thus ambiguous, and explaining the observed equilibrium requires a separate analysis of demand and supply.

4. DATA

This paper's data allows one to estimate which observable variables are important components of inter-district demand, i.e., which variables should be included in the Q_k vector in households' indirect utility functions. Fortunately, these data include both transfer rates and rejection rates, so that one may estimate the transfer demand to enter each school district (D_j) without worrying about the confounding effects of the supply of spaces in that district (S_j). Less fortunately, these data are also highly aggregated, which slightly limits how precisely one may estimate the parameters described above. In particular, the data are at the district-level rather than the household level, and the data do not reveal the number of students that transfer out of a particular district and into another particular district but simply reveal the total number of exiting and incoming students in each district. By incorporating geographic information, the empirical strategy described below is to exploit information about districts' neighbors in order to characterize the likely transfer decisions that are most relevant to students.

The data combine several, school-district level data sets provided by the Minnesota Department of Education. In order to capture the long-run transfer equilibrium, after general equilibrium effects

related to families' location decisions have occurred, I focus on inter-district choice during the 1999-2000 school year, nine years after the beginning of statewide open enrollment. Explanatory variables come from Minnesota's *School District Profiles* (2000), as well as district-level data from the Minnesota Department of Education's website describing mean student test scores on standardized, statewide exams for students in third, fifth, and eighth grade.[9] The two data sets of particular importance are the open enrollment transfer rate data and the open enrollment application rejections rate data. District-level open enrollment transfer flow data are available for the 1999-2000 school year, provided directly from the Minnesota Department of Education. These flows reveal the number of students residing in each school district that attend a different school district (i.e., outgoing transfer students), as well as the number of students attending the school district that do not reside in the school district (i.e., incoming transfer students).

Incoming transfer flows, but not outgoing flows, are also available broken down by race and by two other categories: whether the student has been designated for special education services and whether the student is eligible for free or reduced priced lunches due to membership in a low-income family. The transfer flows do not include breakdowns by grade.

District-level open enrollment rejection data are available for the 1998-99, 1999-2000, and 2000-2001 school years. These data are the results of district responses to an annual survey given by the Minnesota Department of Education in which districts list the number of rejected open enrollment transfer applications by grade and by the reason for the rejection. The response rate to this survey was 338 out of 345 in 1999-2000, and was fairly similar for 1998-99 and 200-2001.[10] The vast majority of school districts do not reject any transfer applications in a particular year. Only 8 percent, 8 percent, and 10 percent of responding districts reject *any* new applications in 1998-99, 1999-2000, and 2000-2001 respectively, and some of these might have accepted some new applicants at the same time that they

[9] The district-level test score measures used in this paper equal the average of the mean student test scores in third, fifth, and eight grade in reading and math during the 1998-99 school year.
[10] The exact response rate and information concerning which districts did not respond is only available for 1999-2000.

rejected others. Only five districts did not receive any transfer students during 1999-2000. The data do not provide any information about characteristics of the students applying to transfer. The presence of rejections data from the years immediately surrounding 1999-2000 is useful for conducting the analysis below given the potentially endogenous nature of any type of application.

The open enrollment transfer and rejection data are combined with district-level data concerning characteristics of residents, school expenditures, student test scores, total enrollments by grade, and total enrollments by race. The analyses also utilize geographic data concerning which districts are contiguous, (sharing a border at some geographic location). One can thus analyze the supply and demand for schooling based on both a district's own characteristics and the characteristics of neighboring districts. This is particularly helpful, since anecdotal evidence suggests that most transferring students attend a school in a neighboring district. Table 1 displays descriptive statistics for variables used in the regression analyses. Out of the 345 districts in operation during the 1999-2000 school year, 2 newly formed districts are omitted from the regression analyses of transfer demand due to missing values for several variables, 7 other districts are omitted due to missing financial data or test score data, and 7 others are omitted because they did not respond to the transfer applicant rejections survey.

The regression results remain nearly identical when one includes this latter group of non-responding districts and assumes that they did not reject any applicants. This assumption seems close to reality, because none of these districts reported rejecting any students during the previous or latter year. In addition, these districts possess similar observed characteristics as districts that did not reject any applicants. These non-responding districts may have mistakenly believed that they need not return the survey form unless they had rejected any applicants.

5. HOW ENDOGENOUS WERE APPLICATIONS?

Applications may be endogenous because people's perceived probability of acceptance influences their application decision. If potential applicants are deterred from applying because they anticipate rejection, then the sum of transfer students and rejected applicants may understate true demand.

However, in the case of inter-district transferring in Minnesota, few people likely withheld applications because they anticipated rejection. As described below, rejections were uncommon. Furthermore, there were not any application fees, and applying to one district did not preclude applying to others. The only costs associated with applying would be the cost of gathering information about schools, the cost of time to obtain and submit an application, possibly the cost of a stamp to mail the application, and the potential emotional disappointment associated with a rejection. Because rejections were not made based on personal student characteristics, the emotional disappointment of a rejection may not have been high for most parents compared to the perceived benefits from a successful transfer application. Given these low costs and the high probability of success, most parents likely would apply to transfer their child even if they were uncertain about whether their child should transfer or if they did not feel very strongly about the transfer opportunity.

