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ABSTRACT

This study identified the capitalization effects of public school choice programs, using data on an inter-district, open enrollment program in Minnesota. The study examined changes in property tax bases in Minnesota as a result of the shift from local monopolies of public schooling to open enrollment. It investigated the effect of transferring patterns in the first school year of statewide open enrollment (1990-91) on changes in property tax bases between 1989-90 and 1996-97. Data came from the Minnesota Department of Families, Children, and Learning's "School District Profiles," district level student transferring data, and the 1990 School District Databook based on the 1990 Census. Results indicated that property tax bases declined in desirable districts that accepted transfer students, while property tax bases increased in districts where students were able to transfer to preferred districts. The capitalization effects were of sufficient magnitude that a district losing students because of transferring did not actually lose much financially, or may have even had a moderate gain, as a result of school choice. The converse was true for districts gaining transfer students. (Contains 21 references.) (SM)

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Capitalization under School Choice Programs: Are the Winners Really the Losers?

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This paper examines the capitalization effects of public school choice programs. Under an inter-district open enrollment program, one would expect changes in local property values caused by the weakening of local monopolies for the provision of free schooling. Using data from Minnesota, I find that property tax bases decline in desirable districts that accept transfer students, whereas property tax bases increase in districts where students are able to transfer to preferred districts. The capitalization effects are of sufficient magnitude that a district losing students because of transferring may not actually lose much financially, or may even have a moderate gain, as a result of school choice. The converse is true for a district gaining transfer students. These effects may undermine attempts to use a school choice program as a means of financially punishing or rewarding districts based on preexisting differences in popularity.

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"Most real estate agents and builders must be generally conversant with school districts' reputations and what types of programs are offered by which one.... A particular district in Minnesota doesn't have to be the deciding factor on choosing a home, however. Minnesota is nationally known for its open-enrollment program, wherein students may apply to attend schools in districts outside of their home district anywhere in the state."

- Ingrid Sundstrom, *Minneapolis-St. Paul Star Tribune*, February 5, 1994.

1. Introduction

Much of the debate over school choice revolves around two points of contention: (1) whether increased competition improves the productivity of public schools and (2) whether the re-distribution of students under expanded choice helps or hurts students. However, another important issue that has received less attention is how school choice affects residential mobility and property values. If the adoption of a school choice program affects property values, it changes homeowners' wealth and alters the local tax base of school districts.

The literature on local public finance implies that school choice may have a significant effect on the demand for housing. Under a Tiebout (1956) model in which the value of housing is based on the quality of local public goods and on the local tax burden, one would expect changes in local property values caused by the weakening of local monopolies for the provision of free schooling. Though access to schools of various quality plays a critical role in Tiebout sorting, there has previously been no empirical investigation of the actual effects of school choice programs on property values.

This paper identifies the capitalization effects of one such program, inter-district open enrollment in Minnesota. The findings strongly support the idea that the establishment of a school choice program can directly influence a school district's property tax base. Since the adoption of inter-district open enrollment weakens the link between local school quality and property values, tax bases depreciate in relatively popular school districts and appreciate in relatively unpopular districts. In fact, the magnitude of these capitalization effects are sufficiently large that, even though state aid follows the transfer students, districts that (lose/gain) a moderate number of transfer students may not experience any

financial (loss/gain). As a result, the adoption of a school choice program may not marginally punish or reward districts based on preexisting differences in popularity, thus removing one of the potential links between school choice programs and increased accountability.

Section 2 describes the related literature and Section 3 provides background concerning the specific choice program examined in this paper, inter-district open enrollment in Minnesota. Section 4 discusses the theoretical predictions that the adoption of open enrollment should cause relatively popular school districts' tax bases to depreciate and relatively unpopular school districts' tax bases to appreciate. Next, Section 5 empirically tests these predictions. The findings support these predictions, are robust to potential endogeneity issues, and are further strengthened when the sample is restricted to districts that would likely be most affected by the policy change. Section 6 discusses the implications of these findings and their applicability to other school choice programs.

2. Related Literature

Oates (1969) and others (e.g., Downes & Zabel, 2002; Figlio & Lucas, 2000; Black, 1999; Bogart & Cromwell, 1997) find evidence that, holding the local tax burden constant, property values are positively related to measures of the quality of available public schooling. However, many theoretical models that simulate consequences of expanding school choice omit potential capitalization effects. Epple & Romano (1998) and Manski (1992) do not consider residential migration and the endogeneity of public school funding when examining the effects of private school vouchers on public school quality and composition. Unlike these models, Nechyba (1996, 2000) incorporates the Tiebout model into simulations of the effects of vouchers by allowing for migration across school districts, changes in the local tax base through changes in housing prices, and changes in the local tax rates due to shifts in the median voter. Under Nechyba's model, (which also incorporates perceived peer effects on the quality of schooling), a private school voucher program "increases school-based stratification while it decreases residential stratification (1996, p. 31)." This decrease in residential stratification is due to individuals moving into less expensive communities and sending their children to private schools. Property values in

these communities increase, leading to a greater local tax base and higher per pupil spending in the local public schools.

Homeowners may already be quite aware of the potential capitalization effects of a school choice program. In states with inter-district public school choice programs, there is anecdotal evidence of real estate agents citing the qualities of neighboring school districts, rather than giving their more traditional sales pitch that the local schools are good. In addition, a recent study by Brunner, Sonstelie, and Thayer (2001) finds a positive correlation between the percentage of people voting against a private school voucher initiative and housing price premiums related to the quality of public education in their precinct. This relationship may indeed result from homeowners' recognition that the housing premium associated with the quality of the local public schools will diminish as school choice options are introduced.

This paper uses data from Minnesota's inter-district open enrollment program to test predictions concerning the actual capitalization effects from the adoption of a school choice program. Property values should rise in districts in which the schooling market is strengthened by additional schooling options. Property values should fall in districts that offer regionally popular public schools, because neighbors can now attend those schools without paying a premium to live in these popular districts. After a brief description of Minnesota's program, I discuss these predictions more thoroughly.

3. Open enrollment in Minnesota

Minnesota currently has the oldest inter-district open enrollment program, in which students may transfer from their residential school district to another public school district. The Minnesota Enrollment Options Program (Minn. Statute 120.062) began in the 1987-88 school year on a voluntary basis for school districts. This meant that districts could decide whether or not to take students or allow them to leave. Transferring students were required to provide their own transportation beyond the border of their new district, and the new district could provide transportation from there to the school. When a student transfers, the losing district loses an amount equal to its own non-compensatory state aid per student, while the receiving district gains an amount equal to *its* non-compensatory state aid per pupil. In 1997-

98, non-compensatory state aid was close to $3,000 per pupil for all districts, varying by a few hundred dollars per pupil. Thus, the change in total state aid for a district as a result of open enrollment would be roughly equal to $3,000 times the net change in enrollment. Note that since average spending per pupil exceeds $3,000 in all districts, per pupil revenue falls in districts that have net gains in transfer students, holding local revenues constant. However, in most cases, the marginal cost of serving a few more or a few less students is likely to be much less than $3,000 per student.[1]

In 1990-91, the program became mandatory, meaning that districts could no longer prevent students from leaving. However, districts can still limit the number of students that they take in based on their capacity.[2] In recent years, about 10% of districts rejected any transfer applications.[3] The districts are not supposed to engage in discriminatory admissions; if more students would like to enter the district than are allowed to, students are randomly selected for the available spaces. Besides the district's own limit on the number of students it chooses to take, the only way in which a student may be prevented from transferring is if there are certain unfavorable desegregation consequences. The state education agency may prevent white students from transferring out of districts that have high percentages of minorities, particularly the urban districts of Minneapolis and St. Paul. Recent changes in the open enrollment program include subsidization of transportation for students with need and permission for districts to cross their borders to provide transportation.

Participation in open enrollment has increased considerably. In 1990-91, the first mandatory year, about 1.5 percent[4] of students transferred. This increased to 4.6 percent by the 1997-98 school year.

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[1] According to Ysseldyke, Lange, & Gorney (1994), only about five percent of 1990-91 open enrollment transfer students were students with disabilities. This percentage is relatively low; during the same year, roughly 11% of all Minnesota public students were classified as special education students. Transfer students with disabilities are not necessarily associated with high marginal costs for the receiving district, since the residential district may be forced to finance the students' needs, such as special transportation arrangements (Lange, Yssekdyke, & Delaney, 1995).

[2] The reason for the rejection may be a general lack of space in the schools, or a lack of space at the specific grade of a transfer applicant.

[3] Unfortunately, the state agency does not maintain records of open enrollment applications. However, the agency did conduct a survey of all districts for the 1999-2000 school year. 304 districts reported that they did not reject any incoming transfer applications, 35 reported that they rejected at least one application, and 6 districts did not respond.

