# Selection in Means-tested School Voucher Programs

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**ABSTRACT**

This study examines public school and public and private school market characteristics associated with participation among elementary school students in a means-tested school voucher program in Florida. Participants are more likely than eligible non-participants to come from disadvantaged public schools on a number of dimensions. Participants' public schools tend to have lower aggregate student performance on standardized tests, and they have higher rates of both violent and non-violent disciplinary incidents and out-of-school suspensions. Moreover, participants' schools receive less positive ratings on various measures from school principals and teachers. Participants face more convenient and varied private school options than do eligible non-participants; however, the private schools options proximate to participants received lower parent ratings of quality on a publicly available website of school reviews than did private schools near non-participants. Participants face less competitive public school markets; they have less access to open enrollment and charter school options.

School voucher programs have become increasingly widespread in recent years. Classic voucher programs have been implemented in cities such as in Milwaukee, WI and Cleveland, OH, while "neovoucher" programs that provide students with scholarships funded by tax creditable contributions serve students in states such as Florida and Pennsylvania (Welner, 2008). These programs aim to expand choice for families: Proponents of voucher programs often argue that they will help the most disadvantaged children, allowing them the opportunity to exit unsafe and underperforming schools. While a healthy body of research has examined the individual characteristics of voucher users, there has been far less detailed work on the contextual characteristics of students' public and private school options that predict whether students use vouchers.

Employing richer data than has been used in past observational research on voucher use, this paper provides a deep descriptive look at the characteristics of students' own public schools, and the characteristics of both public and private school markets, that predict student participation in the means-tested Florida Tax Credit Scholarship Program.

I find that participants are more likely than are eligible non-participants to come from public schools that are troubled along a number of dimensions. Compared to the schools of eligible non-participants, participants' sending public schools have worse aggregate academic performance; higher rates of violent incidents, nonviolent disciplinary incidents, and out-of-school suspensions; and more negative school climates according to both teacher and principal ratings. Private school and public school markets matter too. Participants face more convenient and more varied private school options than do eligible students who do not participate. However, the private schools proximate to participants tend to have lower parent ratings than do private schools proximate to non-participants. On the public school market side, students are less

likely to participate when they have access to robust public school choice. Students with limited options for open enrollment and who have limited access to charter schools are more likely to participate in the program.

These findings represent the most detailed observational work to date on the public and private school contexts that predict who decides to participate in means-tested school voucher programs. As such, this study provides valuable new information to the debate over who benefits from school vouchers, and what factors promote their use.

## BACKGROUND AND PRIOR LITERATURE

Advocates of voucher and school choice programs claim that vouchers will help students escape underperforming and unsafe schools. They argue that affluent students have always exercised choice over their schools; because students are served by neighborhood schools, wealthier parents are able to choose their children's school in connection with their residential decisions. Voucher programs, according to this line of argument, should particularly benefit poorer children by extending to them the access to choice always enjoyed by affluent students (Hoxby, 2003; Goldhaber & Eide, 2002; Gill, Timpane, Ross & Brewer, 2001). By improving poor children's access to private schools, school choice proponents argue, vouchers will open the opportunity for them to find their best educational match and attend safer schools.

Critics of such programs suggest that rather than helping the least advantaged children, school choice programs are most likely to benefit students with highly informed parents and the means to supplement vouchers with their own funds in order to afford private school tuition and related costs such as transportation (Gill, Timpane, Ross & Brewer, 2001). Moreover, they argue that vouchers will not necessarily help students in failing schools, because parents will apply not out of a desire to avoid poor-quality public schools, but due to considerations such as religion or

racial mix of students (Carnegie Foundation for the Advancement of Teaching, 1992; Lacireno-Pacquet & Brantley, 2008).

Two threads of research have informed the debate about who selects into school choice programs and why. The first strand derives information on parents' motivations in applying for school choice programs from interviews, focus groups and surveys. The second compares applicants to non-applicants (or voucher users to those who are offered vouchers but decline them) on observable qualities to determine the factors that predict selection into programs.

Qualitative studies find that parents generally cite academic concerns as their primary consideration when deciding whether to use vouchers (Beales & Wahl, 1995; Greene, Howell, & Peterson, 1997; Witte, 2000; Teske & Schneider, 2001). Studies of two Milwaukee voucher programs found that parents most often rated education quality as an important factor in their decision to participate (Witte, 2000; Beales & Wahl, 1995). These results were echoed in a survey of participants in the Cleveland Scholarship and Tutoring Program. The vast majority of parents in that survey (85%) identified academic quality as a motivator in their decision to apply to the program (Greene, Howell & Peterson, 1997).

Parents citing academic quality as a motivation for voucher use can be read in two ways. First, it may be that private schools offer extremely high quality education, and that parents are drawn to private schools despite having satisfactory public options. Alternatively, parents may participate in choice programs because their public options are very poor, and even a mediocre private school looks good in comparison. Survey evidence of voucher program participants in Florida (Forster & D'Andrea, 2009) and Milwaukee (Beales & Wahl, 1995; Witte, 2000) suggests that the second explanation is at least somewhat at work for many parents. Moreover, parents have reported dissatisfaction with public schools on other grounds, such as safety, as

factors pushing them towards voucher use (Greene, Howell & Peterson, 1997).

Additionally, religion is named as an important consideration by many parents in programs that allow matriculation in non-secular schools. Approximately one-third of parents named this as an important consideration in the Cleveland scholarship program (Greene, Howell, & Peterson, 1997). Surveys of parents also indicate that values, broadly defined, are an important consideration; higher-SES parents are especially likely to report being interested in school values (Schneider, Marschall, Teske, & Roche, 1998).

