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Searching for schools in a low quality market: Evidence from Chile

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Abstract

In this paper, we use survey and school level data in the Metropolitan Region (R.M.) of Chile to examine how legal and incentive changes to improve the national voucher program affected parent behavior and school responses. Using face-to-face interviews conducted with random samples of first grade parents in the R.M. in 2003 (prior to the policy shifts) and 2009 (after changes were implemented), we asked parents to tell us about the number and types of information they use to choose schools, and the distances they travel to send their children to school. We also analyze the changes in the availability of different types of private voucher schools and the quality of these schools across schooling markets with different socioeconomic environments in the R.M. We find that, while changes in some of the key aspects of the voucher program had an important effect on parent's school search behavior, school supply response has been much slower. Parents are gathering more information, traveling greater distances, and willing to pay higher fees for better performing schools. However, while the number of private voucher schools has expanded across the R.M., there are very few quality options available to parents, especially in disadvantaged neighborhoods.

1 Introduction

Widespread concerns over the quality of schools in Chile has pushed the issue of education reform to the forefront of the national debate. In July of 2006, more than 600,000 students walked out of class and occupied hundreds of schools all over the country to protest inequities in Chile's education system. The students maintained that the fault lied with Chile's unfettered national voucher program (El Mercurio, June 1st 2006). School choice and vouchers are among the most hotly debated instruments of school reform in many countries. Voucher programs come in many forms. They often differ in their design and these differences can affect incentives and responses. Therefore, understanding the effects of alternative designs is key to crafting an effective voucher program. This paper examines how changes in some key aspects of Chile's voucher program between 2003 and 2009 may have affected parent behavior and private voucher school incentives and performance.

Chile's long-standing universal system of educational vouchers has provided parents with the opportunity to choose among a variety of public and private schools for over 30 years. In 2008, 50.2 percent of elementary students that live in urban areas attended private voucher schools, 42.3 percent public schools and 7.5 percent private non-voucher schools.[1] Over the period 1990 and 2008, the total number of urban private voucher schools increased by 58.8 percent, and total enrollment in urban private voucher schools increased by 84.4 percent.

The advent of school choice in Chile and other countries has fueled a persistent scholarly and policy debate on the advantages and potential pitfalls of educational vouchers (Henig

[1]Most rural students attend public schools and have few school choice opportunities. In 2008, 21.7 percent of elementary rural students attended private voucher schools and 77.2 percent public schools. However, there has been a moderate growth in the number of rural private voucher schools and students. Over the period 1990 and 2008, the total number of rural private voucher schools increased by 20.8 percent, and total enrollment in rural private voucher schools increased by 13.6 percent.

1994, Moe 2001). Discussions of the effects of school choice and vouchers have often focused on the issues of school quality and efficiency, school diversity, and social equity (Belfield & Levin 2005, Godwin & Kemerer 2002).

Fundamental to the push for educational vouchers is the idea that choice unleashes competitive pressure on schools that makes them deliver higher quality schooling at a lower cost (Barrow & Rouse 2008). Friedman (1962) argues that the public school system is a monopoly in which schools are guaranteed students no matter how well they perform. The result is that they have few incentives to produce high quality education and to allocate their funds efficiently. He argues that allowing private schools to compete for tax dollars would bring new schools into the educational marketplace that offered higher quality education for the same price as public schools.

Chubb, J. and Moe, T. (1990) developed a theory of educational governance to help explain how politics affects the efficiency of schools. They argue that given the way incentives are structured in politics, the top-down forms of control tend to bury schools in bureaucracy and erode efficiency. Chubb, J. and Moe, T. (1990) maintain that the problem of over-regulation has been especially burdensome in education because the regulators continually change the rules and this leads to large amounts of cumbersome paperwork, limits autonomy of principals and teachers, and stifles creativity. They argue that the only way to improve efficiency is to shift from top-down control of schools to a market based education system of vouchers where schools compete for students.

For many voucher advocates, to give families the freedom to pursue their own educational preferences that reflect their values, and educational and religious philosophies is also an important issue for educational change. Coleman (1990) asserts that by allowing parents

to choose schools on the basis of communities to which they belong (e.g. religious communities, progressive communities) choice can increase diversity in education and strengthen the notion of community and parental trust in schools.[2] Friedman's (1962) economic logic is also grounded in a respect for diversity and a tolerance of individual values. He argues that the point is not just to give parents higher quality schools, but also the kind of education they want for their children. Friedman (1962) theorizes that the availability of publicly funded vouchers would "bring a healthy increase in the variety of educational institutions available to parents".