[4] Due to the lack of availability of actual student transfer counts, percentages of students transferring are measured in pupil units throughout this paper. Pupil units are used for state funding purposes, so these measures are ideal for

The average percentage of transfer students was higher than this, because some of the larger districts had relatively low rates of transferring. In 1990-91, the average fraction of students transferring out of a district was 1.9 percent and by 1997-98 it had risen to about 7 percent. Initial rates of student entrance are significantly correlated with future rates of student entrance, while no such relationship holds for student exit rates. Specifically, there is a .35 correlation between incoming transfer rates in 1990-91 and the change in incoming transfer rates between 1990-91 and 1997-98. This indicates that districts that gained students early in the program were likely to gain more students over the next seven years of the program. Trends in the relative characteristics of "big gaining" and "big losing" districts are presented in Table 1. These high impact districts tend to be smaller than others, both in terms of population and tax base. Along other dimensions, the high impact districts are fairly similar to the others.

4. Theoretical Framework

The model is a simplified version of Nechyba's (1996) model. For simplicity, I assume that all agents have one child. Let m_i be the residential community of agent i, h_i be the house type of agent i, s_i be the perceived quality of schooling received by the child of agent i, and c_i be the private good consumption of agent i. All agents maximize the utility function, $u_i(m_i,h_i,s_i,c_i)$,[5] which I assume to be increasing in s_i and c_i. Throughout this discussion, "school quality" is used in the loosest sense. School quality refers to any aspect of the school that might make a child's enrollment valuable, including the potential academic gains made by students, as well as the school's location, athletic programs, art programs, etc.

Consider all agents who initially send their child to public school. For these agents, prior to open enrollment, s simply equals the quality of the local public school district, which I call s_{ir}. Now allow for open enrollment, in which students may be able to transfer to a public school outside of their residential

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computing the direct financial impact of student exiting or entering. In 1990-91, a kindergarten student counted for .5 pupil units, a 1st-6th grader counted for 1 pupil unit, a 7-12th grader counted for 1.35 pupil units, and a pre-kindergarten, handicapped student counted for 1 pupil unit. In 1997-98, those weightings were .53, 1.06, 1.3, and 1 respectively.

[5] Nechyba (1996) provides a straightforward derivation of this reduced form function from an individual's maximization of her utility as a function of her consumption, her leisure, and her child's educational attainment.

district. The value of s_i is a function of both the local public schools and nearby public schools, subject to access to and availability of transfer spaces in these schools. Let s_{ij} be agent i's perceived "quality" of the jth school district other than the agent's residential district, where j=1 to n. With open enrollment, s_i= $E[\max(s_{ir}, a_{i1}s_{i1}, a_{i2}s_{i2}, ..., a_{in}s_{in})]$, where $a_{ij} \in [0,1]$ represents agent i's discounting factor to account for the convenience and availability of transfer spaces in the jth school district. For the time being, I ignore endogeneous changes in school quality resulting from open enrollment.

The utility derived from living in a community where there is access to neighboring districts' schools of superior perceived quality to the local schools is now greater. For agents residing in these communities, $s_i > s_{ir}$, so $u_i(m_i,h_i,s_i,c_i)$ increases. The utility derived from living in a community where the local public schools have higher perceived quality than nearby districts' schools does not increase under open enrollment. For agents in these communities, $s_i = s_{ir}$, so the level of utility remains unchanged (assuming that s_r remains unchanged under open enrollment, which will be relaxed later). On the other hand, the utility that these agents could derive from living in some of the other districts has increased, because they may reside in those districts, but transfer their child to a better school. These changes in relative valuations will serve to change the market prices of housing in school districts. Some agents may choose to relocate as a direct result of their new valuations. For example, they may move into a less expensive community and send their children as transfer students back to their original, more desirable public school. These arguments may be extended to agents who initially send their children to private schools[6]; they too will have new valuations and might alter their behavior as a result.

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[6] An agent t who chooses to send her child to private school has chosen a residence such that $u_t(m_t,h_t,s_t,c_t)$ is maximized. Here $u_t = u_t(m_t, h_t, s_p, c - \tau)$, where s_p is the perceived quality of the private school and c is reduced by τ, the cost of private school tuition. After public school choice is introduced, agent t may change her residence and/or where she sends her child to school. She could decide to: (1) remain in the same residence but remove her child from private school and transfer the child to a non-residential public school, (2) relocate to a new district and transfer the child to another district, or (3) relocate to a new district and send the child to either the local public school or a private school. Changes in public school options and the market price of residences as a result of choice will affect whether the agent takes any of these actions. In any case, agent t will either have the same relative valuations for housing as before (if sending her child to private school remains optimal), or she will have changes in relative valuations similar to agents who initially sent their child to public school.

One would expect initial student transferring patterns under open enrollment to correspond directly with the changes in property values due to open enrollment. A high fraction of students transferring *out of* a district is an indication that residents may now take advantage of preferred schooling options in nearby districts. Some people will thus have increased valuations of residing in that district. As a result, one would expect housing values in that district to increase. A high fraction of students transferring *into* a district is an indication that parents in nearby districts are taking advantage of the higher "quality" of this district. This means that the value of residing in nearby districts has increased, causing less demand to live in this district and thus a negative effect on housing values. Put more simply, housing in a popular school district becomes less valuable when residents no longer have the exclusive right to attend the local schools.

5. Empirical methods

The approach of this paper is to look at changes in property tax bases in Minnesota as a result of a regime change, the shift from local monopolies of public schooling to open enrollment. As in other event studies, one would ideally examine trends from shortly before the program was anticipated until a time when most of the impact of the program's adoption would be realized. Unfortunately, due to a change in measurement practices, district property values prior to the partial adoption of the program are not directly comparable to future values. As a result, the main analysis in this paper focuses on changes in property values between 1990 (one year before the program was fully adopted) and 1997 (six years after the program was fully adopted).[7] However, further analyses will be done to ensure that these results are not driven by the persistence of trends prior to the adoption of the program in 1986. The evidence suggests that examining changes in property values between 1990 and 1997 will produce lower bound estimates for the impact of the adoption of open enrollment on district's property tax bases.

[7] The magnitudes of the results remain similar when the sample period is extended to 2000, indicating that most of the capitalization effects occurred by 1997. Using 1997 as the end of the sample period allows for a more extensive set of control variables.

For the main analysis, I examine the effect of transferring patterns in the first school year of statewide open enrollment (1990-91) on changes in property tax bases between 1989-90 and 1996-97. The data used here is at the district level and combines data from the Minnesota Department of Families, Children, and Learning's *School District Profiles* for the 1990-91 and 1997-98 school years,[8] district-level student transferring data provided by that agency for the 1990-91 and 1996-97 school years, and the 1990 School District Databook based on the 1990 Census.

The property value data used for the dependent variable are perfect for measuring the impact of the adoption of open enrollment on school districts' revenues. Property tax bases are computed by multiplying the "adjusted net tax capacity" per residential student times the number of residential students in the district. The adjusted net tax capacity captures changes in the values of residential and non-residential properties, as well as the construction of new properties. The adjusted net tax capacity also corrects for variation in local property assessment practices by multiplying reported values by a correction term based on the ratio of values determined by the local assessor to actual market sales occurring during the previous twenty-one months. Thus, the property tax base variable should precisely measure changes in a district's tax base resulting from changes in the market value of existing property and from the construction of new property. Though the tax base should be correlated with changes in the market values of individual homes, one may only make qualitative inferences concerning actual changes in the value of homes.[9]

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[8] For each year's *School District Profiles*, the property values are based on the year before. Thus, the 1990-91 and 1997-98 data give property values for 1989-90 and 1996-97 respectively.

[9] Longitudinal data on individual house prices in Minnesota are unavailable. The coefficients on student transferring in this paper will pick up changes in the number of properties and will include non-residential property. Therefore, they will not accurately predict the magnitude of the change in market value of an individual home. It is unclear whether these estimates understate or overstate the impact on individual homes. (See footnote 23 for a discussion of how this paper's estimates compare with rough predictions for changes in the value of existing homes based on the literature examining premiums related to higher perceived school quality.)

If the adoption of choice has even a small effect on the construction or abandonment of property, then this will have a large impact on the property tax bases and lead the estimates to overstate the impact on an existing home. On the other hand, the adoption of choice is likely to have a much smaller effect on non-residential property than on residential property. Non-residential property values are related to proximity to certain types of people and areas. It is unlikely that the first five or so years of open enrollment would cause substantial shifts in the *area* of residence chosen by individuals. In other words, while people might move across neighboring districts due to open

Actual transfer rates are ideal measures of people's appreciation of the transfer opportunities offered by the school choice program. Measures of school quality such as test scores, pupil-teacher ratios, or per pupil spending would not pick up whether residents are actually willing and able to transfer their children to another district. Furthermore, unlike these other measures, actual transfer rates capture competition that may occur when districts specialize in certain areas. Transfer rates pick up every possible component of the broad definition of school quality given in Section 4. As one would expect, students are more likely to transfer to districts with higher mean district test scores than their residential district.[10] As described in Section 5.5, additional analyses reveal that the magnitude of the capitalization effect associated with the initial transfer rate is related to other important factors, such as differences in achievement levels across districts or the fraction of a district's population that is composed of school-age children.