Finally, parents consider location when deciding where to send their children. Roughly 60% of parents participating in choice programs in Milwaukee report that the location of private schools was a very important consideration for them in deciding to participate (Beales & Wahl, 2005). Location was also ranked as an important consideration for parents in the Cleveland Scholarship and Tutoring Program, and among parents who were offered but did not take up a voucher, difficulty securing transportation was identified as a major impediment (Greene, Howell, & Peterson, 1997). Surveys and focus groups of parents who declined vouchers in New York, Dayton, OH, and Washington, D.C. also revealed that inconvenient locations were a barrier to take-up for some parents who applied to those programs (Howell & Peterson, 2006).

While the survey literature suggests that parents' decisions to participate in voucher programs are influenced by contextual characteristics—such as the safety, academic performance, and overall environment of the public schools or the convenience and quality of private school options—observational studies have, with a few exceptions, focused primarily on the family or child characteristics that distinguish applicants from non-applicants (Chakrabarti, 2005; Witte, 2000; Beales & Wahl, 1995; Howell, 2004; Howell & Peterson, 2006; Campbell, West, & Peterson, 2005; Belfield, 2005). Only a handful of studies have also matched students to

the public schools that they previously attended and examined how public school characteristics are associated with application (Belfield, 2005; Howell, 2004; Figlio, Hart, & Metzger, 2010). Findings are mixed; Belfield (2005) finds no difference between the public school quality of applicants and non-applicants, while Howell (2004) and Figlio et al. (2010) find that applicants come from schools that have poorer academic performance than schools of eligible non-applicants. Left unstudied by observational research to date is the role that school climate (including factors like school violence, disruptive behavior from students, and teacher expectations) may play in parents' decisions to enroll their children in voucher programs.

Likewise, very few studies have considered how the likelihood of voucher use is associated with characteristics of the markets for private and public schools that students face. The few studies that have looked at private school markets have found that private school proximity (Goldhaber, Brewer, Eide, & Rees, 1999) and market penetration (Campbell, West, & Peterson, 2005) positively predict voucher program participation. I am unaware of any prior studies that have examined the extent to which access to public school choice programs is associated with participation in voucher programs.

This paper contributes to this literature by considering a dramatically expanded set of public school, private school market, and public school market characteristics to determine the factors associated with application and take-up in one of the largest voucher programs in the country—the Florida Tax Credit Scholarship Program.

## FLORIDA TAX CREDIT SCHOLARSHIP PROGRAM

The Florida Tax Credit (FTC) Scholarship Program, inaugurated in the 2002-2003 school year, offers dollar-for-dollar tax credits to corporations that make donations to scholarship funding organizations. These organizations in turn award scholarships applicable towards private

school tuitions for students who are eligible for free or reduced-price lunch (i.e., those with income less than or equal to 185% of the federal poverty line), and who either attended Florida public schools in the prior year or are entering schools for the first time as kindergarteners or first graders. As of 2007-08, participants remain eligible for scholarships in subsequent years if their family income remains below 200% of the federal poverty line (Statute 220.187, 2001; 2006).

By the 2007-2008 school-year, the FTC program enrolled nearly 21,500 students. This represented about 1% of the public school population of Florida and approximately 2% of the low-income population. Students applying for the program for the first time in 2007-2008 (to enter in the 2008-2009 school-year) were eligible to receive up to $3950 in funds to be used for tuition and other school-related expenses such as books and transportation costs (Florida Department of Education, 2009). Vouchers need not cover the full amount of private school tuition; families are allowed to supplement the scholarship as necessary to meet tuition bills. However, the voucher covered about 90% of a typical religious elementary school tuition in Florida, leaving families with relatively modest out-of-pocket expenses (Figlio & Hart, 2010).

The application process poses nontrivial costs to applicants. Applicants must fill out a lengthy application and pay a modest fee. Furthermore, they have to submit tax returns to the program to verify income eligibility. These time and financial costs suggest that parents are unlikely to apply on a whim. Rather, some specific factors are likely impelling them to apply. For instance, they may consider their public school to be of poor quality (either in terms of academic performance or safety), they may see their own child flailing in the public school (regardless of overall school quality), or they may value some quality that a private school is

uniquely able to provide (such as a religious orientation or convenient location). I consider how these factors play into the decision to use vouchers.

**ANALYTIC PLAN**

Because I use a large number of different sources to examine the public and private school contexts that students face, data sets will be described as they are introduced. Briefly, however, I use application microdata, microdata on students attending public schools in the year of application, administrative data on school characteristics, surveys of public school principals and teachers, and administrative and survey data on private schools.

In order to fully exploit the detail provided by the microdata on public school students, my primary analysis focuses on students who were observed in public schools in 2007-2008, and distinguishes those who participated in the FTC program in the following year from those who did not participate. Groups are compared using t-tests; robust standard errors are clustered at the school level to adjust for the fact that children in the same schools share the same school characteristics. I also conducted several sensitivity checks, to be described after the main results.