While efficiency and school diversity are important issues in education policy reform discussions, the concern that school systems be fair and equitable is crucial to most governments. Advocates have often argued that the introduction of educational vouchers can make improved educational opportunity and private schooling options available to the most disadvantaged children (Sugarman 1999). Since the option of school choice through residential mobility or through enrollment in private schools has long been available to wealthier families, voucher proponents maintain that expanding the right of disadvantaged parents to leave their low performing neighborhood schools for higher performing ones may improve social equity as income becomes less important in determining who attends higher quality schools (Neal 2002, Viteritti 2003).

Voucher skeptics have identified both demand side and supply side critiques of school choice and competition. On the demand side, they are concerned about whether families, especially low-income parents, have the time, ability and resources to choose the best schools

[2]Recent empirical work by Bryk & Schneider (2002) demonstrates that building trust in school communities is essential for improving academic performance.

for their children (Smith & Meier 1995, Henig 1994, Carnegie Foundation 1992, Schneider et al. 2000). Schneider et al. (1997) argue that choice may exacerbate the level of inequality in education as more highly educated parents with higher cognitive skills, higher quality networks, and greater interest in education become better "shoppers" for information and use that information to choose the best schools for their children.

On the supply side, critics have raised concerns about the effect of competition and parental choice on the schools themselves. For instance, some skeptics argue that faced with competitive pressure in an industry that provides complex services to poorly informed parents, schools will have incentives to economize on quality (Levin 1998). A number of formal models in the literature have demonstrated that school quality declines when competition increases. For instance, Bayer & McMillan (2002) develops a theoretical model that predicts that schools will respond to the competitive pressures of vouchers by reducing effort and lowering school quality. Opponents claim that parents will pay higher fees for similar or lower quality options (Molnar 2001).

Others are concerned that school location decisions in educational markets may exacerbate inequities. For example, opponents are concerned that for-profit schools may not have incentives to establish schools in poor neighborhoods, where business is more risky and students are more expensive to educate. Based on their empirical findings on private school location patterns in California, Downes & Greenstein (1996) predict that if a voucher system were implemented, private schools would be more likely to locate in communities with more highly educated parents than in low-income communities.

Scholars have pointed out that the design of a voucher program can affect parent and school responses to choice (Levin 1998). Until recently, Chile's unfettered voucher program

lacked several key components of an effective design. It had an unrestricted flat per pupil voucher that could be topped up by parents, thus providing few incentives for schools to locate in poor neighborhoods. The government provided parents with little information on school quality and schools were not held accountable for test scores and other outcomes. And private voucher schools were permitted to shape their pool of students based on independent criteria (interviews, tests, etc.), which also likely induced self-selection out of many quality schools.

Many aspects of Chile's voucher system have changed over the last 8 years. Chile instituted a weighted voucher and national school accountability program, provided parents with more information on school quality, and banned school selection in primary grades. In this paper, we use survey and school level data in the the Metropolitan Region (R.M.) of Santiago, Chile to examine how these changes affected parent behavior and school responses. Using face-to-face interviews conducted with random samples of first grade parents the R.M. in 2003 (prior to the policy shifts) and 2009 (after the changes were implemented), we asked parents to tell us about the number and types of information they use to choose schools, and the distances they travel to send their children to school. We also analyze the changes in the availability of different types of private schools and the quality of these schools across schooling markets with different socioeconomic environments in the R.M..

We find that, while changes in some of the key aspects of Chile's voucher program had an important effect in parent's school choice behavior, school supply response has been much slower. Parents are gathering more information, traveling greater distances, and willing to pay higher fees for better quality schools. However, while the number of private voucher schools have expanded in the R.M., there are very few quality options available to parents,

especially in disadvantaged neighborhoods.

2 Chile's voucher program and shifts

Chile's national voucher program was designed and implemented by the military government in 1981. First, the Ministry of Education decentralized education service delivery to regional and provincial offices and the administration of public schools to municipal governments, whose maximum authority is an elected mayor. Second, it made all students in grades kindergarten through twelve (K-12) eligible for a flat per pupil voucher[3] to attend public or private schools that did not charge tuition. The essential features of this system remained in place for over a quarter-century. The center-left coalition in power between 1990 and 2010 chose to focus on improving the quality of poor schools through direct resource investments, while maintaining the organizational and funding components introduced in the eighties (Cox 2003). The only significant modification of the voucher program between 1990 and 2002 was in 1994, when the Ministry instituted a financing scheme that allowed all private voucher schools to charge limited tuition (Montt et al. 2006).