Examining a subset of districts, those neighboring Minneapolis, there is some empirical evidence which supports the idea that interested applicants did apply during the sample period. One year after this paper's sample period, there was an out-of-court settlement of an adequacy lawsuit brought by the Minneapolis branch of the NAACP against the state of Minnesota. As a result of this settlement, students from low income families residing in the Minneapolis urban school district were guaranteed access to a minimum number of transfer spaces in nearby, suburban districts. In particular, students were eligible to transfer to the suburban districts if their family's income was sufficiently low that the student qualified for federally subsidized lunches. Participants in this new program may or may not have transferred across districts through regular open enrollment if this new program did not exist. Some participants in this new program may have been induced to participate due to the new advertising or larger overall participation rates created by the program. Other participants in this new program would have applied and been rejected through regular open enrollment applications. Finally, some participants in this new program would not have bothered to apply through regular open enrollment because they would have anticipated rejection.

This latter category is the potential cause for concern in this paper's analyses of open enrollment demand, and it does not appear that many students fit into this category. Table 2 compares the number of subsidized lunch transfer students during 1999-2000 (this paper's main sample period) to the number of subsidized lunch transfer students into the participating suburban districts in 2001-02 and 2002-03 when the new program was first in effect.[11] While the suburban districts had recruitment targets that may have induced students to temporarily participate, Table 2 reveals that the number of these students who used the program for consecutive years was generally similar to the number of these types of students using open enrollment before this program began. Only two out of the eight suburban districts experienced a non-trivial increase in incoming transfer students from low income families, and one of these two districts had a high enough rejection rate in 1999-2000 to explain this increase.[12] While this analysis only covers a few suburban districts, it is noteworthy that summing the number of incoming transfers and the number of rejected applicants does not appear to cause one to systematically underestimate district-level demand.

Data concerning rejections from the years immediately before and after this paper's main sample period (1999-2000) provide further evidence that the estimates are not strongly influenced by the potential endogeneity of applications. People might not continue to apply each year if they had been previously rejected, so that it is important to check whether the results would be influenced by year to year deferment of applications. Twelve out of twenty-seven districts that rejected applicants in 1998-1999 also rejected applicants in 1999-2000, while sixteen out of twenty-six districts that rejected applicants in 1999-2000 also rejected applicants in 2000-2001. Fortunately, all of the qualitative results below concerning transfer demand in 1999-2000 remain similar when one controls for rejections made during the previous year and rejections made during the following year. This confirms that the results are not biased from a transitory component of endogenous applications.

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[11] The number of Title I transfer students in 1999-2000 may slightly overstate the number of Title I transfer students who resided in the Minneapolis district, because incoming Title I transfer students in the suburbs may have come from other suburban districts. However, this type of transfer was probably uncommon due to the higher incomes generally found in the suburban districts.

[12] The total number of rejections for one of these two districts was approximately as large as the increase in incoming transfers reported in Table 2. (As a condition of receiving the raw, district-level rejections data, I agreed not to report the specific number of rejections by district.)

6. **EMPIRICAL ANALYSES**

The first subsection below describes rates of participation in open enrollment. The next subsection analyzes the demand for transferring into districts, and the third subsection analyzes cases in which supply is binding so that the district rejects some transfer applicants.

6.1 Descriptive Statistics

Students from low income families (eligible for federally subsidized school lunches) and students receiving special education services are slightly more likely than other students to participate in open enrollment. Statewide, 25.9 percent of public school students come from low income families and 11.1 percent of public school students are placed in special education, while these groups respectively composed 26.9 percent and 12.5 percent of transferring students. Nonwhite students are slightly less likely to participate in open enrollment, composing 15.7 percent of all public school students but only 11.8 percent of transferring students. These participation trends differ from those observed for other types of school choice programs. Examining entrants into lotteries for intra-district transferring in Chicago, Cullen, Jacob, & Levitt (2003) also observe lower participation rates among non-white students, but found lower participation among students from low-income families as well. Examining participation in a national, privately-funded voucher program that targeted low-income families, Campbell, West, & Peterson (2005) find that African American children eligible for the program were actually more likely to apply than other eligible children, though they were less likely to participate conditional on acceptance.

6.2 Demand for Public School Transfer Spaces

I estimate the demand to transfer into district j, D_j, by finding the sum of incoming transfer students and the number of rejected applicants. [13] The following model is used to predict transfer demand:

[13] This measure estimates students' demand to transfer to district *j* rather than attending any other school district. Demand in this context means that one would actually transfer if the application is accepted. This measure will overstate demand in the (relatively rare) case that a student is rejected from a district that the student would not have attended anyway. Anecdotal evidence suggests that students seldom apply to more than one district during the same year.