The Scholarship Funding Organizations that disburse the scholarships provided me with microdata on all 34,953 students who applied in 2007-2008 for admission in the 2008-2009 school -year. To make a clean comparison to non-participants who are income-eligible for the program, the sample is restricted to those who used free and reduced price lunch in 2007-2008; since the program eligibility threshold is identical to the threshold for reduced price lunch qualification, this should not force me to exclude any income-eligible participants. Because most participants are in elementary school and because elementary schools differ in significant ways from middle and high schools, the comparisons further focus on elementary-aged students (n=18,012). Finally, because I have the richest data on students who were observed in public

schools prior to applying, this analysis focuses primarily on this group of students. These students, who I consider “potential switchers”, are restricted to the non-disabled population, since disabled students are eligible for the more generous McKay Scholarship Program and are therefore underrepresented in the applicant population. This yields a sample of 2764 new "Participants", who are compared to 555,271 non-disabled, elementary-aged subsidized lunch-using “Non-participants”, who were eligible but chose not to participate in the FTC program. Individual characteristics of Participants and Non-participants are presented in Table 1. Participants are more likely than Non-participants to be Black (and less likely to be White or Hispanic) and are more likely to be using free (rather than reduced-price) lunch. Participants are also lower-achieving compared to their non-participating peers.

Because I test many comparisons, using a standard alpha level of .05 to determine which comparisons are significant may increase the likelihood of falsely identifying significant differences between groups. All comparisons have therefore been tested using a Holm-Bonferonni correction to determine whether the purported significance of differences holds up to a more stringent test (Holm, 1979). This method provides a more conservative test by adjusting the alpha level to account for the number of comparisons made. The p-values for the $k$ comparisons being tested are arranged in ascending order. The smallest p-value is compared to the adjusted significance level $\alpha/k$. If the p-value is smaller than this threshold, the first null hypothesis is rejected. The second smallest p-value is then compared to the adjusted significance level $\alpha/(k-1)$, and so on until a null hypothesis cannot be rejected. At that point, the remaining null hypotheses are accepted. Based on the number of comparisons I present, the Holm-Bonferonni correction suggests that results are “truly” significant when the p-value of the difference between groups is less than approximately 0.01. Significant comparisons referred to in

the text meet this threshold of significance; comparisons that meet conventional levels of significance will be considered "marginally" significant.

## RESULTS

### Contextual Characteristics of Students' Own Public Schools

Students who participate in the program are significantly more likely to come from low-performing schools (Table 2). Participants were significantly less likely to attend schools that had received Florida Department of Education grades of "A" in 2006-2007, and were significantly more likely to attend schools that had received a grade of "C". They were also less likely to attend "D", or "F" schools; while these differences were significant at conventional levels of significance, they are only marginally significant using the more conservative Holm-Bonferonni adjusted levels of significance.

Demographically, Participants came from schools with larger shares of students using subsidized lunch. Lower proportions of students in Participants' schools were White or Hispanic, and higher shares were Black, than in Non-participants' schools. While the share of teachers with advanced degrees was marginally lower in Participants' schools, other differences in staffing characteristics, including average teacher experience and student-teacher ratios, were not significant. Participants and Non-participants did not differ in rates of charter school attendance. These results are consistent with past literature comparing voucher users and comparable public school students.

Table 3 presents a finer-grained look at the public school contexts that distinguished Participants from Non-participants. To further characterize public school contexts, I used three sources of data on school climate. Reports on incidents of student disruption and suspension rates in schools were taken from the Florida School Indicator Reports. I classify four types of

incidents: violent incidents; drug/alcohol, and tobacco offenses; bullying; and other non-violent offenses. [1] I report the number of each type of offense per 100 students in the school.

Reports on school climate were gleaned from surveys of principals and teachers collected by researchers at the University of Florida, the Urban Institute, and Princeton University. Principal surveys were administered to all principals in the state in 2004. The response rate was 72.5%. Teacher surveys were administered in 2005 to a subset of teachers in 275 elementary schools. Although these surveys were administered a few years before students began applying for vouchers, they should provide a proxy for school climates as of 2007-2008.

Principals rated their agreement with statements such as "staff morale is low" and "parents worry about violence in this school" on a scale from 1-5. Because scores are skewed, with few principals ranking their schools very pessimistically, schools were classified according to whether principals ranked them in the most optimistic two categories. Measures include rankings of staff morale, whether teachers with three or fewer years of experience ("new" teachers) were excellent, whether teachers with more than ten years of experience ("experienced teachers") were excellent, whether student disruption interfered with learning, whether parents worry about violence at the school, and whether parents monitor children's academic progress.

Teachers were asked to rate their agreement with statements on a scale of 1-4; again, schools were classified according to whether teachers ranked statements in the top two categories. Measures include ratings of whether teachers spend less time on non-tested materials to boost scores on the FCAT, whether respondents spend less time with low performers due to the A+ accountability program, whether they spend less time with higher performers due to the

[1] Violent incidents include battery, fighting, homicide, kidnapping, sexual offenses, sexual battery, and robbery. Drug, alcohol, and tobacco incidents include drug sales as well as use of illegal substances. Nonviolent incidents include including arson, breaking and entering, disruption on campus, larceny/theft/motor vehicle offenses, threat/intimidation, trespassing, vandalism, weapons possession, and "other" major offenses.

accountability program, whether parents monitor instruction, whether teachers at the school in general have low expectations of children, and whether parents help children with their homework. Teachers also estimated the percent of their time spent on discipline problems, and the number of contacts (including calls and face-to-face meetings) they had with parents in a week. Table 3 presents comparisons of Participants and Non-participants on these dimensions.

Schools attended by Participants were, on average, more troubled than schools attended by Non-participants (Table 3). Participants' schools reported significantly higher rates of violent incidents and other nonviolent incidents than did Non-participants' schools; differences between Participants and Non-participants' schools on the rate of drug, alcohol, and tobacco incidents and on the rate of bullying incidents were not significant. Participants also attended schools with significantly higher rates of out-of-school suspensions. There was no statistically significant difference between the groups on the rates of in-school suspensions.