Since the dependent variable captures changes in tax bases occurring after the initial transferring, initial transfer rates will be exogenous, unless there is persistence in property growth trends. If trends in property growth prior to the adoption of open enrollment persist, then the coefficients of the initial transfer rates may be biased. The reason for this bias is that initial transfer rates reflect the minimum of the supply and demand for transfer spaces, and the supply or the demand for transfer spaces may be related to previous trends in property growth. There are several potential reasons why the supply or demand may be related to previous trends in property growth. For example, districts with declining property tax bases and possibly declining enrollment would be likely to have relatively low marginal cost of admitting transfer students. Thus, districts with low property growth may be more willing to admit

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enrollment, it is unlikely that many people move to a new region because of the expansion of the schooling market in that region. The relatively small impact on nonresidential property values would cause these estimates to understate the impact of the adoption of choice on the value of an individual home.

[10] Beginning with the 1998-99 school year, statewide district-level mean Reading and Math test scores are available separately for third grade, fifth grade, and eight grade exams. Tenth grade mean Writing scores are also available. For all seven of these exams, on average, a 1990-91 transfer student's new district had a slightly higher 1998-99 mean score than the student's residential district. Though it is impossible to know whether open enrollment itself affected these mean scores, this provides reassuring evidence that this paper's results are not due to some bizarre phenomenon in which students transfer to schools with lower average achievement than their residential schools.

transfer students.[11] Another possibility is that schools in districts with increasing property tax bases are becoming more popular, so that there is greater demand to transfer into these districts. The best way to address these possibilities is to simply control for previous trends in property value growth.[12] Section 5.3 below controls for previous trends in property growth and this analysis suggests that this potential endogeneity does *not* lead one to overestimate the capitalization effects of choice.

There are two reasons why I focus on initial transfer rates rather than transferring between 1991 and 1997. First, using initial rates allows one to examine the effects of choice on assessed property values six years later. This period is sufficiently long for market transactions and property assessments to occur so that the observed dependent variable, the assessed value of housing, actually reflects the changes in the market values of property (see footnote 7). Second, changes in transfer rates between 1991 and 1997 are influenced by changes in actual or perceived school quality over the sample period. Some of these changes in perceived quality may be the direct result of open enrollment. For example, transferring patterns may provide signals of school quality, so that parents of students who did not transfer reevaluate their perceptions of schools. However, some changes in perceived school quality may simply be due to secular trends. Districts that lose students to choice may be declining in quality so that their property values decline, while districts that gain transfer students are becoming more popular and have rising

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[11] In Minnesota, a decline in property values would not increase the award for admitting transfer students, since it is compensatory state aid that is negatively correlated with tax base, whereas the award for admitting a transfer student is non-compensatory state aid per pupil.

[12] In response to an earlier version of this paper, Bettinger & Bogart (2001) argue that one should instrument for the availability of desirable transfer spaces. They use an instrumental variables technique to examine capitalization effects of inter-district open enrollment in Michigan. Excess capacity measures and district-level test score comparisons serve as instruments for actual incoming and outgoing transfer rates. Though similar data is available for Minnesota, I argue that this instrumental variables approach is problematic for two reasons. First, the instruments are not valid. The excess capacity measure is a district's maximum enrollment over a given time period minus the current enrollment, so that this measure is positively correlated with enrollment variation within the district. Districts that recently enjoyed increased popularity would likely experience both rising enrollment and rising property values, so that there is a spurious correlation between the excess capacity measure and property value trends. Second, to the extent that the instruments are weak, one will inevitably underestimate the capitalization effects of choice. The instruments are based on the assumption that test scores affect the demand, but not the supply, for transfer spaces. However, one would not expect property values to increase in District X, if District X is surrounded by higher achieving districts that refuse to admit students due to potential, negative peer effects. The instrumental variables would predict high exiting from District X, yet this exiting would not occur and property values would not increase. For these two reasons, I argue that one should not use an instrument, but instead should include actual transfer rates and attempt to control for potential endogeneity (see Section 5.3 for further discussion).

property values. The effects of these quality changes due to secular trends should be in the opposite direction of the overall impact of the adoption of choice. Though transfer rates between 1991 and 1997 do not provide valid estimates of the capitalization effects of the adoption of school choice, I include them as control variables in some models in order to test whether the results are robust to changes in the perceived quality of schooling over the sample period.

A complication of this paper's analysis is that a significant fraction of districts merged or dissolved over the seven year period. Of the 390 districts in existence in both 1989-90 and 1990-91,[13] twenty-seven percent merged or dissolved by 1997-1998, leaving only 285 districts with the same boundaries during this time span. When districts merge, they are entirely lost from the sample.[14] After running models on the restricted sample of surviving school districts, I discuss this sample selection issue further and test whether it leads to biased estimates. The findings suggest that sample selection does not change the qualitative results, and, if anything, leads one to underestimate the true impact of school choice on capitalization.

5.1. Regression Framework

The regression model here uses the percentage change in a district's property tax base between 1989-90 and 1996-97 as the dependent variable. Call this variable %PROPΔ. The baseline model is:

$$\%PROP\Delta_i = \beta_0 + \beta_1(\%IN91_i) + \beta_2(\%OUT91_i) + \beta_3(NONE\_IN91_i) + X_i\beta_4 + \varepsilon_i. \qquad (1)$$

$\%IN91_i$ and $\%OUT91_i$ are the independent variables of most interest. $\%IN91_i$ equals the number of students who transfer into district i in 1990-91 divided by the residential student population. Similarly, $\%OUT91_i$ equals the number of students who transfer from district i to another district in 1990-91 divided by the residential student population. The denominator for both of these variables includes all residential students, so it is equal to the number of students who live in the district and attend school there plus the

[13] The district must have existed in both 1989-90 and 1990-91 in order to provide data on both 1989-90 property values and on 1990-91 student transfer rates. In addition, the Census data only presents 1989-90 data for districts that still existed in 1990-91.

number of students who live in the district and transfer to another public school district. Due to data limitations, the transfer rates in this analysis are based on pupil units, rather than numbers of students (see footnote 4).

X_i is a vector of other control variables from the baseline year that capture characteristics of district i's housing and residents. Table 2 provides definitions for these variables and Table 3 provides their summary statistics. $NONE\_IN91_i$ is a dummy variable set to one if district i had no incoming transfer students in 1990-91. This controls for the fact that some people may not have been fully aware of their right to transfer in 1990-91 and transfer rates of zero are probably related to the district's initial unwillingness to admit students when program participation was voluntary. Districts' reluctance to participate may be an indicator of relatively strong schools and is also related to attrition from the sample due to district mergers.

Columns A through D of Table 4 shows the results of Huber-White heteroskedasticity-consistent OLS regressions of various forms of the model above.[15] For ease of interpretation, all continuous variables that are not 'percents' are in log-form. Thus, the coefficients on these continuous variables should be interpreted as the change in the property growth rate associated with a one percent change in the independent variable. The coefficients on $\%IN91_i$ and $\%OUT91_i$ reflect the change in the property growth rate associated with a one *percentage point* change in the transfer rate. The estimated coefficient of $\%IN91_i$ ranges from -1.31 to -1.58 in these models, suggesting that a one percentage point change in the incoming transfer rate is associated with a decline in property values of at least 1.31%. The estimated coefficient of $\%OUT91_i$ ranges from 1.59 to 2.93, suggesting that a one percentage point change in the outgoing transfer rate is associated with an increase in property values of at least 1.59%. These statistically significant results support the predictions of section 4.

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[14] The new district cannot be used because the initial transfer rates of the original districts are no longer interpretable.

[15] Using various combinations of independent variables and testing for the robustness of the results may be important here. Atkinson and Crocker (1987) describe how collinearity issues often plague hedonic property value regressions. It is possible that property growth regressions could also suffer from this problem.

In order to support this claim further and to understand how closely the estimates represent the true effect of the choice program on property values, one must control for potential sources of endogeneity. There are three potential sources of endogeneity in this analysis: (1) changes in the perceived quality of schooling after the adoption of the school choice program, (2) persistence of property growth trends, and (3) sample selection.[16] The next three subsections address these endogeneity issues, and then Section 5.5 examines which types of districts are most affected by the policy change.

5.2. Controlling for Changes in School Quality

Although initial transfer rates continue to be the key independent variables of interest, including future transfer rates should produce better estimates of the true effect of expanded schooling options on capitalization. As mentioned in Section 3, these future rates are much higher than the initial rates, and the initial rate of incoming transfer students is significantly, positively correlated with the future rate of incoming transfer students. Including these future transfer rates will eliminate possible biases caused by the correlation of initial transferring with future transferring and will partially control for changes in the perceived quality of schooling that occur over the sample period. ($\%IN98_i$ -$\%IN91_i$) and ($\%OUT98_i$ - $\%OUT91_i$) are the changes in the percentages of incoming and outgoing transfer students between the 1990-91 and 1997-98 school years. To also control for the effects of changes in student composition on perceived school quality, I include %POVΔ, a proxy for the change in the poverty rates of students between 1990-91 and 1997-98 (see Tables 2 and 3 respectively for formal definitions and descriptive statistics).