In 2002, while parents in theory had unfettered choice among public and private schooling options, there were a number of factors that continued to restrict their options. First, Chile had an unrestricted flat per pupil voucher that could be topped up by parents, thus providing few incentives for schools to locate in poor neighborhoods and enroll disadvantaged children. Second, private voucher schools were permitted to shape their pool of students based on independent criteria (interviews, tests, etc.), which also likely induced self-selection of parents

[3]Chile's voucher formula included adjustments for rural schools and high schools, but did not take into account student socioeconomic characteristics or the existence of a high concentration of low-income students in public and private voucher schools.

out of many quality private schools. Finally, the government also provided parents with little information on school quality and schools were not held accountable for test scores and other outcomes.

Following a vigorous national policy debate on education in 2006, the government introduced a number of features in the national voucher program that strengthened parental choice and provided schools with incentives to locate in poor neighborhoods and serve disadvantaged pupils.

2.1 Finance

Between 1981 and 2007 municipalities and private school owners received a flat per-pupil voucher and, beginning in 1994, parents were allowed to add on to vouchers with their private resources. In 2007, the Chilean legislature enacted the adjusted voucher law (*Ley de Subvención Preferencial or SEP*). The SEP law recognizes that it is more costly to educate disadvantaged students by introducing an extra per-pupil subsidy (50 percent over the base voucher) for students classified as priority in the Ministry of Education's socioeconomic status classification system and for schools with a high concentration of priority students.[4] The SEP law is designed to increase private voucher schools' incentives to enroll disadvantaged students and locate in poor neighborhoods underserved by local schools and enable schools to devote more resources to children from disadvantaged home environments and thereby to raise their achievement and narrow the achievement gaps in Chile.

[4]This system determines whether a student is "priority" based on individual and household surveys collected by the Chilean government. See Elacqua et al. (2009) for details on the decision tree the Ministry of Education uses to classify "priority" students.

2.2 Regulation

The government also made several changes to the rules and regulations under which the voucher system operates. The legislative reforms regulated school selection procedures. The SEP law forbids participating schools from using parental interviews and admissions tests to select and expel students. In addition, participating schools cannot charge tuition to priority students. During the school year owners and/or principals can no longer suspend or expel students because they cannot pay tuition (in schools with shared financing). Prior to this Act, schools were allowed to select students and could expel students that fell behind on tuition payments.

The government also established low-income student quotas to foster school integration and expand disadvantaged families schooling options. Schools that received government funding - public and private voucher schools - were required to enroll at least 15 percent vulnerable students,[5] unless the school could demonstrate that it has not received enough applications to fill this quota.

The Chilean legislature also enacted the General Law of Education (LGE) in 2008 that, among other things, raised the eligibility requirements of schools to participate in the voucher program. Prior to the LGE almost anyone could open a private school and receive government funding without having to conform to any standard of quality. The only formal requirement to open a school in Chile was to have a high school diploma (Montt et al. 2006). The LGE now requires owners to have a college degree and education credentials.

The government also changed the rules that must be adhered to by schools that receive

[5]This system determines whether a student is "vulnerable" based on individual and household surveys collected by the government nutrition agency JUNAEB (National Scholarship and School Aid Board).

the voucher. The SEP law ties the additional per-student voucher to an increased role of the Ministry of Education in monitoring and classifying schools based on student performance and holding them accountable for their outcomes (Elacqua et al. 2009). The Ministry now classifies schools in three categories (Autonomous, Emerging and In Recovery) based on student performance over time and holding them accountable for their outcomes. The classification affects the degree of autonomy schools have in spending additional resources. In cases where schools meet minimum standards and show adequate progress over the previous four years, they are classified as "Autonomous" and have flexibility in the way they choose to spend the additional SEP resources. In cases where schools show some progress, they are classified as "Emerging" and they must present a plan to the Ministry of Education on how they plan to use the additional resources. If a low performing school does not show adequate improvement over four years, it is classified as "In Recovery", and is reconstituted or shut down. The Ministry publishes the school classification in its web site and schools are required to explain to parents the consequences of its classification.