Likewise, Participants' schools were assessed somewhat more pessimistically by their principals than were Non-participants' schools. While the trends were consistently in favor of Non-participants' schools, however, only two comparisons were significantly different between the two groups. Participants were significantly more likely to come from schools where principals reported that student disruptions interfered with learning and significantly less likely to come from schools where principals rated new teachers in their school as "excellent". There was no significant difference in the extent to which they reported low staff morale, rated their more experienced teachers as excellent, reported parent concerns of violence, or reported parents monitoring academic progress of students,

Teachers in Participants' schools were also less sanguine than in Non-Participants' schools. However, based on the more conservative Holm-Bonferonni significance thresholds,

only one of these comparisons was significant: Teachers in Participants' schools reported spending a significantly higher share of time on discipline. They reported marginally fewer contacts with parents, on average, and were marginally more likely than in Non-participants' schools to report spending less time with the lowest performers due to pressure from Florida's A+ accountability program. Teachers in Participants' schools were also marginally more likely to agree that teachers in their school had low expectations for students generally. There was no significant difference in the likelihood of focusing on the FCAT at the expense of other skills, the likelihood of ignoring strong students due to FCAT pressures, reports of parental monitoring of instruction, or the likelihood that teachers reported parents helping with homework.

Thus, Participants disproportionately came from public schools of low academic quality and with more disruptive environments. These forces may be expected to "push" students towards application. However, once students have decided to explore other options, a whole new set of considerations enter the equation. In particular, in deciding whether to participate in a voucher program, students are likely to consider both the availability of acceptable private school options and whether they can meet their needs by exercising choice amongst different public schools. I consider each of these factors in turn.

**Private School Markets**

Private school markets may induce or discourage participation in the program in several ways. Specifically, students who face a more competitive private school market—with private options nearby, a variety of types of schools to choose from, and better-reputed private schools—may be more likely to apply to the program. To determine whether Participants and Non-participants face different private school markets, I examine several geospatial variables: the distance between the child's public school and the nearest private school, the number of private

schools within a five-mile radius of the public school, the percentage of children who had any private schools within a five -mile radius of the public school, and the number of "types" of private schools within a five-mile radius. Schools are categorized as one of nine "types": Baptist, Catholic, Evangelical, Islamic, Jewish, Protestant, "Other Christian", non-denominational, and secular. This measure is intended to capture the variety of options that families have; a greater variety of options should increase the likelihood that families of different religious backgrounds will have a school that satisfies their religious tastes. Private schools are restricted to those that serve elementary-aged children, and to schools that accept the FTC scholarship. The child's public school is used as the focal point for geospatial measurement because I do not have home addresses for non-applicants.

Participants face significantly more competitive private school markets than do Non-participants on a number of measures (Table 4). Public schools attended by Participants are located nearly a mile closer to their nearest private competitor compared to Non-Participants' schools. A greater proportion of Participants have competitors within a five-mile radius of their public schools, and Participants also see a greater average number of competitors within five miles. Furthermore, Participants faced more diverse private school markets; on average, Participants had access to significantly more types of private schools within a five-mile radius of their public schools. The latter three measures were also robust to the use of a two-mile radius.

Past survey-based literature indicates that parents also consider private school quality when making decisions about children's schooling. Private schools are not subject to the testing and reporting requirements that public schools follow to comply with accountability policies, so parents lack state-provided ratings of school quality. However, parents may look to other publicly available ratings of schools, including ratings on websites like greatschools.org.

Greatschools.org allows parents to search for schools near a certain address or in a given district or county, and provides basic information regarding religious affiliation, student body demographics, and student-teacher ratios. It also provides consumer ratings of schools; users are allowed to assign one to five stars to a school and write comments. Comments identify whether the reviewer was a parent, student, former student, staff member, teacher, or administrator, and the site also lists the dates the reviews are given. Note that these are not highly scientific ratings; the decision to review is entirely based on self-selection. However, they provide one source of information that parents may use to decide whether to use private schools.

I reviewed comments for FTC-accepting elementary schools and calculated average ratings for each school as of January 1, 2008. I used these ratings to create three measures, using the public school as the geospatial locus. The first is the rating given to the closest rated school, if the closest school is within a ten mile radius. A little over half the time, the closest school is not rated and this measure represents the rating of the closest school that *does* have a rating. The results are substantively similar if this measure is restricted to represent only the cases where the closest school is rated. The second measure is the average rating of the twenty closest private schools (or the average rating for schools within a ten mile radius, if public schools did not have twenty competitors in that radius). The third is the average ratings of private schools within a five mile radius. Only ratings that included comments could be incorporated in the average parent rating, because those were the only ones for which dates were available. Comments without ratings were similarly not used, unless the text of the comments explicitly stated ratings (e.g., "This is a five-star school!").

Participants' public schools had lower rated competitors on average than did Non-participants'. The rated private school options nearest to Participants' public schools received

significantly lower parent ratings than did the rated private schools nearest to Non-participants' schools. Likewise, the average rating of the twenty closest schools and the average rating of private schools in a five mile radius were both significantly lower for Participants than for Non-participants.

One concern may be that these results could simply reflect the concentration of participants in areas where schools in general—both public and private—were low-performing. Being in an area with low educational quality in public schools could both prompt the opening of new schools, and also reduce pressure on those schools to provide very high quality education. However, concentration in areas with poor public schools is not the full story for these results. Even when I controlled for measures of public school quality, including school grade and test scores, the results held. In only one case—the measure for the average parental ratings of schools within five miles—did the results diminish to non-significance at conventional levels ($p<.09$).