(6) $\log(D_j) = \alpha + \beta_1 \log(\text{\# of Households}_j) + \beta_2 \log(\text{Population Density}_j) + \beta_3(\text{\% of Students in Elementary Grades}_j) + \beta_4(\text{\% of Students in Mid. School Grades}_j) + X_j \beta_5 + \overline{X}_{j,neighbors} \beta_6 + X^{\min}_{j,neighbors} \beta_7 + \varepsilon_j.$

The dependent variable equals the natural logarithm of the sum of incoming transfer students and the number of rejected applicants in district j during 1999-2000. One may thus interpret the coefficients in terms of percent changes in the number of students who would like to transfer into the district. The qualitative results remain nearly identical if one replaces this dependent variable with one that divides the level of demand by some measure of school district size, such as total residential enrollment.

The first four independent variables control for structural differences across districts which may be related to the number of students seeking to transfer into the district. These control variables are the number of households in the district, the population density in the district, the fraction of public school students enrolled in elementary grades (Kindergarten through grade 5), and the fraction enrolled in middle school grades (grades 6 through 8).

The X_j vector contains various combinations of independent variables that might predict demand, and the purpose of this analysis is to determine the relative importance of these variables. In order to facilitate the comparisons of these variables and their predictive validity, they are all converted into standard normal values across the sample (i.e., Z-scores). The demand for transferring into a district is likely based on both characteristics of district j and characteristics of neighboring districts. There might be greater demand to transfer into district j if a nearby district is significantly worse along some quality measure or if many nearby districts are worse along this quality measure. Vector $X^{\min}_{j,neighbors}$ therefore includes the Z-score of the minimum value of these characteristics among district j's neighbors, and Vector $\overline{X}_{j,neighbors}$ contains the Z-score of the population size-weighted mean value of these characteristics for district j's neighbors.

In the full model, these vectors include all of the district-level variables listed in Table 1: median income of residents, mean house value of residents, education levels of residents, per pupil expenditures, local revenues per pupil, and mean student scores on standardized tests. The model does not include

variables for racial composition, because there is little variation in racial composition outside of the two urban districts of Minneapolis and South St. Paul.[14] One should note that the mean test scores may be slightly influenced by the performance of incoming transfer students, because separate test score data for residential and transfer students are not available.[15] Because net transfer rates will also affect per pupil expenditures and revenues, I do not use the actual values of these variables, but instead estimate their hypothetical values if no students transferred.[16]

Additional regression models, not shown here, add four control variables for alternative school choice mechanisms: the log of private school enrollment in the district, the log of private school enrollment among the district's neighbors, the log of charter school enrollment in the district, and the log of charter schools enrollment in the district neighbors. The results below remain nearly identical after the inclusion of these control variables, and the coefficients of these four control variables are very small. Of the four, only private school enrollment in the district is ever statistically significant, as it is mildly, negatively related to transfer demand.

6.2.1 Demand Related to Free-Riding.

Table 3 reveals the explanatory power of various types of variables when they are included alone. The focus of Table 3 is on variables that might be related to the free-riding type of transfer demand, whereby students are transferring to a district that is considered to be of higher quality than their residential district. Aside from the inclusion of the structural control variables, Table 3 reveals the "raw validity" of various factors, the predictive power when one factor is included on the right-hand side of the model and other factors are omitted. The structural control variables alone actually explain 43.4 percent of the variation in demand, so the final column of Table 3 reports how much of the remaining variation is explained by a particular factor. The direction and statistical significance of the coefficients are similar for test scores, household income, and home values: demand is greater when a district has higher levels of

[14] Omitting these two urban districts from the analyses would not affect any of the qualitative results in this paper.
[15] Test scores predating the open enrollment program are also not available.
[16] I estimate hypothetical total expenditures by subtracting the net amount of state aid gained by the district due to incoming and outgoing transfers, and then I divided this total expenditure measure by the number of public school students who reside in the district regardless of whether they actually remain in the local public schools.

these seemingly desirable characteristics and demand is greater when at least one of the district's neighbors has relatively low levels of these characteristics. Average characteristics of a district's neighbors are far less important predictors of transfer demand than the minimum value among neighbors, both in terms of magnitude and statistical significance. Excluding the average neighbor characteristics from these regressions has little impact on the other coefficients or on the relative predictive validity of the various types of variables. The amount of explained variation in the demand for transfer spaces is fairly similar for each type of district characteristic, with R^2's equal to .456, .447, or .464, respectively when mean household income, median house value, or mean student test score are used as independent variables. Average math test scores predict demand better than average reading test scores.

Rows 6 and 7 of Table 3 reveal the effects of parental education levels on transfer demand. Transfer demand is greater when a district has fewer high school dropouts or when a district's least educated neighbor has fewer residents with Bachelor's degrees. These findings are consistent with the idea that parents want to transfer their children into districts with better educated parents. The raw validity of these variables are fairly low, so much of this finding may simply be due to a positive correlation between parental education and another valued trait such as student test scores or parental wealth.