2.3 Information

Expanding access to more and better information is a crucial component of a universal school choice program.(Levin 1998). The Chilean government has invested resources to improve the quantity and quality of information available to parents. For example, the Ministry of Education developed simplified parent report cards in 2005 on average test scores and school improvement compared to other similar schools nationally and locally.[6] Schools distribute these report cards to parents and they are also made available electronically. The Ministry

[6]See www.simce.cl

also designed an on-line school information system in 2006 that provided information on vacancies in local schools to help parents with their school choice options. In 2007, the government expanded the web site and began to include information on schooling inputs (class size, facilities, school fees, teacher quality, donations, etc.) and outcomes (test scores, college admission scores, graduation rates) on all schools as well as pictures of the school facilities and maps with the school location.[7]

Increased access to Internet at home and work and the rise of cybercafes, have also increased access to information on schools for parents, especially for middle class parents. According to the National Household Survey (CASEN), Internet access increased by 23 percent beteween 2003 and 2009. In 2009 about half of primary school parents in the R.M. had access to the Internet at home and work, compared to only one quarter of parents in 2003 (figure 1).

Figure 1 Here

2.4 Greater supply of private schooling options

In this more favorable environment for parental choice the number of private voucher schools expanded in the R.M. Over the period 2003 and 2009, the total number of schools increased by 3 percent, and the total first grade enrollment decreased by 12 percent (see figure 2).[8] Despite sharp declines in first grade enrollments, private voucher schools have far outpaced growth rates of other school types. The total number of private vouchers schools increased by 17 percent. In contrast, the total number of public schools decreased by 5 percent.

[7] www.infoescuela.cl

[8] The declines in the number of students is likely due to demographic changes. According to data from the National Agency of Statistics the Metropolitan Region has a decreasing Total Fertility Rate (TFR). Between 2000-2005 the TFR was 1.99 children per woman in a fertile age, meanwhile the TFR was 1.92 in 2008.

Figure 2 Here

The location of the new private voucher schools are illustrated in the figure 3. As set displayed in the map in figure 3, private voucher school owners are responding to the weighted voucher and establishing schools in municipalities with different socioeconomic environments in the R.M. (see figure 3).We used the National Household Survey (CASEN) to calculate the proportion of residents living in poverty for each municipality. Quintile 1 represents municipalities with the lowest proportion of residents living in poverty and quintile 5 represents municipalities with the highest proportion of people living in poverty. Table 1 presents the entry of private voucher schools by quintiles. In all quintiles the number of new private voucher schools has increased.

Figure 3 Here

Table 1 Here

3 Survey data supports that parents are exercising more choice

In this section we examine the effects these policy and program shifts may have had on the school search behavior of different types of parents with children enrolled in public and private schools. We conducted face-to-face interviews in 2003 and 2009 (before and after the changes were implemented) with two representative samples of first-grade parents in the R.M. We chose first-grade parents because this is when all parents must make a choice about which school to enroll their child in and incentives to gather information about schools is highest. We constructed the sample frames by first stratifying schools by socioeconomic status and school type (public, private voucher, private non-voucher). Then, first grade

parents within the schools were randomly selected from lists provided by the Ministry of Education. The samples were weighted to match the proportions of each stratum with the actual population. Table 2 reports the demographic data for our two samples of first-grade parents in the R.M. by school type.

Table 2 Here

There are significant changes in the two sample demographics, mainly due to changes in the population demographics. For example the percentage of single parents has increased and church participation has declined between 2003 and 2009. We will account for these changes in the empirical analysis in the next section.

We begin by identifying the sources of information different types of parents with children enrolled in public and private schools find useful in their search for information on schools. We then focus on the changing role of social networks in the flow of information. Next we explore whether or not parents are traveling longer distances to schools. We undertake simple bivariate analyses of how parent preferences differ by education and by the sector chosen between the two samples and whether or not the differences have changed over time. We then present a multivariate analysis to sort out the independent effects of each factor controlling for other demographic variables. Finally, we evaluate if and how much the changes in the sample population demographics versus changes in the choice environment (regulations and number schooling options) between 2003 and 2009 influence changes in parent behavior. We use the Oaxaca decomposition technique to disentangle these effects.

3.1 Type of sources

We approach the study of information by looking at patterns in the sources of information parents use for gathering information about schools in 2003 and 2009. In our qualitative studies, we identified the following categories of information sources that were available to parents: traditional media outlets, official government sources, the Internet, school marketing materials, school personnel, and social networks (friends and family).[9] In figure 4 we display the sources used in 2003 and 2009. We find that, while parents in 2009 were no more likely to use the media, government sources, and school personnel as sources of information in their search for schools than parents in 2003, they are more likely to search for information on the Internet, use school marketing materials, and talk to their social networks about schooling options.