Taken together, these analyses indicate that Participants face more competitive private school markets from the perspective of available competitors, and of the likelihood of finding a school that matches the family's religious tastes. However, Participants' most convenient private school options receive lower parent ratings, suggesting that their private school options engender somewhat less client satisfaction than do the private schools proximate to Non-participants.

**Public School Markets**

Obviously, private schools are not the only option for students who are disgruntled in their current public school. Students may prefer to exercise school choice within the public school system, either through attending a charter school or by pursuing open enrollment options. These may be especially attractive relative because they potentially pose fewer costs than a private school. While the FTC scholarship covers approximately 90% of the tuition of an average

religious elementary school in Florida, even a relatively small amount of remaining tuition may pose a hardship to the low-income families targeted by the program. Moreover, there are application costs associated with the FTC program, and students may incur additional costs for books, transportation, and uniforms. By contrast, enrolling in charter schools, or in non-zoned public schools through open enrollment programs, does not impose tuition costs on students, although they may have to pay some portion of transportation costs (Florida Department of Education, 2008). Some parents may also prefer to remain in the public school system rather than sending their children to private schools, for instance if their only options are religious schools and they prefer secular schooling. I look both at students' access to open enrollment programs and to charter options to assess whether the degree of public school choice is associated with students' use of vouchers.

To examine access to open enrollment, I used the Florida Department of Education's 2008-2009 report on controlled open enrollment in the state. This document reports the share of students in each district using open enrollment options from the 2006-2007 school year through the 2008-2009 school year. The report indicates that 12.42% of public school students statewide were enrolled in non-zoned schools under the controlled open enrollment program in the 2007-08 school-year. However, there was significant variation in the extent of open enrollment among districts. Approximately half of students were enrolled in districts with more than 5% of students using controlled open enrollment; these students are characterized as residing in a "high open enrollment" districts. Moreover, 17 of Florida's 67 districts had fewer than five students in the entire district (15 had no students in the program and two districts had one student each). I therefore create a second measure based on whether students are in one of these 17 "no open enrollment" districts.

The second form of public school choice that I study is access to charter schools. The Florida Department of Education Master Identification Data File identifies which schools are charters, so I geocode access to charter schools in much the same way that access to private schools is geocoded. I therefore create three main measures of access to charter schools: whether students attended public schools with a charter competitor within five miles, the number of charter competitors within five miles of a student's public school, and the ratio of charter to private schools in five miles. The rationale for the last measure will be expanded upon below.

Table 5 indicates that Participants have poorer access to public school choice than do Non-participants. They are less likely to be in high open enrollment districts; only 46% of participants vs. 52% of non-participants were in districts in which more than 5% of the public school student body participated in the controlled open enrollment plan. The differences were even more marked when the measure of open enrollment is whether students are in districts with effectively *no* participation in controlled open enrollment. While about 34% of participants came from such districts, the share of non-participants who came from "no open enrollment" districts was about half that figure. This suggests that students with more limited access to public choice options will be more likely to participate in voucher programs.

This is supported—albeit somewhat more weakly—by the charter school figures. While there were only negligible differences in the share of students who had access to *any* charter schools within five miles, Participants had access to a marginally smaller *number* of charter options within five miles compared to Non-participants. However, when a two-mile radius was used, these differences were non-significant.

Another way to conceptualize the role of public school competition is to take the share of charter schools to private schools in a five mile radius. This gives a rough sense of how readily

accessible public alternatives are in relation to private options. It also controls for the density of the population within five miles. For instance, if there are relatively few charter schools within five miles, it could be because there is little taste for public alternatives in that radius or because there are not enough people in that radius to support many other schools. Comparing the ratio of charter to private schools allows me to distinguish areas of low density from those with enough density to support alternatives, that simply lack charters. Table 5 indicates that there are significantly fewer charters per private school within a five mile radius of Participants' schools compared to Non-participants'. This suggests that more limited access to public school choice options relative to private school options is associated with participation in the program.

**Importance of Application vs. Take-up**

A natural question to pose is whether these differences manifest themselves at the application stage or in the decision to use an offered voucher. To examine this, I ran t-tests for each stage, juxtaposing Applicants to Non-applicants and, among the pool of students who were offered vouchers, Users to Decliners. This can help to determine whether significant differences emerge between applicants and non-applicants, and whether patterns at the take-up decision magnify or shrink the gap between those who ultimately use vouchers and those who do not.

For the characteristics of students' own public schools and for private school markets, these analyses suggest that most of the differentiation between those who do not use vouchers and those who do, comes with the decision to apply for the program. The pattern of results of t-tests for differences between Applicants and Non-applicants are strikingly similar to those for Participants vs. Non-participants. However, conditional on being offered a voucher, only a small number of comparisons are significantly different between those who ultimately use a voucher and those who decline it. This suggests that parents make the determination about whether their

current public schools are unacceptable, and whether they have access to a suitable private school option, before applying; these factors seem to have little impact on the decision-making after being offered a voucher. Given the costs associated with application, this is sensible.

Most interesting are the results for the public school market. This is the only case where take-up seems to play a role above and beyond the application decision. For all measures of access to charter schools, Users have at least marginally significantly poorer access than do those who decline vouchers. There is no additional difference between Users and Decliners in terms of the likelihood of being enrolled in a district with greater than 5% of students using open enrollment, conditional on applying and being offered a voucher. However, Users are strongly significantly more likely to hail from districts with no open enrollment than are those who decline an offered voucher. This suggests that applicants may be hedging their bets and applying to both private options and public options. Where they have a greater ability to exercise public choice, they are more likely to do so even if they are also offered a private school voucher.