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[16] A fourth potential source of endogeneity would be movements in property values caused by changes in the preferences of the median voter. In basic models of the provision of local public goods, the median voter determines the local tax rate. Under a school choice program in which transfer funds are independent of the local tax rate, parents of exiting transfer students may care less about the local schools than they did previously or than did previous residents. Within the context of this paper's model, consumption is a function based on disposable income and thus negatively correlated with local tax rates. Thus, individuals' valuation of housing increases if the local tax rate declines, ceteris paribus.

In actuality, average changes in districts' tax rates are not significantly related to transferring patterns. Even if they were, this relationship should not systematically affect property values. In any district, capitalization effects will be internalized into residents' decisions concerning the optimal tax rate. How effectively a district's residents adjust the tax rate to maximize property values should be independent of the open enrollment transfer rates for that

Column E of Table 4 presents estimates for the new model, which includes these measures of later transferring and changes in student composition. The estimated coefficient on $\%IN91_i$ decreases to −1.18. This is consistent with the hypothesis that some of the negative correlation between incoming transfer rates and changes in property values is caused by mutual correlation with future transferring rates. Increases in the poverty rates of students are associated with decreases in total property values. A one percentage point increase in *future* incoming transfers is associated with a .25 percent decrease in total property values. This effect may be extremely important in magnitude, as future transferring rates are much larger than initial transfer rates (see Table 3). The actual direct effect of future transferring opportunities on property values is probably even larger, because increases in incoming transfers may be positively correlated with increases in perceived school quality that raise property values.

The estimated coefficient on $\%OUT91_i$ in Column E is similar to the other model's estimates. Future exiting is not significantly correlated with property growth, possibly because the direct, positive effect of the student exit opportunities is cancelled out by the correlation of student exiting with declines in the perceived quality of schooling. In summary, the positive correlation of future transfer rates with changes in perceived school quality prevent one from observing the direct effect of future transfer opportunities, but these future transfer rates serve as valuable controls for changes in perceived school quality during the sample period.

5.3. Controlling for the Persistence of Property Growth Trends

If trends in districts' property value growth prior to open enrollment persist after the adoption of open enrollment, then a correlation between previous property growth and initial transfer rates causes the initial transfer rate coefficients to be biased. To test whether this endogeneity issue actually exists, I examine changes in property values prior to the adoption of open enrollment. Unfortunately, comparable district-level property value measures are not available for these years. However, county-level property measures are available and growth in county property values serves as a good proxy for growth in district

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district. Thus, one need not worry about capitalization effects of tax changes biasing the observed relationship between transfer rates and capitalization.

property values. There are 82 counties in Minnesota as compared to the 282 districts of interest. The correlation between district and county changes in property values between 1990 and 1997 is .45.

The first test to determine whether the transfer rates are endogenous is to check whether property value growth trends persist. The evidence points towards a moderate persistence of these trends. The correlation between the percentage growth in county property levels between 1981 and 1987 and the percentage growth in county property levels between 1990 and 1997 is .299. The correlation between county property growth over the earlier period and district property growth between 1990 and 1997 is .053.[17] Thus, if demand and supply decisions concerning transferring in the 1990-91 school year are related to prior property value growth, there is evidence that these decisions may be related to future property value growth.

The next step in investigating this endogeneity issue is to check whether controlling for previous property growth trends alters the coefficients of the initial transfer rate variables. Table 5 adds the county-level 1981 to 1987 property growth as a control variable to the regression of the baseline variables on the district level property growth between 1991 and 1996 (similar to model D of Table 4). This only controls for the countywide component of property growth trends and does not control for district-specific trends. The control therefore may omit some of the trends in the relative popularity of districts within counties. Though this is less than ideal, the control should be adequate for dealing with supply-side responses to property trends, since these potential responses are based on absolute factors (e.g., whether the tax-base is declining). The control accounts less for demand-side response, since these responses will be partially associated with changes in the relative popularity of districts compared to other districts within the same county. Nonetheless, adding the control is a useful way of determining whether the previous coefficient estimates are biased upwards in magnitude, since it is likely only the supply-side

[17] The weaker correlation with district-level growth is not surprising, given the contention of this paper that open enrollment affected district-level property values in the opposite direction of previous trends.

endogeneity that would cause this upward bias.[18] As seen in Table 5, adding the property trend control does not significantly change the estimates. The coefficient of the previous property growth variable is insignificant. Not only does this support the claim that previous estimates are not biased downward in magnitude, this is also consistent with the assertions of this paper that the adoption of open enrollment would unravel the connection between past and future property growth at the district level.

5.4. Controlling for Sample Selection

As mentioned earlier, twenty-seven percent of the districts are lost from the analysis due to district mergers. The reason for the high rate of merging includes, but is not limited to, the presence of open enrollment. Open enrollment may have put added pressures on districts with high rates of student exit. Other reasons for district mergers include the presence of academic pairing agreements that may eventually lead to full consolidation, one-time financial subsidies to merging districts, and a continuing trend of rural districts merging in order to deal with declining rates of enrollment. District merging certainly imposes non-random sample selection for the districts that existed in the first and last year of this analysis. In particular, districts that avoid merging despite high transfer student exit rates may possess unobserved qualities correlated with property growth. This paper uses three estimation methods to address the sample selection issue: (1) full maximum-likelihood estimation of a Heckman (1976) selection model, (2) estimation using two-stage methods considering more flexible functional forms for the correction of selectivity bias as suggested by Lee (1982), and (3) estimation using OLS for the subgroup of the sample that categorically excludes districts likely to merge.

5.4.1. Method 1

The first approach is to use maximum-likelihood estimation of a Heckman selection model to attempt to control for possible biases due to nonrandom sample attrition. The sole reason for sample attrition in this context is if a district merges. The probability that a district merges is related to district size and various district characteristics. The most telling indicator of whether a district merges is whether

[18] Demand-side endogeneity would likely bias the coefficients towards zero, because school district popularity may be positively related to property growth trends (i.e., incoming transfer rates are associated with an upward trend in

they previously had an academic pairing agreement with another district, an arrangement in which one district provides instruction for another district's students at some grade levels. Over two-thirds of all districts with pairing agreements in 1990-91 merged by 1997-98, and more than 70 percent of all districts that merged over this period had pairing agreements.

The first stage equation is the probability that a district remains in the sample (does not merge) across the years.[19] This selection equation contains all of the baseline variables from equation (1), because these variables may be associated with merger rates. In addition, a dummy variable for whether district i had an academic pairing agreement, (AC_PAIR_i), is included. This allows for identification based on more than functional form.[20] Since these agreements predate the existence of mandatory choice, this dummy is an instrument for merging that is unrelated to the adoption of choice. Furthermore, having an academic agreement in the baseline year is plausibly exogenous to the percentage change in total property values in the district. While there might be some association between having such an agreement and rates of change in property values, there is not likely to be a direct causal effect on these rates from having the agreement.

Table 6 shows estimates for both equations of the Heckman selection model. In addition, it indicates an estimate of ρ, the correlation between the two error terms. The statistically significant estimate of -.362 for ρ suggests that there is indeed a sample selection issue: districts likely to merge that

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property values).

[19] In other contexts, one might think of a conceptual difference between districts that "need" to merge and that are "induced" to merge. For example, if the state forced districts with certain qualities to merge with their struggling neighbors, then two types of selection equations would be appropriate. However, since mergers are voluntary, one selection equation will sufficiently characterize the incentive to merge for any district. Only one merger over this period resulted from a district dissolving and then becoming incorporated into two other districts. All other mergers were agreements between all participating districts.

[20] Aside from having a pairing agreement, I could not find any additional variables, (i.e., those not found in Model 1), that actually influenced the chances of merging. Though there were external financial incentives to encourage mergers, these incentives were not likely to be large enough to have differential effects on districts. In addition, I did not find a relationship between financial well-being and merging. According to one state official, the state education agency may encourage districts to merge if they have debts greater than 2 percent of their operational expenditures and do not have budget reserves. I created a dummy variable that identified the roughly 9 percent of all districts with this status in 1990-91. However, this variable did not have a statistically significant effect on the likelihood of merging; in fact, the coefficient actually suggested a decreased chance of merging. Overall, the greater desire for these districts to merge was probably negated by other districts' desire not to merge with them, leading to no observable relationship between financial well-being and merging.

do not actually merge have higher than expected rates of property growth. The estimated coefficients on $\%IN91_i$ and $\%OUT91_i$ are −1.26 and 1.68 respectively. These estimates are slightly larger than those in the most inclusive OLS model (column E of Table 4).

5.4.2. Method 2

The second approach is to make the sample correction term more general in order to determine whether the results of Table 6 are dependent on the assumption of normality of the selection equation. I use a correction procedure with a type of flexible functional form suggested by Lee (1982).[21] Table 7 contains the results of this second stage regression.[22] While one cannot strongly reject the assumption of normality in the selection equation, the actual distribution appears to be a bit skewed. Thus, this version may reduce the chance of biases due to slight misspecification of the model. The estimated coefficient of $\%IN91_i$ is −1.36 and the estimated coefficient of $\%OUT91_i$ is 1.76; both of these estimates are moderately larger in magnitude than the estimates from the Heckman model.