Row 8 of Table 3 reveals that the total spending per pupil variables, which adjust for transferring patterns (see footnote 14), do not have statistically significant effects on transfer demand. This is not very surprising, because expenditures per pupil will reflect a combination of local funding, state, and federal funding. While local funding is likely associated with desirable characteristics such as property wealth and parental interest in schooling, other funding may be linked to undesirable characteristics such as high poverty rates and low property wealth. Overall, spending per pupil across Minnesota school districts is negatively correlated with potentially valued characteristics such as median income, so the popularity of districts with higher socio-economic characteristics may cancel out the popularity of districts that spend greater amounts per pupil.

In order to isolate spending that should not be linked to any negative traits, row 9 of Table 3 focuses on local revenue per residential pupil. Presumably parents would be thrilled to send their child to a district where other parents make sizable financial contributions to school expenditures. In fact, demand to transfer is greater for districts where the average local expenditures of neighboring districts is relatively large and for districts where the minimum local expenditure level among the neighboring districts is relatively low. The latter finding is intuitive, parents from the low spending district may want to upgrade to a higher spending district. One possible explanation for the former finding is that parents residing in districts with high local tax rates and large local property tax bases care a lot about their children's schooling and are not always satisfied with the local schools, so they are more likely to send their children to a neighboring district even if this district has lower per pupil expenditures.

In addition to raw validity, it is important to determine the incremental validity of various predictors of the demand for choice. In particular, how does the amount of explained variance in demand decrease when only one type of variable is omitted? Table 4 displays the regression results when all types of independent variables are included. The coefficients generally retain their sign from Table 3. The R-squared when all variables are included equals .538, a moderate increase from the models that only included one type of predictor.

The R-squared does not decrease much when any one type of variable is omitted from the full regression model, partly because these variables are positively correlated. There is a .43 correlation between mean test score and median income, a .37 correlation between mean test score and mean house value, and a .88 correlation between median income and mean house value. The inclusion of the mean test score variables in Table 4 allows one to explain an additional 2 percent of the variance in demand. The F-test comparing the full regression model with a model omitting the test score variables confirms that, at the .01 level of significance, one can reject the null hypothesis that the test score variables' coefficients equal zero.

This suggests that transfers flow towards schools with higher outputs, even controlling for schools' inputs. This provides some tentative evidence that public school choice could lead students to

move to more productive districts, in which students earn higher test scores than one would predict from the included socio-economic and spending variables. There are several reasons why one should interpret this result very cautiously. First, as previously stated, the test score variable measures the performance of the actual students served, so that the average test score is slightly influenced by whether student inflows and outflows improve the mean student ability level. Second, it is possible that the schools with higher than predicted test scores are not truly more productive, but simply have students with high academic abilities related to unobserved, non-school factors or students who enjoy positive peer interactions. Third, the students who use the choice program may not necessarily improve their own performance as a result (Cullen, Jacob, & Levitt, 2003, 2005). Fourth, while this analysis focuses on student sorting, a school choice program could also directly affect schools' productivity through competition or changes in funding.

Given that parents are able to express a preference for their child to transfer to particular schools within a non-residential district, an important robustness check is to determine whether within district school heterogeneity influences transfer demand. While school-level data are not available for all of the descriptive characteristics, they are available for student test scores, the variables at the district-level which bests predict transfer demand. When one adds either the standard deviation in school-level mean test scores or the maximum school-level mean test score in a particular grade as an additional control variable in the models from Equation 6, this variable is statistically insignificant and the models continue to explain roughly the same proportion of the variance in transfer demand.[17] Either most transfer applicants are enticed by overall district characteristics or these characteristics seem to proxy well for the qualities of particular schools that these applicants find attractive.

[17] For example, suppose that one re-estimates the model in row 4 in Table 3 with the mean math test scores specifically for 5th grade students in the district. If one adds an independent variable equal to the Z-score for the maximum school-level mean 5th grade student math test score found in the district, this additional variable has a coefficient of .067 with a standard error of .154. The R-squared only increases from .466 to .468 with the addition of this maximum school-level mean test score variable.

6.2.2 Demand Related to Tastes for Differentiated Products.

Another important robustness check for these analyses is to determine whether the previous estimates might be biased in either direction by transfer demand related to districts specializing in specific areas. While it is generally difficult to measure idiosyncratic preferences, there are certain measurable characteristics of districts that might differentiate them from one another and thus influence transfer demand. I add a few of these measures that are likely to be exogenous, i.e., not influenced by the actual transfer students who enter the schools. These variables include the fraction of spending that is dedicated to vocational education, the fraction of spending that is used for community service purposes, and the average and minimum neighboring districts' values for these vocational and community service variables. As with the earlier variables, each of these variables is included in the form of a Z-score. In addition, I explore whether transfer demand is related to indicators for whether the district has a highly successful hockey team or football team, a team that has gone to the state finals in its division during either of the two years prior to the sample period. These sports are very popular in Minnesota and there is anecdotal evidence of students being recruited for athletic purposes.