**Robustness Checks**

There are two clear concerns that arise from restricting the sample to currently-enrolled elementary school students. The first is that children who switch into the program after first attending public schools may be very different than students who enter the program in Kindergarten and never actually attend public schools, which is a popular route into the program. Perhaps children are most likely to enter directly into the program instead of their public kindergarten if their zoned public schools are particularly bad. In that case, I might be underestimating the extent to which participants are able to use the program to avoid "bad" schools. Alternatively, perhaps there are families with a taste for qualities that only private schools can provide—such as religious education. Because these families are insensitive to the

characteristics of the public schools, excluding these families may overestimate the extent to which the program diverts students from facing poor public schools.

To address these concerns, I re-estimated the main results for application using imputed schools for those who were not observed in public schools in the prior year. I imputed school attendance by geocoding applicant home addresses and public school latitudes and longitudes using ArcGIS. I assigned children who did not attend a public school in 2007-2008 to the nearest public school that served their grade, excluding some irregular types of schools (e.g., vocational schools, technical schools, and schools serving delinquent or homebound students.)

The relationships between participation status and contextual school characteristics (not shown) are strikingly similar to the results for would-be switchers. In general, the magnitude of the difference between Non-participants and Participants diminishes somewhat when the sample includes those who did not previously attend public schools, but the pattern of significance generally holds. A few exceptions occur; for instance, the comparisons for access to charters and number of charters within a five mile radius become non-significant; however, the comparison for the ratio of charters to private schools remains strongly significant.

A second concern is that including fifth graders may downward bias results. Since most fifth graders move to a middle school in sixth grade, they may make application decisions with an eye to the quality of their prospective middle school rather than their current elementary school. I therefore ran the main analyses excluding fifth graders. The pattern of results was essentially unchanged when fifth graders were excluded. In general, results became somewhat stronger when fifth graders were excluded, suggesting that the main results presented in the paper are conservative.

Additionally, one might be concerned about the specification of the t-tests. For instance, one might be concerned that the large sample sizes may make small differences excessively easy to detect. An alternative way to consider these comparisons is to use the share of students in a school who leave the school using a scholarship as the dependent variable, and contextual characteristics as the independent variables. This lowers the sample size to somewhat less than 2,000 schools. Again, the main pattern of results holds. However, several new comparisons rise to significance under this specification. For instance, higher student-to-teacher ratios and higher rates of in-school suspensions become at least marginally ($p<.05$) positive predictors for share of students leaving under this specification. Principal reports that parents worry about violence and that old teachers are not rated excellent become marginally significant under this specification as well. Teacher reports of greater focus on the FCAT in their classroom is associated with marginally smaller shares of students leaving to participate in the FTC program. A few variables that were significantly different for Participants and Non-participants become non-significant as predictors of the share of students leaving from a given school. For instance, being a "D" school is not significantly related to the share of students leaving in this specification, and being in a district with more open enrollment drops to marginal significance ($p<.10$). However, these exceptions are few, and overall this replication with a diminished sample size bolsters confidence in the main results.

**DISCUSSION**

I find that Participants in the Florida Tax Credit Scholarship Program disproportionately come from lower quality public schools than do eligible Non-participants. Participants are more likely to be in schools that have poor academic performance, and in schools that have greater reported rates of disruption from violent and non-violent incidents. These administrative reports

dovetail with reports from principals and teachers, who also rate the schools that Participants come from as more disruptive and less positive along several other dimensions.

Private school markets are also associated with participation. Relative to Non-participants, Participants disproportionately attended school in markets with more convenient and diverse options. However, parent ratings of private school quality were negatively related to participation. This suggests that "push" factors may be especially important in motivating students to apply; students who feel that their public schools are bad fits, either due to the poor quality of the school itself or due to the student's poor performance specifically, may be motivated to apply for the FTC program regardless of whether the private school options are particularly attractive. Another possibility is that poorer quality schools may be specifically publicizing their involvement in the program and reaching out to potential applicants, exposing families to information on the program and eliciting application. However, this is merely speculation; further research is needed to determine what drives the negative relationship between parent ratings of private schools and participation behaviors.

Public school markets are also associated with participation. On average, Participants had more limited access to open enrollment programs or charter schools than did Non-participants. Access to public school options mattered at both the application and take-up phases of the participation decision. One read on these results is that they emphasize the importance of “push” factors. If one concern of voucher opponents is that parents will use vouchers specifically to seek out religious education that voucher opponents are uninterested in funding, the fact that voucher participation is sensitive to the availability of other options suggests that this is not the only motivating factor at work. Instead, it suggests that there is a sizeable portion of participants who

are looking for alternatives to their zoned school broadly defined, and that they will accept alternatives in the public realm.

This paper raises several important questions that future work should address. For instance, how do the factors examined in this study interact with each other? One might expect that attending a poor quality public school would pose a greater impetus to participate in the voucher program in a district with limited open enrollment options, for instance. Likewise, the likelihood of participating might depend on the quality of the public options that a student has nearby; the role of quality of nearby schools might be more salient in a district with greater access to open enrollment. The demographic make-up of a zoned public school might interact with the demographic make-up of its public and private competitors, and students' preferences for racial mix of their school might vary based on students' own race. Given that about a third of applicants observed in public schools do not take up a voucher when they are offered one, and students with better access to public choice options are more likely to decline vouchers, another question might be what happens to students after they apply to the program? Do students who decline vouchers end up in charter schools or using open enrollment programs? While these questions are beyond the scope of this paper, they present important avenues for future work in this area.