5.4.3. Method 3

The final empirical method considers that having an academic pairing agreement may not be fully exogenous to growth in total property values. One reason why previous estimates may be biased is if there are omitted variables that are correlated with both AC_PAIR_i and the independent variables. Another potential bias would be if the presence of an academic pairing agreement actually does influence the rate of property growth, by altering the perceived quality of schooling in some systematic way. In light of these issues, I now re-estimate the regression models of Table 4 using only districts that did not have these agreements in 1990-91. The sample selection issue among this subgroup is possibly less

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[21] This method consists of adding terms to the second stage regression which are based on the conditional expectation of the second stage regression's error term given the selection equation's error term assuming a Type AA distribution. As Lee reports, this type of distribution has been shown to provide a good fit for regression curves with skewness and kurtosis. The second stage regression here includes the inverse Mill's ratio (referred to as $g_1(x)$) and two higher order terms based on the Type AA distribution: $g_2(x)$ and $g_3(x)$, where:

$$g_2(x) = -x\phi(-x)/(2\Phi(-x)),$$

$$g_3(x) = ((1-x^2)\phi(-x)) / (6\Phi(-x)),$$

and x is the estimate of the likelihood of staying in the sample (not merging).

[22] The standards errors of these estimates are incorrect. Though they have been corrected for heteroskedasticity in the second stage equation, they have not been corrected for heteroskedasticity in the selection equation.

severe, because the merger rate (11%) is much lower. At the same time, this procedure removes districts that were most likely to merge, but for some unobserved reason, did not. Regression results for the districts without agreements in 1990-91 are displayed in Table 8. These results show estimates of the coefficients on $\%IN91_i$ and $\%OUT91_i$ that are greater in magnitude than in the full sample OLS models (Table 4) and are at least as large as the other sample selection models' estimates. Overall, sample selection does not qualitatively change the results and, if anything, appears to bias these coefficients downward in magnitude.

5.5 Are Capitalization Effects Related to Test Scores, Residential Composition, or Geographic Location?

Further support for the theory presented in Section 4 may be found by examining how these coefficients change when one examines districts likely to be most affected by the policy change. In particular, one would expect exiting transfer opportunities to be more valuable for districts with lower student achievement levels than neighboring districts and for districts composed of a large fraction of school-age children. This section investigates these predictions, and also tests whether capitalization effects vary between rural and non-rural areas.

First, consider a district with lower student achievement levels than neighboring districts. The value of a transfer opportunity for residents in this district may be particularly large, so that exiting from this district is associated with large increases in property values. Conversely, a district with higher achievement levels than the neighboring districts may have had large house premiums associated with school quality, so that open enrollment causes a sharp decline in property values in this district. In order to test these predictions, I divide the sample into two groups based on whether a district's achievement level is less than or greater than the achievement level of the neighboring school districts. For each district, I derive an index of student achievement based on principle components analysis of seven annual test score measures across four years (see footnote i of Table 9 for details concerning this index of student achievement.) The initial transfer rate coefficients from the split sample regressions, analogous to Model E of Table 4, are presented in the first two columns of Table 9. As expected, the effect of open enrollment exiting is much greater for districts with lower achievement levels than the neighboring

districts. In fact, exit opportunities only affect tax base growth for districts with lower achievement than their neighbors. The entry rate coefficients are also in line with these predictions: the capitalization effect associated with incoming transfer students is more than twice as large when a district's students outperform neighboring districts' students. This evidence bolsters the claim that the initial transfer rate coefficients are capturing capitalization effects caused by the decline of housing premiums related to the perceived value of sending a child to public schools within a district.

Additional supportive evidence is found when one divides the sample by the fraction of a district's residential population who are school-age children. Dropping the assumption that each household has one child, one would expect changes in schooling options to matter more in places where people have more children to consider. The third and fourth columns of Table 9 divide the total sample into two groups based on the percentage of the district population that is composed of children (ages seventeen and under). The results indicate that the effect of student exit opportunities on property values is much greater in areas with higher concentrations of children. The effect of incoming transfer students is only slightly greater in these areas, probably because this effect would depend more on the composition of the neighboring district's populations and less on the district's own composition. The finding that districts with higher fractions of young children have larger capitalization effects gives further credibility to the idea that the correlation between initial transfer rates and property value growth is in fact due to changes in public schooling options.

Since Minnesota consists of a large metropolitan area and many small, rural districts, it is important to determine whether these capitalization effects are limited to certain geographic areas. The fifth and sixth columns of Table 9 display the transfer rate coefficients dividing the sample into rural and non-rural groups. The rural group consists of districts with at least 90% of housing on rural land, as defined by the 1990 Census. This is a natural cutoff point, since all other districts have less than 70% of their housing on rural land. The coefficients on the transfer rates in Table 9 have the same sign as the other analyses, but the %IN coefficient is smaller in magnitude for the rural districts, while the %OUT coefficient is smaller in magnitude for the non-rural districts. However, these coefficients both increase in magnitude

when one accounts for sample selection. For the rural group, a Heckman sample selection correction model (analogous to Section 5.4.1) yields a %IN coefficient of -.905 (.487 standard error) and a %OUT coefficient of 2.15 (.677 standard error). For the non-rural group, the %IN coefficient equals -1.56 (.321 standard error) and the %OUT coefficient equals .885 (.795 standard error). Although exiting from non-rural districts is associated with smaller capitalization effects, at conventional levels of statistical significance, one cannot reject the hypothesis that the %OUT coefficients are equal for rural and non-rural districts. (Nor can one reject a similar hypothesis for the %IN coefficients.) This evidence generally suggests that the capitalization resulting from the adoption of open enrollment was a universal phenomenon in Minnesota.

6. Discussion of results

Both incoming and outgoing transfer rates have statistically significant relationships with the future growth rates of property values. The estimated coefficients are in the direction predicted earlier in the paper. The results remain robust when controlling for changes in the perceived quality of schooling, for the persistence of property growth trends, and for sample selection. For all specifications, a one percentage point change in (incoming/outgoing) transfers suggests a (decrease/increase) in the property tax base of at least one percent over the seven year period. I estimate that a one percentage point increase in initial incoming transfer rates is associated with decrease in property wealth of at least 1.2 percent and that a one percentage point increase in initial outgoing transfer rates is associated with an increase in property wealth of at least 1.4 percent. These capitalization effects remain robust when one does similar analyses using the net transfer rates of districts, including analyses restricting the sample to districts with high net exiting or to districts with high net transfer student gains. The estimated effect of a one percentage-point net exit of students (outgoing minus incoming) remains close to a 1.3 percent increase in property values. This 1.3 percent estimate likely understates the true capitalization effects of the adoption of school choice. The estimate does not include the effects of future transferring and is likely biased downward due to the various aforementioned endogeneity issues.

As mentioned earlier, one can only extend these quantitative results so far. Given the nature of the dependent variable, these estimates say nothing about the size of the impact of open enrollment on the value of an individual home. In addition, the magnitude of the effects found in Minnesota may be very different than states with different numbers and types of school districts. Even so, there is good reason to believe that the qualitative results here can be applied to individual homes and to other states. The results suggest that school choice programs increase demand for property in districts in which students may transfer to nearby schools and decrease the demand for property in desirable districts that allow non-residential students to transfer in. The magnitude of the estimates is plausible; back-of-the-envelope calculations based on the existing literature's estimates of housing premiums predict between a 1% and 1.3% percent increase in property values given a one percentage point increase in the initial exiting transfer rate.[23]

These estimates are very relevant to changes in school district revenue in Minnesota. The impact of transferring on property wealth may counteract the impact of the loss or gain of funding associated with losing or gaining students. For instance, consider a district that is at the median in terms of size. This median-sized district has approximately 1,000 students and an adjusted tax base of about $2,000,000, (which is proportionally lower than the actual value because property is assessed at a fraction of market value). Suppose this district suffers a net loss of 30 students. For each student who leaves, the district loses roughly $3,000 in state revenue. However, they will also enjoy savings from not having to

[23] An initial exit rate of about 1% would, on average, lead to a future exit rate of about 6%. Suppose the market value of 6% of all homes increases by the estimated housing premium found in the literature for "better" school districts. (Equivalently, one might conjecture that the capitalization effects are evenly distributed across homes, so that each home's value increases by .06 times the premium.) Exploiting discontinuities in Florida's school rating system and controlling for the linear effects of actual test scores, Figlio & Lucas (2000) estimate a 17.28% premium based on the initial shock of the local elementary school receiving a "A" rating rather than a "B" rating. On average, Bogart & Cromwell (1997) estimate a 18.56% premium based on houses in the Cleveland area served by better school districts. Assuming 6% of the property bases appreciate by these percentages, these estimates predict that the total value of existing residential property would increase by 1.0% and 1.1% respectively. (Black (1999) estimates a much smaller housing premium, based only on differential access to elementary schools.) If housing premiums are realized immediately, then given the average tax base growth in the sample (18%) or average house price inflation in Minneapolis (17%) during the sample period, a 1% or 1.1% initial change would be associated with about a 1.2% or 1.3% growth in property values during the sample period. This paper's estimates predict that a change from an initial exit rate of close to zero to an exit rate of one would eventually lead to a 6% exit rate and 1.4% growth in the property tax base, including the construction of new homes and buildings.