The inclusion of these additional variables does little to change the results. For example, the estimated coefficient on the test variable in this expanded model equals .225 with a .069 standard error, as opposed to .216 with a .067 standard error in Table 4. The R-squared increases from .538 to .554 when these eight additional variables are included. There is slightly greater transfer demand when districts spend a greater proportion of their budgets on vocational programs than neighboring districts. This is probably due to a few students who prefer a school district offering these specialized services. When neighboring districts spend a relatively large fraction of their budgets on community service programs, there is less demand to transfer into a district. This may be due to increased loyalty to the local, residential schools in districts that have greater interactions with their communities. Successful hockey or football teams do not increase transfer demand; in fact, districts with successful football teams receive less transfer demand than other districts. It is possible that few students are recruited to transfer in order to play for the best teams, and it is also possible that an even greater number of students are dissuaded

from transferring into a district where it may be more difficult for them to play on the teams. The results remain similar if one replaces these indicator variables with the number of successful teams per residential student served.

7. The Supply of Transfer Spaces

Unlike demand, one cannot precisely estimate the supply of transfer spaces; one only observes supply in the few cases that it is binding because a district rejects an applicant. The data allow one to characterize reported reasons for these rejections and to compare districts receiving similar levels of demand but making different decisions concerning rejecting applicants. Only 26 districts (about 8 percent of respondents) rejected any applications for 1999-2000. Responding to a closed-ended survey, districts gave reasons for these rejections which included lack of capacity in a program (31 percent of rejections), lack of capacity in a class (23 percent of rejections), lack of capacity in a school building (28 percent of rejections), and other reasons (18 percent of rejections). Districts with court-ordered desegregation plans were also permitted to cite racial balance concerns as a reason for rejections, but none did so. Districts using certain explanations for rejections possess fairly similar characteristics as districts using other explanations, though the small number of rejecting districts weakens one's ability to formally test for differences within the group of rejecting districts.

It is possible that the low rates of rejections in Minnesota are related to school districts' ability to expand capital resources, such as the number of classrooms, over time. Examining Milwaukee's private school voucher program, Belfield, Levin, & Schwartz (2004) find that nearly half of the participating private schools in 2002 were founded after the program began. The long-run supply of transfer spaces under inter-district enrollment may also be somewhat elastic, especially given that about 5 percent of Minnesota's districts experienced net gains of transfer students equal to at least 20 percent of the size of their residential student population.

To provide rough evidence of supply-side decision making, I divide districts based on their transfer demand, and then examine how various factors influence the relative likelihood that a district

rejected any transfer applicants. Given the low rate of rejections and the small number of districts in each group, one cannot simultaneously identify the effects of more than a couple of explanatory variables, so these results should be interpreted cautiously. In light of this sample size issue and the desire to make the sources of identification as transparent as possible, the analyses here use a non-parametric approach, comparing mean rejection rates among various subsets of districts. Rejections are supposed to be based on capacity constraints, so I first examine whether districts are more likely to reject any applicants if total student enrollments are at historically high levels compared to the previous five years. Next, dividing the sample based on whether enrollments are at historically high levels, I examine whether any other factors lead to statistically significant differences in rejection rates.

Table 5 reveals the importance of capacity concerns, as well as another explanatory variable: an indicator for whether districts have a mean student test score that is at least one standard deviation greater than a neighboring district's mean student test score. Columns 2a and 3a of Table 5 suggest that districts at a historically high enrollment level are generally more likely to reject applicants: across all districts the rejection rates jump from 7% to 13% when districts fall into this category. Historically high enrollment levels also tend to increase rejection rates among districts with similar levels of demand, though the differences in rejection rates are rarely statistically significant.

Columns 2b and 2c of Table 5 reveal that districts that are at a historically high enrollment level are even more likely to reject at least one applicant if the district has a mean student test scores that is at least one standard deviation greater than in a neighboring district. Whenever there are at least five districts in each group, one can dismiss, at the .05 level of significance, the null hypothesis of equal rejection rates in favor of the hypothesis of greater rejections among districts with a large test score differential. Test score differentials are also very highly correlated with rejections among districts that were not at historically high enrollment levels. In fact, column 3c reveals that the frequency of any rejections was only 4% among districts with neither historically high enrollment levels nor a large test score differential. While the statistically significant correlation between rejections and test scores gaps may not be entirely causal, it is remarkable that rejections are almost completely non-existent among the

roughly 75% of districts that do not have test scores far exceeding a neighbor, even when these districts have high levels of transfer demand.