There are several limitations to this study. First, Florida presents a unique context; while there are rural areas in the state, the vast majority of the population lives near major urban areas. Thus, these results may not generalize to programs in other states. Second, the main analysis was conducted on a sample of children who attended public schools prior to program application. While the robustness checks indicate that participants who are not in public schools would likely be zoned to more disadvantaged schools than the average eligible non-participant, my method of

matching students is imperfect. These analyses therefore may not fully accurately capture the public school options that these children face. While these results shed some light on contextual factors that such families are likely considering while applying to the program, they can speak more confidently to the association between contextual factors and program application for the group of potential switchers on which the main analysis was conducted.

Despite these limitations, this study makes an important contribution. By examining a richer set of public school quality and private school market measures, it provides a fuller picture of the contextual factors associated with student participation in the program. From a policy perspective, examining public school contexts is important because these policies are often justified as a way to help students exit underperforming, unsafe schools. Knowing that these policies do in fact attract applicants in poor schools is useful in gauging the success of the voucher policies in opening up choices to families in low-quality schools. Likewise, the results on the private school market front have implications for the characteristics that make program use attractive to students. Unsurprisingly, they suggest that students are most likely to make use of the program when private school options are convenient and varied; lack of convenient private school options may be a barrier to participation in some parts of the state. The public school market findings, while intuitively sensible, present perhaps the most novel contribution of this paper. They suggest that students with better access to public options are less likely to participate in voucher programs. While further research in this domain is warranted, this study considerably deepens the literature on the contextual factors associated with participation in means-tested school voucher programs.

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**Table 1. Individual characteristics of sample students: by participation**

| | Non-participants | Participants | Group differences |
|---|---|---|---|
| **Race/ethnicity** | | | |
| % White | 25.620 | 19.320 | *** |
| | (43.653) | (39.488) | |
| % Black | 33.866 | 52.243 | *** |
| | (47.325) | (49.959) | |
| % Hispanic | 34.315 | 23.806 | *** |
| | (47.476) | (42.597) | |
| **Lunch status** | | | |
| % Free lunch | 81.672 | 87.048 | *** |
| | (38.689) | (33.584) | |
| % Reduced price lunch | 18.328 | 12.952 | *** |
| | (38.689) | (33.584) | |
| **Individual performance 2007-2008** | | | |
| Math score: 2007-08 FCAT (st. dev) | -0.146 | -0.310 | *** |
| | (0.883) | (0.894) | |
| Reading score: 2007-08 FCAT (st. dev) | -0.138 | -0.239 | *** |
| | (0.865) | (0.860) | |
| Above school mean (%): math | 44.794 | 41.353 | * |
| | (49.728) | (49.273) | |
| Above school mean: (%) reading | 44.533 | 42.857 | |
| | (49.700) | (49.514) | |
| **Observations** | **555,271** | **2,764** | |

Note: Standard deviations in parentheses. Data from FTC program applications and Florida Education Data Warehouse. Sample includes non-exceptional students enrolled in free or reduced price lunch observed in Florida public elementary schools in 2007-2008. Sample sizes for scores: n~242,150 for non-participants, n=931 for participants. Individual scores are expressed in standard deviation terms relative to all same-grade peers (including non-subsidized lunch users) in Florida in 2007-08. Race categories are mutually exclusive.
*** p<.001, ** p<.01, * p<.05, + p<.10

**Table 2. School demographics, performance, and staffing: by participation**

| | Non-participants | Participants | Group differences |
|---|---|---|---|
| **School aggregate performance** | | | |
| 2006-07 DOE grade=A | 55.107 | 44.229 | *** |
| | (49.739) | (49.675) | |
| 2006-07 DOE grade=B | 17.206 | 16.876 | |
| | (37.744) | (37.461) | |
| 2006-07 DOE grade=C | 21.885 | 29.905 | *** |
| | (41.347) | (45.793) | |
| 2006-07 DOE grade=D | 3.648 | 5.067 | * |
| | (18.748) | (21.936) | |
| 2006-07 DOE grade=F | 2.153 | 3.924 | * |
| | (14.516) | (19.420) | |
| **School demographics** | | | |
| Percent White | 34.681 | 28.596 | *** |
| | (27.615) | (27.012) | |
| Percent Black | 29.540 | 41.011 | *** |
| | (27.937) | (31.990) | |
| Percent Hispanic | 29.528 | 24.626 | *** |
| | (26.696) | (26.524) | |
| Percent on subsidized lunch | 63.495 | 66.209 | *** |
| | (21.079) | (20.013) | |
| **School staffing** | | | |
| Percent teachers with advanced degrees | 30.172 | 29.318 | * |
| | (10.976) | (10.691) | |
| Average years teacher experience | 10.954 | 11.037 | |
| | (3.202) | (3.215) | |
| Student-teacher ratio | 14.392 | 14.692 | |
| | (2.496) | (5.649) | |
| **Charter school** | 2.965 | 4.052 | |
| | (16.963) | (19.721) | |
| **Observations** | **555,271** | **2,764** | |

Note: Standard deviations in parentheses. Data from FTC program applications and Florida School Indicator Reports. Sample includes non-exceptional students enrolled in free or reduced price lunch observed in Florida public elementary schools in 2007-2008