serve as many students. In addition, following the findings of this paper, the district will enjoy growth in property values as a result of the student exit opportunities. This will increase the district's local tax revenue, though this effect will be mitigated by an increase in the district's financial obligations to the state. Districts must pay 26.3% of their adjusted tax base to the state every year. This median-sized district has a local adjusted tax rate of roughly 60%. So, the net gain in school revenue from capitalization for this district would be 33.7% (60% minus 26.3%) of the increase in the adjusted property tax base.[24]

Chart 1 displays the net financial impact on the school district's annual revenue as a result of this net exit of 3% of the residential student population. The chart shows varying results given different marginal costs of serving a student and given different estimates for the coefficient on net initial transferring. Modest estimates show that a "losing" district may not actually lose much financially, or may even have a moderate gain,[25] as a result of open enrollment. One can similarly show that a "gaining" district may not gain much financially, or may even lose, as a result of open enrollment. As explained earlier, the true effect of transferring opportunities on capitalization may very well exceed the estimates used for this chart. In addition, to obtain better estimates of the financial impact on individual districts due to all aspects of the policy change, one would want to also consider changes in student composition, changes in perceived quality, and changes in the preferences of the median voter (see footnote 24) as a result of school choice.

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[24] During the sample period, there was no observed relationship between transfer rates and changes in districts' property tax rates. Most Minnesota districts only hold property tax referenda about once every eight years. In the longer run, if local property tax rates are inversely related to changes in the property tax base, then this would diminish the effect of open enrollment on district revenues.

[25] An incorrect conclusion would be that a district could benefit from reducing the quality of its schools, ceteris paribus. Though the presence of choice may reduce the decline in property values associated with a decline in residential school quality, lowering residential school quality would unambiguously have a non-positive effect on property values. The increase in property values from exiting transfer students is solely a result of the popularity of the neighboring districts' schools. The transfer student induced to exit the residential district by a decline in residential school quality must be worse off than before the school quality decline, or else this student would have opted to transfer in the first place. Lowering school quality to deter neighbors from transferring would also lead to an unambiguous decrease in property values. Simply put, rather than losing some fraction of the housing premium associated with superior schooling when students enter, the district would be losing an even larger fraction of this premium.

One would expect potential capitalization effects to influence people's attitudes towards school choice programs and schools' participation in them. It seems reasonable that a homeowner would vote against a school choice proposal that would reduce the value of her home. It also seems reasonable that some districts in Minnesota may be less willing to admit transfer students due to capitalization effects. The district administrators could face political pressure from district residents to limit transfer spaces. In addition, the administrators might fear that accepting transfers would eventually weaken their tax base. The relationship between schooling options and property values could thus prevent school choice proposals from being passed or could limit the size of established choice programs.

Aside from open enrollment programs, other school choice programs, such as private school vouchers or charter schools, could also affect property values. To the extent that housing in popular and unpopular school districts are close substitutes, property values should rise in districts where students enjoy their new opportunities to attend charter or voucher schools. If an unpopular local public school is only losing a moderate fraction of students, then it is possible that this school may be better off or equally well off after the policy change. This would depend on the details of the school finance system, the peer effects associated with the exiting students, and any potential reputation effects.

This paper's results do not discredit the idea that the adoption of a school choice program can create incentives that cause school districts to improve. Districts that are initially losing students might wish to recapture the lost state aid associated with these students. These districts might also fear that high exit rates lead residents and potential homebuyers to lower their opinion of the school district's quality. For these reasons, the district might wish to improve in order to retain more students. Similarly, under an inter-district open enrollment program, a district might wish to improve to attract transfer students and thus gain more state aid or prestige. However, the results here do cast doubt on whether the adoption of a school choice program imposes accountability by financially punishing or rewarding districts for *preexisting* differences in popularity. Using conservative estimates of the size of capitalization effects, one finds that the adoption of choice might financially reward relatively unpopular school districts.

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References

Atkinson, Scott E. and Crocker, Thomas D. "A Bayesian Approach to Assessing the Robustness of Hedonic Property Value Studies." *Journal of Applied Econometrics* 2(1), (1987), pp. 27-45.

Bettinger, Eric P. & Bogart, William T. "The Impact of School Choice on Property Values Michigan's Experience." Case Western Reserve, mimeo, (forthcoming in National Tax Association Proceedings), (2001).

Black, Sandra E. "Do Better Schools Matter? Parental Valuation of Elementary Education." *Quarterly Journal of Economics*, (1999), pp. 577-600.

Bogart, William T. and Cromwell, Brian A. "How Much More is a Good School District Worth?" *National Tax Journal*, (1997), pp. 215-232.

Brunner, Eric; Sonstelie, Jon and Thayer, Mark. "Capitalization and the Voucher: an Analysis of Precinct Returns from California's Proposition 174," *Journal of Urban Economics* 50, (2001), pp. 517-536.

Downes, Thomas A. and Zabel, Jeffrey E. "The Impact of School Characteristics on House Prices: Chicago 1987-1991." *Journal of Urban Economics* 52(1), (2002), pp. 1-25.

Epple, Dennis and Romano, Richard E. "Competition Between Private and Public Schools, Vouchers, and Peer Group Effects." *American Economic Review* 88, (1998), pp. 33-62.

Figlio, David and Lucas, Maurice. "What's in a Grade? School Report Cards and House Prices." *NBER Working Paper #8019*, (2000).

Funkhouser, J. and Colopy K. "Minnesota's Open Enrollment Option: Impacts on School Districts." Policy Studies Associates, prepared for the U.S. Department of Education, (1994).

Heckman, James J. "The Common Structure of Statistical Models of Truncation, Sample Selection and Limited Dependent Variables and a Simple Estimator for Such Models. *Annals of Economics and Social Measurement* 5(4), (1976), pp. 475-92.

Lange, Cheryl M., Ysseldyke, James E., and Delaney, Thomas J. "Open Enrollment's Impact on School Districts When Students with Disabilities Transfer Schools." Enrollment Option for Students with Disabilities: Research Report No. 14. University of Minnesota. ERIC document: ED392202, (1995).

Lee, Lung-fei. "Some Approaches to the Correction of Selectivity Bias." *Review of Economic Studies* 49(3), (1982), pp. 355-372.

Manski, Charles F. "Educational Choice (Vouchers) and Social Mobility. *Economics of Education Review* 11, (1992), pp. 351-69.

Nechyba, Thomas J. "Public Finance in a General Equilibrium Tiebout World: Equalization Programs, Peer Effects and Private School Vouchers." NBER Working Paper 5642, (1996).

Nechyba, Thomas J. "Mobility, Targeting, and Private School Vouchers." *American Economic Review* 90, (2000), pp. 130-146.

Oates, Wallace E. "The Effects of Property Taxes and Local Public Spending on Property Values: An Empirical Study of Tax Capitalization and the Tiebout Hypothesis." *Journal of Political Economy* 77(6), (1969), pp. 957-71.

School District Profiles, 1990-91, Minnesota Department of Children, Families, and Learning. (1991).

School District Profiles, 1997-98, Minnesota Department of Children, Families, and Learning. (1998).

Sundstrom, Ingrid. "House Hunters Study Up on Schools and School Districts." *Minneapolis -St. Paul Star Tribune*, February 5, 1994.

Tiebout, Charles. "A Pure Theory of Local Expenditures." *Journal of Political Economy* 64, (1956), pp. 416-24.

Ysseldyke, J.E., Lange, C. M., & Gorney, D. "Parents of Students with Disabilities and Open Enrollment: Characteristics and Reasons for Transfer." *Exceptional Children* 60(4), (1994), pp. 359-372.

TABLE 1: Trends for High Impact Districts
(see Table 2 for variable definitions)

	Big Losing Districts* in 1990-91		Big Gaining Districts* in 1990-91		All Other Districts in 1990-91	
For 1990-91 Variables, N=	26		18		349	
Variable**	Mean	Median	Mean	Median	Mean	Median
%PROPΔ	36%	27%	3%	10%	18%	17%
ADULTS	780	458	1537	772	4489	1415
PROP90 (Thousands $)	1518	741	3442	1187	9134	2008
%VACANT	20%	12%	23%	15%	14%	9%
%RENTED	18%	18%	20%	19%	20%	19%
MEDIAN HOUSE VALUE	38059	33953	43866	33982	48153	43611
%RURAL HOUSING	94%	100%	76%	100%	75%	100%
MEDIAN INCOME	23121	22800	22775	20146	25874	23929
% KIDS	40%	40%	38%	40%	41%	41%
% ADULTS W/ B.A.	10%	9%	13%	10%	13%	11%
% ADULTS H.S. DROP.	30%	32%	30%	32%	28%	29%
% ADULTS- POVERTY	15%	15%	15%	14%	12%	12%
%POVΔ	20%	21%	63%	42%	40%	38%
%IN 1991-98	2.6%	4.0%	9.5%	16.3%	5.2%	3.4%
%OUT 1991-98	6.6%	7.9%	4.2%	3.7%	4.1%	3.1%

* "Big Losers" are defined as those districts that had a net loss of at least 5% of the amount of residential enrollment. Similarly, "Big Gainers" saw a net gain of at least 5% of their residential enrollment.
** See Table 2 for variable definitions.