Although some transfer applicants may have requested specific schools, within-district heterogeneity in Minnesota does not appear to influence supply decisions. The difference between the highest school-level mean test score in the district and the minimum district-level mean test score among neighboring districts does not predict rejections as well as the district-level gaps. This finding even holds if the analysis only includes rejections that districts claimed were due to "lack of capacity in a school building" rather than district-level capacity constraints.

Aside from mean student test scores, other explanatory variables did not lead to large or statistically significant differences in rejection rates. Rejections occurred in both rural and metropolitan counties. Large gaps in average house values or in median household income between a district and one of its neighbors were only slightly more common among districts that rejected transfer students. The greater importance of test scores might reflect administrators' concerns over the potential peer effects from admitting transferring students, though these results should be interpreted with caution due to the possible correlation of test score gaps and omitted variables.

8. CONCLUSIONS

Using data on transfer rates and transfer application rejections, one finds that the demand for inter-district transferring in Minnesota is related to students moving into districts with higher average test scores and socio-economic characteristics than their residential district. These variables, along with structural variables like population density and the fraction of students in high school, are statistically significant predictors of transfer demands. About half of the district-level variation in the demand for incoming transfer spaces is not explained by these variables, and may be due to idiosyncratic factors such as subjective views of school quality, the convenience of school locations, and the quality of specific programs such as science or art.

There is positive demand for districts with higher mean student test scores than a neighboring district, and this remains true if one controls for socio-economic variables and school expenditures. This suggests that parents are concerned with outcomes, and this is also consistent with the possibility that parents tend to prefer to transfer their children to more productive schools.

Yet, there is evidence that schools' supply-side decisions occasionally constrain parental demand for districts with high test scores. Given similar levels of demand, districts with substantially greater test scores than a neighboring district are much more likely to reject transfer applicants. This pattern remains true among school districts that are not at capacity in terms of their recent historical high level of enrollments. While districts claim that they are making rejections for capacity reasons, concern over negative peer effects might influence their marginal decision making. The rejection rates in Minnesota are sufficiently low so that, on average, transfer students enter districts with higher mean student test scores than their residential districts. However, rejections might occur more frequently in states with greater spatial heterogeneity, where neighboring districts differ substantially in their demographics. For other choice programs and other geographic areas, one could imagine the supply-side forces being sufficiently strong that the vast majority of successful transfers do not allow students to enter schools with higher socio-economic characteristics or higher productivity than the schools in their residential district.

Given that this paper's data do not allow for a rigorous analysis of these supply-side issues, further research is needed in this area. The topic is important in light of current U.S. education policies; the No Child Left Behind Act may soon dramatically increase the frequency of public school transfer applications throughout the United States. Under the *No Child Left Behind*, parents may transfer their children out of a public school that has been deemed failing for two consecutive years. These students have the right to transfer to some other public school within the district that has not been deemed failing. If school principals in large districts behave like Minnesota's superintendents, then these principals may try to turn away transfer applicants by claiming the schools are at full capacity. It is difficult to obtain detailed data concerning No Child Left Behind transfer rates and transfer applications because of the policy's decentralized administration and its brief tenure. Due to the broad definition of a failing public

school,[18] many schools have faced this designation and thus have been subject to the loss of their students. However, many non-failing schools are not eager to admit transfer students, and most urban areas have resisted compliance with the law because they would otherwise face tremendous overcrowding problems. In a study by the Citizen's Commission on Civil Rights which received survey responses from 10 states and 53 districts in other states, the authors report that 5.6 percent of eligible students requested transfers out of failing schools during 2003-2004 but only 1.7 percent of eligible students actually transferred schools (Brown, 2004, p. 109).

Capacity concerns may often be valid, especially given pre-existing concerns with overcrowding in urban public schools due to enrollment growth and budget cuts. However, cases in which transfer applicants are rejected may more closely reflect the principal's or superintendent's concerns over peer effects than their concerns over actual capacity constraints. One policy alternative would be to further increase the financial compensation for schools serving certain types of transfer students whose education is associated with a relatively high marginal cost. Another alternative would be to adopt a strict, centrally-determined formula for capacity. An example of this policy is found in Britain, where the government amended a 1980 open enrollment policy eight years later to require schools to accept transfer students as long as total student enrollment remains less than it had been during 1979. The amendment arose due to concerns that local educational agencies were setting low capacity levels in some schools to prevent enrollment declines in other schools (Clark, 2005). Whether choice programs in the U.S. should adopt a similar policy depends on the desired level of participation in the particular choice program, as well as the perceived trade-off between increased participation and local administrators' flexibility.

[18] Under the No Child Left Behind accountability systems, student test scores only contribute to school ratings in the form of pass rates. The ratings therefore do not reflect value-added concepts of school quality, based on the educational progress of students at the school. Furthermore, more diverse schools must meet more requirements than less diverse schools, since multiple subgroups of the student population (e.g., Hispanic, White, special education students) must have a pass rate that exceeds the thresholds.