*** p<.001, ** p<.01, * p<.05, + p<.10

**Table 3. Students' school climate characteristics: by participation**

| | Non-participants | Participants | Group differences |
|---|---|---|---|
| **School incidents and suspension rates** | | | |
| Violent incidents | 1.357 | 2.156 | *** |
| | (2.796) | (4.146) | |
| Drug, alcohol, or tobacco incidents | 0.038 | 0.052 | |
| | (0.162) | (0.178) | |
| Bullying incidents | 0.223 | 0.217 | |
| | (0.626) | (0.682) | |
| Other non-violent incidents | 0.669 | 0.855 | *** |
| | (0.941) | (1.088) | |
| Percent receiving in-school suspension | 2.906 | 3.088 | |
| | (3.967) | (4.170) | |
| Percent receiving out-school suspension | 3.603 | 4.861 | *** |
| | (3.794) | (4.974) | |
| **School climate: Principal report** | | | |
| Morale low | 18.633 | 20.994 | |
| | (38.937) | (40.738) | |
| New teachers excellent | 65.505 | 58.682 | ** |
| | (47.535) | (49.254) | |
| Older teachers excellent | 78.339 | 75.839 | |
| | (41.193) | (42.818) | |
| Student disruption interferes with learning | 27.807 | 35.567 | *** |
| | (44.805) | (47.885) | |
| Parents worry about violence | 10.175 | 12.150 | |
| | (30.232) | (32.680) | |
| Parents monitor academic progress | 29.168 | 28.619 | |
| | (45.454) | (45.211) | |
| **School climate: Teacher report** | | | |
| Percent time spent on discipline | 19.735 | 23.547 | *** |
| | (13.328) | (14.886) | |
| Number of parent contacts/week | 11.476 | 10.380 | * |
| | (6.646) | (6.929) | |
| Less time on skills not on FCAT | 95.405 | 92.011 | |
| | (20.939) | (27.150) | |
| Less time with low performers b/c of A+ | 40.693 | 50.413 | * |
| | (49.127) | (50.067) | |
| Less time with high performers b/c of A+ | 79.734 | 82.920 | |

| | | | |
|---|---|---|---|
| | (40.199) | (37.685) | |
| Most teachers have low expectations | 18.135 | 26.997 | * |
| | (38.531) | (44.456) | |
| Most parents monitor instructional program | 39.218 | 38.568 | |
| | (48.824) | (48.743) | |
| Most parents help with homework | 52.592 | 44.628 | + |
| | (49.933) | (49.779) | |
| **Observations** | **424,043** | **2231** | |

Note: Standard deviations in parentheses. Data from FTC program applications, Florida School Indicator Reports, Master School Identification Data, and Florida principal and teacher surveys. Sample includes non-exceptional students enrolled in free or reduced price lunch observed in Florida public elementary schools in 2007-2008N's for principal survey ~370,200 for non-participants and ~1800 for participants. N's for teacher survey ~81,850 for non-participants and ~350 for participants.

*** p<.001, ** p<.01, * p<.05, + p<.10

**Table 4. Private school markets faced by students' public schools: by participation**

| | Non-participants | Participants | |
|---|---|---|---|
| **Degree of competition** | | | |
| Miles to nearest competitor | 2.685 | 1.715 | *** |
| | (3.753) | (2.286) | |
| Competitor within 5 miles (fraction) | 0.860 | 0.941 | *** |
| | (0.347) | (0.236) | |
| Density within 5 miles | 9.344 | 12.771 | *** |
| | (9.242) | (10.134) | |
| Diversity within 5 miles | 3.533 | 4.170 | *** |
| | (2.194) | (1.951) | |
| **Quality of competitors** | | | |
| Rating of closest rated school | 4.246 | 4.149 | ** |
| | (0.909) | (0.969) | |
| Average rating of 20 closest private schools | 4.198 | 4.139 | *** |
| | (0.357) | (0.367) | |
| Average rating of schools within 5 miles | 4.194 | 4.146 | ** |
| | (0.484) | (0.448) | |
| **Observations** | **497,540** | **2478** | |

Note: Standard deviations in parentheses. T-tests conducted using robust standard errors clustered at the school level. Sample includes non-exceptional students enrolled in free or reduced price lunch observed in Florida public elementary schools in 2007-2008. Authors' calculations using Florida Private School Directory, Florida Master School Identification Data, and greatschools.org merged with application data.
*** p<.001, ** p<.01, * p<.05, + p<.10

**Table 5. Students' public school market characteristics: by participation**

| | Non-participants | Participants | Group differences |
|---|---|---|---|
| **Open enrollment** | | | |
| Higher district open enrollment (>=5% of students) (fraction) | 0.521 | 0.462 | *** |
| | (0.500) | (0.499) | |
| No open enrollment in district (fraction) | 0.173 | 0.344 | *** |
| | (0.378) | (0.475) | |
| **Charter schools** | | | |
| Any charter within 5 miles (fraction) | 0.519 | 0.484 | + |
| | (0.500) | (0.500) | |
| Number of charters within 5 miles | 1.169 | 1.046 | * |
| | (1.622) | (1.526) | |
| Ratio charter:private schools within 5 miles | 0.129 | 0.087 | *** |
| | (0.203) | (0.155) | |
| **Observations** | **555,271** | **2764** | |

Note: Standard deviations in parentheses. T-tests conducted using robust standard errors clustered at the school level. Sample includes non-exceptional students enrolled in free or reduced price lunch observed in Florida public elementary schools in 2007-2008. Authors' calculations using Florida Master School Identification Data and 2008-2009 Controlled Open Enrollment report merged with application data.
*** p<.001, ** p<.01, * p<.05, + p<.10