TABLE 2: Description of Variables

All variables are from the 1990 Census unless otherwise stated.

Variable Name	Description
District Size	
ADULTS	Number of adults living in the district.
Housing Characteristics	
%VACANT	Percent of residential housing units in the district that were unoccupied.
%RENTED	Percent of residential housing units in the district that were rented to an occupant other than the owner.
MEDIAN HOUSE VALUE	The median value of a house in the district.
%RURAL HOUSING	Percent of residential housing units in the district that are located in a rural area.
Resident Characteristics	
MEDIAN INCOME	The median income of adults living in the district.
%KIDS	Percent of district's population composed of children (ages 17 and under).
% ADULTS W/ B.A.	Percent of adults living in the district who possess a Bachelor's Degree.
% ADULTS H.S. DROP.	Percent of adults living in the district who dropped out of high school.
%ADULTS- POVERTY	Percent of adults living in the district who are classified as below the poverty line.
Student Compositional Change	(Variables based on MN state agency data)
%POVΔ	A proxy for the change in the percentage of low-income students who attend a school in the district; it's the percentage change in per pupil district expenditures on food between the 1990-91 and 1997-98 school years. This is a good estimate of the change in the poverty rate among students, because district expenditures on food are usually based almost entirely on subsidies for children of low-income households.
% IN 1991-98	Fraction of students transferring into the district in the 1997-98 school year minus the fraction transferring into the district in the 1990-91 school year. (Used to control for changes in perceived district quality as a result of choice.)
% OUT 1991-98	Fraction of students transferring out of the district in the 1997-98 school year minus the fraction transferring out of the district in the 1990-91 school year.
Dependent Variable	
%PROPΔ	The percent change in the district's tax base between the 1989-90 and 1996-97 school years. The district's tax base is adjusted to account for differences in property assessment practices.
Base of Dependent Variable	
PROP90	The district's tax base in 1990, adjusted for differences in property assessment practices.

TABLE 3: Summary Statistics

	All 1990-91 Districts That Also Existed in 1989-90		Districts Existing in Both 1990-91 & 1997-98		1990-91 Districts Without Academic Pairing Agreements	
N=	390		285		255	
Variable	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
%PROPΔ	-	-	0.176	0.2124	0.192	0.210
%IN91	0.017	0.0287	0.019	0.0297	0.020	0.0304
%OUT91	0.022	0.0338	0.018	0.0215	0.018	0.0179
NONE IN91	0.226	0.419	0.158	0.365	0.129	0.336
LN(ADULTS)	7.342	1.205	7.613	1.257	7.746	1.233
%VACANT	0.149	0.144	0.152	0.152	0.152	0.153
%RENTED	0.201	0.0645	0.204	0.0714	0.201	0.0693
LN(MEDIAN HOUSE VALUE)	10.65	0.4713	10.76	0.4678	10.814	0.4439
%RURAL HOUSING	0.762	0.361	0.705	0.383	0.679	0.389
LN(MEDIAN INCOME)	10.109	0.2549	10.147	0.2842	10.166	0.289
% KIDS	0.404	0.0473	0.408	0.0500	0.410	0.0496
% ADULTS W/ B.A.	0.125	0.0751	0.139	0.0883	0.144	0.0909
% ADULTS H.S. DROP.	0.285	0.0875	0.270	0.0956	0.264	0.0979
% ADULTS- POVERTY	0.127	0.0603	0.122	0.0656	0.119	0.0652
%POVΔ	-	-	0.405	0.290	0.413	0.294
%IN 1991-98	-	-	0.058	0.0731	0.0563	0.0723
%OUT 1991-98	-	-	0.041	0.0369	0.0409	0.0331

TABLE 4: The Capitalization Effects of Student Transfer Opportunities

OLS Regressions with Robust Standard Errors

DEPENDENT VARIABLE: % Change in Property Tax Base Between 1990 and 1997 (%PROPΔ)

Model:	A	B	C	D	E
%IN91	-1.49	-1.89	-1.93	-1.86	-1.28
	-4.16	*-6.17*	*-5.99*	*-5.42*	*-3.87*
%OUT91	1.95	1.94	1.06	1.39	1.32
	2.09	*2.18*	*1.39*	*2.30*	*2.47*
NONE IN91		-0.110	-0.071	-0.069	-0.078
		-2.43	*-1.62*	*-1.65*	*-1.92*
LN(ADULTS)	-0.009	-0.022	-0.035	-0.029	-0.004
	-0.81	*-1.90*	*-1.21*	*-1.06*	*-0.20*
%VACANT			0.149	0.063	0.232
			1.68	*0.38*	*2.06*
%RENTED			-0.711	-0.758	-0.499
			-3.13	*-2.48*	*-2.09*
LN(MEDIAN HOUSE VALUE)			0.114	0.126	0.045
			2.00	*1.53*	*0.74*
%RURAL HOUSING			-0.035	-0.040	-0.024
			-0.48	*-0.62*	*-0.37*
LN(MEDIAN INCOME)				-0.517	-0.614
				-2.91	*-3.46*
% KIDS				0.797	1.46
				1.49	*4.41*
% ADULTS W/ B.A.				-0.369	0.012
				-1.30	*0.05*
% ADULTS H.S. DROP.				-1.31	-0.977
				-3.80	*-3.57*
% ADULTS-POVERTY				-0.657	-1.61
				-1.05	*-3.94*
%POVΔ					-0.064
					-1.72
%IN 1991-98					-0.308
					-2.03
%OUT 1991-98					-0.039
					-0.12
CONSTANT	0.24	0.36	-0.61	4.64	5.95
	2.59	*3.90*	*-1.18*	*2.78*	*3.68*
R-squared	0.08	0.11	0.21	0.29	0.29
N=	285	285	282	282	281

T-statistics in italics

TABLE 5
Controlling for Previous Trends in County-Level Property Growth: District-Level Regression With Robust Standard Errors (adjusted for clustering at the county level)

DEPENDENT VARIABLE: % Change in District's Total Property Values, 1981-87

N=282
R-squared=.30

	coefficient	t-stat.
%IN91	-1.21	-3.86
%OUT91	1.35	2.81
% CHANGE COUNTY PROP. VALUES: 1981-87	-0.051	-0.99
NONE IN91	-0.072	-1.80
LN(ADULTS)	0.001	0.06
%VACANT	0.254	2.26
%RENTED	-0.515	-2.53
LN(MEDIAN HOUSE VALUE)	0.063	0.94
%RURAL HOUSING	-0.024	-0.35
LN(MEDIAN INCOME)	-0.582	-3.54
% KIDS	1.47	4.30
% ADULTS W/ B.A.	-0.015	-0.06
% ADULTS H.S. DROP.	-0.97	-3.12
% ADULTS- POVERTY	-1.51	-1.51
%POVΔ	-0.063	-1.40
%IN 1991-98	-0.291	-1.92
%OUT 1991-98	-0.004	-0.01
CONSTANT	6.42	4.16

TABLE 6
The Capitalization Effects of Student Transfer Opportunities: Heckman Selection Model using Maximum Likelihood Estimation

	PROBIT		OLS	
Dependent Variable	= 1 if REMAIN in sample = 0 if lost from sample due to merger		% Change in Total Property Values, 1990-97	
	coefficient	Z-stat.	coefficient	Z-stat.
%IN91	4.07	2.26	-1.38	-4.22
%OUT91	-3.43	-1.47	1.46	2.73
NONE IN91	-0.066	-0.44	-0.073	-1.87
LN(ADULTS)	0.277	2.86	-0.014	-0.74
%VACANT	2.02	4.04	0.185	1.74
%RENTED	4.29	2.97	-0.516	-2.32
LN(MEDIAN HOUSE VALUE)	-0.191	-0.68	0.033	0.57
%RURAL HOUSING	0.220	0.98	-0.020	-0.33
LN(MEDIAN INCOME)	1.12	1.53	-0.577	-3.37
% KIDS	5.18	2.62	1.21	3.72
% ADULTS W/ B.A.	1.66	1.05	-0.048	-0.21
% ADULTS H.S. DROP.	0.228	0.19	-0.982	-3.74
% ADULTS- POVERTY	1.51	0.070	-1.52	-3.82
%POVΔ			-0.067	-1.94
%IN 1991-98			-0.308	-2.09
%OUT 1991-98			-0.108	-0.35
AC_PAIR	-1.55	-14.22		
Inverse Mill's Ratio			-0.068	-4.08
CONSTANT	-13.89	-1.95	6.91	4.40
N=	390			