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Table 1: Descriptive Statistics for Main Sample

	Mean	Median	Stand. Dev.
District characteristics			
Number of Incoming Transfer Students	95.9	62	110.6
Number of Outgoing Transfer Students	94.9	54	148.1
Demand for Incoming Transfer Spaces	97.4	62	115.0
Number of Residential Students	2524	1053	5406
Number of Households	5633	2175	13249
Population Density (people per sq. ft.)	0.000101	0.000010	0.000309
% of Students in Elementary Grades	0.433	0.428	0.087
% of Students in Middle School Grades	0.239	0.238	0.053
Z-score of Average Student Test Score	0	0.074	1
Z-score of Average Student Math Test Score	0	0.031	1
Z-score of Average Student Read. Test Score	0	0.076	1
Mean House Value	90220	83025	36777
Median Income	41307	38155	10875
% of Adults with a Bachelor's Degree	0.118	0.103	0.056
% of Adults without High School Diploma	0.171	0.174	0.052
Public School Spending per Pupil	6980	6688	1310
Local Public School Revenue per Pupil	2144	1922	946
% of Spending Spent on Vocational Ed.	0.02	0.02	0.02
% of Spending on Community Service	0.03	0.03	0.02
Indicator Variable for a Hockey Team Going to the State Finals Recently	0.12	0	0.32
Indicator Variable for a Football Team Going to the State Finals Recently	0.05	0	0.23
Household-weighted, district-level averages for neighboring districts			
Z-score of Average Student Test Score	0.054	0.076	0.426
Z-score of Average Student Math Test Score	0.052	0.067	0.431
Z-score of Average Student Read. Test Score	0.056	0.070	0.437
Mean House Value	88112	82182	28408
Median Income	41606	37532	9461
% of Adults with a Bachelor's Degree	0.130	0.114	0.049
% of Adults without High School Diploma	0.164	0.168	0.041
Public School Spending per Pupil	6829	6694	689
Local Public School Revenue per Pupil	2096	1984	585
Minimum district-level value among neighboring districts			
Z-score of Average Student Test Score	-0.608	-0.417	0.762
Z-score of Average Student Math Test Score	-0.656	-0.484	0.746
Z-score of Average Student Read. Test Score	-0.614	-0.400	0.792
Mean House Value	69447	64845	23016
Median Income	35229	33929	7749
% of Adults with a Bachelor's Degree	0.083	0.079	0.034
% of Adults without High School Diploma	0.130	0.137	0.042
Public School Spending per Pupil	6107	6105	728
Local Public School Revenue per Pupil	1415	1342	509

Notes to Table 1: Summary statistics are based on the 329 districts used for the regression analyses. As described in the Data Section of the text, 16 districts are excluded due to incomplete data. Therefore, the total number of exiting transfer students among these 329 districts is slightly different than the total number of incoming transfer students. Percents are expressed in decimal form.

Table 2: Transfers of Low Income Students to Districts in Suburbs of Minneapolis, Before and after these Districts were Forced to Admit These Students

Name	(1) Incoming low-income students in 1999-2000 (main sample period, before districts were forced to admit them)	(2) Incoming low-income students from Minneapolis who attend in both 2001-02 and 2002-03
Richfield	46	23
Edina	28	49
St. Louis Park	23	24
Hopkins	35	22
Robbinsdale	150	104
Wayzata	17	31
Columbia Heights	31	32
St. Anthony	25	16

Sources: Column 1 is based on open enrollment transfer data provided by the Minnesota Department of Children, Families & Learning and Column 2 is based on data presented by Palmer (2003).

Table 3: The Demand for Transfer Spaces: Regressions Revealing the Predictive Power of Individual Types of Explanatory Variables

	Coefficients			R-squared	% of Variation in Demand Not Explained by Structural Control Variables That Is Explained by Each Model
	Within District	Average of district's neighbors	Minimum of district's neighbors		
1. Median income	.290	.046	-.327	.456	3.9%
	(.106)	(.121)	(.111)		
2. Median house value	.229	-.013	-.153	.447	2.3%
	(.089)	(.123)	(.114)		
3. Average test score	.163	.095	-.245	.464	5.3%
	(.053)	(.158)	(.086)		
4. Average Math test score	.180	.067	-.253	.467	5.8%
	(.053)	(.154)	(.087)		
5. Average Reading test score	.135	.110	-.218	.457	4.1%
	(.053)	(.154)	(.083)		
6. % of Residents with B.A. or more	.034	.054	-.149	.440	1.1%
	(.091)	(.090)	(.081)		
7. % of Residents w/o High School Diploma	-.181	.015	-.086	.449	2.7%
	(.076)	(.110)	(.115)		
8. Per pupil Expenditures	.017	.030	-.031	.435	0.2%
	(.059)	(.060)	(.056)		
9. Local per pupil Revenue	-.021	.181	-.234	.457	4.1%
	(.061)	(.070)	(.068)		

Notes to Table 3: Each row represents a separate regression, with the same 329 districts in the sample. All independent variables listed above have been converted to Z-scores. Independent variables also include the district-level structural control variables in Equation 1: the natural log of the number of households, the natural log of the population density, the percent of public school students enrolled in elementary grades, and the percent of public school students enrolled in middle school grades.

Table 4: The Demand for Transfer Spaces: Full Regression Model

Independent Variable	Coefficient
Log(# of Households)	0.021
	(0.084)
Log(Population Density)	0.530
	(0.077)
% of Students in Elementary Grades	-1.372
	(0.642)
% of Students in Middle School Grades	-2.127
	(1.042)
Average Student Test Score	0.216
	(0.067)
Neighbors' Mean: Avg. Student Test Score	0.081
	(0.219)
Neighbors' Minimum: Avg. Student Test Score	-0.235
	(0.112)
Average House Value	0.107
	(0.146)
Neighbors' Mean: Average House Value	-0.310
	(0.212)
Neighbors' Minimum: Average House Value	0.379
	(0.163)
Median Income	0.146
	(0.187)
Neighbors' Mean: Median Income	-0.085
	(0.236)
Neighbors' Minimum: Median Income	-0.422
	(0.160)
% of Adults who are high school dropouts	-0.168
	(0.096)
Neighbors' Mean: % of adults who are high school dropouts	-0.072
	(0.143)
Neighbors' Minimum: % of adults who are high school dropouts	-0.158
	(0.122)
% of Adults with Bachelor's Degree	-0.227
	(0.122)
Neighbors' Mean: % of Adults with Bachelor's Degree	-0.180
	(0.135)
Neighbors' Minimum: % of Adults with Bachelor's Degree	0.026
	(0.092)
Public School Operating Expenditures per Pupil	0.150
	(0.068)
Neighbors' Mean: Public School Operating Expenditures per Pupil	-0.166
	(0.089)
Neighbors' Minimum: Public School Expenditures per Pupil	0.002
	(0.057)
Locally-funded Public School Expenditures per Pupil	-0.142
	(0.073)
Neighbors' Mean: Locally- funded Public School Expenditures per Pupil	0.301
	(0.104)
Neighbors' Minimum: Locally-funded Public School Expenditures per Pupil	-0.192
	(0.088)
Constant Term	10.703
	(1.479)

Notes to Table 4: Estimates are based on a district-level regression containing 329 observations. The R-squared of the regression equals .538. Robust standard errors are in parentheses.

Table 5: The Percent of Districts Rejecting Any Transfer Applicants, Sorted by Transfer Demand, Capacity Levels, and whether Test Scores Far Exceeded those of a Neighboring District

	(1)	(2)			(3)		
	All Districts	Districts *with* Historically High Enrollments			Districts *Below* Historically High Enrollment Level		
District Transfer Demand Ratio		(2a) Overall	(2b) with test scores at least 1 S.D. larger than a neighboring district	(2c) without test scores at least 1 S.D. larger than a neighboring district	(3a) Overall	(3b) with test scores at least 1 S.D. larger than a neighboring district	(3c) without test scores at least 1 S.D. larger than a neighboring district
0 - 1.79%	16%	17%	38%**	0%**	16%	14%	17%
	(N=55)	(N=12)	*(N=5)*	*(N=7)*	(N=43)	(N=7)	(N=36)
1.8% - 3.13%	9%	27%*	60%**	0%**	5%*	17%*	0%*
	(N=55)	(N=11)	(N=5)	(N=6)	(N=44)	(N=14)	(N=30)
3.14% - 4.6%	4%	17%	---	17%	2%	7%	0%
	(N=55)	(N=6)	(N=0)	(N=6)	(N=49)	(N=15)	(N=34)
4.7% - 7.53%	4%	0%	0%	0%	4%	18%**	0%**
	(N=55)	(N=10)	(N=4)	(N=6)	(N=45)	(N=13)	(N=32)
7.54% - 12.5%	9%	17%	33%	0%	8%	50%*	3%*
	(N=55)	(N=6)	(N=3)	(N=3)	(N=49)	(N=9)	(N=40)
12.6 % and up	6%	0%	0%	0%	6%	23%**	3%**
	(N=54)	(N=7)	(N=4)	(N=3)	(N=47)	(N=11)	(N=36)
All ranges	8%	13%	28%**	3%**	7%	19%**	4%**
	(N=329)	(N=52)	(N=21)	(N=31)	(N=277)	(N=69)	(N=208)

Notes to Table 5: The district Transfer Demand Ratio equals the number of incoming transfer students plus the number of rejected transfer applicants, divided by the number of residential students in the district. Sample sizes are listed in parentheses below each percentage. Asterisks indicate that one can reject the null hypothesis of equal rejection rates in a one-tailed test predicting greater rejection rates for the high enrollment or high test score group, (* for .10 level; ** for .05 level), where the relevant tests are whether the rates in column (2a) exceed those in column (3a), in column (2b) exceed those in column (2c), or in column (3b) exceed those in column (3c).