ρ =Correlation Between Error Terms = -.395 and Standard Error of ρ = .092

TABLE 7
The Capitalization Effects of Student Transfer Opportunities: Sample Selection Correction Method Based on Lee (1982)

DEPENDENT VARIABLE: % Change in Property Tax Base, 1990-97

N=281
R-squared=.34

	Coefficient	t-stat.
%IN91	-1.11	-3.03
%OUT91	1.56	3.48
NONE IN91	-0.061	-1.61
LN(ADULTS)	0.014	0.52
%VACANT	0.265	2.29
%RENTED	-0.273	-1.24
LN(MEDIAN HOUSE VALUE)	0.007	0.12
%RURAL HOUSING	0.036	0.55
LN(MEDIAN INCOME)	-0.378	-2.01
% KIDS	1.26	3.56
% ADULTS W/ B.A.	0.122	0.45
% ADULTS H.S. DROP.	-0.941	-3.43
% ADULTS- POVERTY	-1.02	-2.51
%POVΔ	-0.072	-2.20
%IN 1991-98	-0.320	-2.14
%OUT 1991-98	-0.280	-0.87
g1(x)	-0.59	-2.85
g2(x)	-0.54	-2.41
g3(x)	-0.22	-1.57
CONSTANT	4.3	2.34

TABLE 8
The Capitalization Effects of Student Transfer Opportunities: Estimation of OLS Excluding Districts with Academic Pairing Agreements in 1990-91

DEPENDENT VARIABLE: % Change in Property Tax Base, 1990-97

Model:	A	B	C	D	E
%IN91	-1.90	-2.10	-2.03	-2.00	-1.38
	-6.10	*-7.45*	*-6.28*	*-6.03*	*-4.29*
%OUT91	2.52	2.46	1.70	1.70	1.64
	2.36	*2.23*	*2.22*	*3.00*	*3.02*
NONE IN91		-0.065	-0.031	-0.035	-0.053
		-1.28	*-0.65*	*-0.77*	*-1.24*
LN(ADULTS)	-0.026	-0.033	-0.028	-0.025	-0.011
	-2.24	*-2.83*	*-0.96*	*-0.97*	*-0.51*
%VACANT			0.120	-0.094	0.077
			1.34	*-0.59*	*0.65*
%RENTED			-0.950	-1.20	-0.894
			-3.96	*-3.81*	*-3.41*
LN(MEDIAN HOUSE VALUE)			0.091	0.161	0.082
			1.64	*2.11*	*1.37*
%RURAL HOUSING			-0.038	-0.030	-0.009
			-0.51	*-0.46*	*-0.15*
LN(MEDIAN INCOME)				-0.563	-0.673
				-2.96	*-3.64*
% KIDS				0.250	0.923
				0.45	*2.45*
% ADULTS W/ B.A.				-0.404	-0.016
				-1.37	*-0.06*
% ADULTS H.S. DROP.				-1.24	-0.974
				-3.93	*-3.61*
% ADULTS-POVERTY				-0.596	-1.53
				-1.02	*-3.69*
%POVΔ					-0.071
					-1.81
%IN 1991-98					-0.41
					-2.59
%OUT 1991-98					-0.44
					-1.09
CONSTANT	0.39	0.45	-0.36	5.00	6.53
	4.19	*4.89*	*-0.70*	*2.85*	*3.93*
R-squared	0.14	0.15	0.26	0.32	0.32
N=	255	255	252	252	251

T-statistics in italics

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TABLE 9
Further Evidence of Capitalization: Transfer Rate Coefficients Dividing the Sample Based on District Characteristics (From OLS Regressions Similar to Model E of Table 4)

DEPENDENT VARIABLE: %PROPΔ (% Change in Property Tax Base, 1990-97)

	Test Scores Compared to Scores of Neighboring Districts[i]		Child Concentration[ii]		Rural Status[iii]	
	Below	Above	Low	High	Rural	Non-Rural
%IN91	-0.85	**-2.03**	-1.44	-1.43	-0.68	-1.43
	-2.89	***-1.89***	*-3.58*	*-2.73*	*-1.31*	*-3.48*
%OUT91	**2.80**	-0.13	0.35	**5.04**	1.87	0.73
	4.25	*-0.15*	*0.57*	***4.57***	*2.90*	*0.87*
N=	145	134	140	141	167	114
R-squared	.43	.26	.37	.31	.30	.58

T-statistics in italics

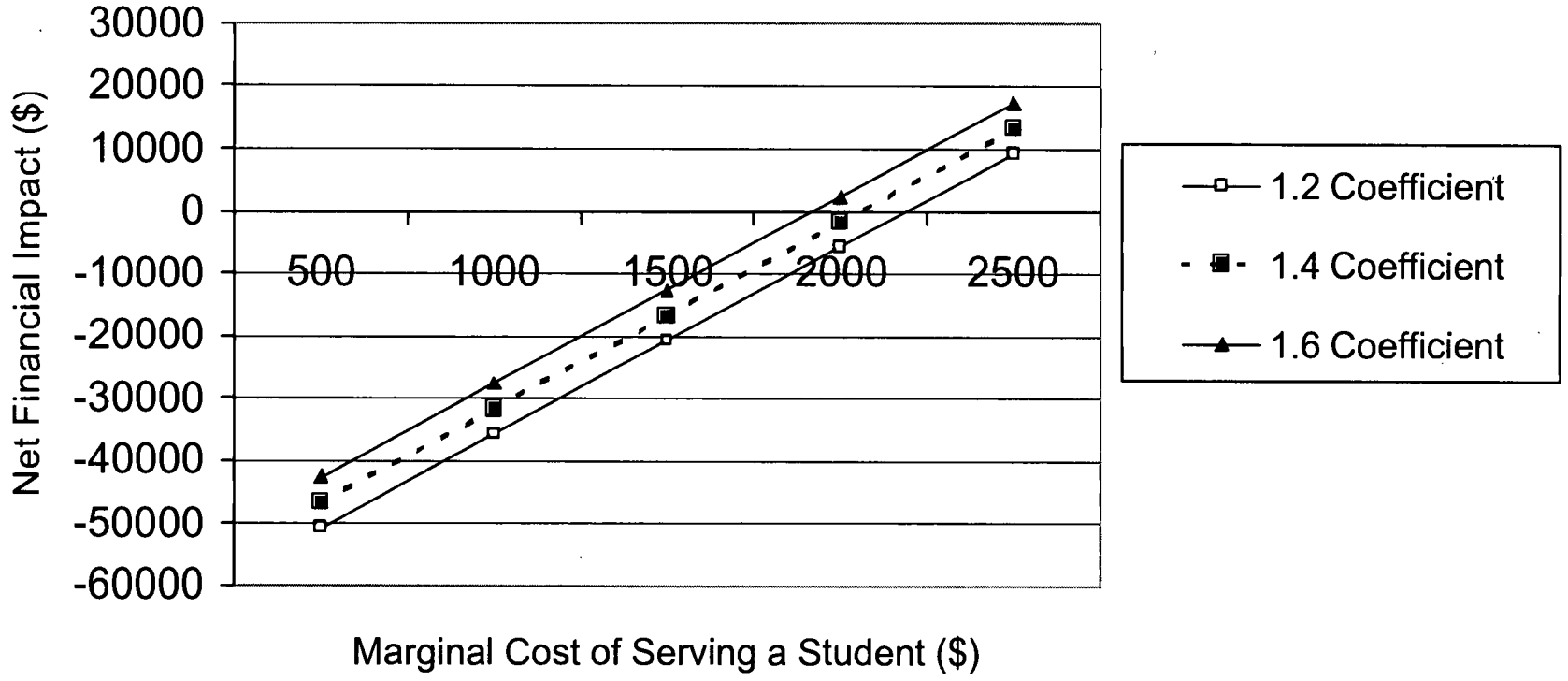
[i] Test score outcomes during the sample period are unavailable. I derive an index of student achievement levels based on annual, district-level testing outcomes between 1998 and 2001. A district is "above" its neighbors if its achievement index is greater than the residential-enrollment-weighted average achievement index of the neighboring districts; otherwise, the district is "below." For districts with the maximum set of test score outcomes, the factors used for principle components are (with corresponding score coefficients from earliest year to latest year in parentheses): 3rd grade mean Math score 1998-2000 (.056, .032, .041), 3rd grade mean Reading score 1998-2000 (.042, .055, .042), 5th grade mean Math score 1998-2000 (.042, .062, .047), 5th grade mean Reading score 1998-2000 (.077, .049, .057), 8th grade Math pass rate 1998-2001 (.074, .068, .060, .062), 8th grade Reading pass rate 1998-2001 (.044, .052, .045, .046), and 10th grade Writing pass rate 1998-2001 (.027, .025, .031, .031).

[ii] For child concentration, school districts are divided into two equally sized groups based on the percentage of residents under the age of 18.

[iii] For rural status, a district is defined as rural if at least 90% of the residential properties in the district were on rural land as defined by the 1990 Census.

Chart 1

Financial Impact of a Net Loss Rate of 3% for a School District with Median Characteristics
(Varying Marginal Cost and Capitalization Effects)



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