Figure 4 Here

Tables 3 and 4 display the findings by education level and school sector. Social networks continue to be the most important source of information for parents, across the board, when choosing a school. However, marketing materials have become an important source of information for parents with less than a college education enrolled in public and private voucher schools. Schools are likely using more aggressive advertising strategies to recruit new students in competitive local schooling markets. Highly educated individuals with children enrolled in private (voucher and non-voucher) schools are more likely to use the Internet to search for schools than less educated public school parents.

[9]We asked parents whether they used the following sources to gather information about schools: 1) Media: Newspapers, magazines, radio, television; 2) School Marketing Materials: flyers, brochures, posters; 3) the Internet; 4) School Personnel: teachers, secretaries, principals, other; 5) Social Network: relatives, friends or neighbors, co-workers, children's friend's families, neighborhood council; 6) Government: municipality or Ministry of Education.

Table 3 Here

Table 4 Here

3.2 Number of sources

In the last section, we demonstrated that parents use different sources of information to learn about schools - and we showed that social networks play a key role in the flow of information about schools. Other researchers have also found that one of the most important sources of information is talking with friends and relatives about schools (Schneider et al. 2000). This is a relatively low cost strategy for parents, since information can be gathered through informal interactions.[10] Increasing the number of discussants in an education network is one strategy parents can use to increase the quantity and quality of information on schools. In our study, we asked respondents how many people they had discussed their school choice decisions with, excluding their spouses and their children's teacher. In tables 5 and 6, we present the distribution of the number of discussants in R.M. by education level and school sector chosen. We find that parents increased the size their education networks between 2003 and 2009. In 2003, 14 percent of respondents had no educational discussants and an additional 17 percent had only one discussant. In 2009, only 8 percent had no discussants and less than 12 percent had only one educational discussant. The size of an education network in R.M. has increased over time across education levels and school types. In 2003, 55 percent of parents that we interviewed reported discussing their school choice decisions with three or more discussants, compared to over 70 percent of respondents in 2009.

Parents are talking to more people and gathering more information about their schooling

[10] see (Schneider et al. 2000) for the downside to using this strategy to search for schools.

options before making a decision. Choosing a school for their children is one of the most consequential decisions most parents will make in their lives. Parents, armed with more and better information, seem to be taking this task seriously.

Table 5 Here

Table 6 Here

While gathering more information from different sources of information and having a larger network are valuable ways to obtain valuable information about schools, and we demonstrated that parents have become more informed consumers of education, next we examine whether or not parents are more willing to travel greater distances in search of a better school for their children.

3.3 Distance traveled

To study whether parents were willing to choose schools outside of their neighborhoods, we asked parents whether or not they walk their first grade children to school. Table 7 indicates that respondents in 2009 were more likely to choose schools further away from home than the parents we interviewed in 2003. While less educated parents are more likely to walk their children to school than other parents, the differences across education levels have diminished between 2003 and 2009 (table 8). Most of the decline is explained by the fact that parents who enroll their children in private voucher schools are less likely to choose neighborhood schools than parents who choose public schools. Parents are willing to travel greater distances to choose a private voucher school for their children.

Table 7 Here

Table 8 Here

In short, these patterns suggest that the changes in the voucher design and information programs introduced between 2003 and 2009 to strengthen parental choice combined with the increased number of private schooling options have had an impact on parental choice behavior. Parents, across the board, regardless of their level of education and regardless of their sector enrollment (public or private), are exercising choice.

4 A Multivariate analysis of choice behavior

The simple bivariate analyses presented above do not control for other factors that may be simultaneously related to parental choice. To determine which variables affect the likelihood that a respondent will cite a particular source of information or choose a school outside of her neighborhood, independent of the effects of other variables, we now turn to a model of parental behavior as a function of a set of parental characteristics that have been found to be correlated with choice behavior (for example, see Schneider et al., 2000; Elacqua et al., 2006).

4.1 Type of sources

In each group of sources of information (Internet, school marketing and social network) we use a logit model to predict the probability that parents use each source of information. The econometric model is based on the estimation of a latent variable y^* that represents the net benefit of using a specific source of information.

$$y_i^* = \mathrm{x}_i^{'}\beta + u_i \tag{1}$$

The net benefit cannot be observed, but the outcome of the individual following the

decision rule in (2) is observable

$$\begin{aligned} y_i &= 0 \text{ if } y_i^* < 0 \\ y_i &= 1 \text{ if } y_i^* \geq 0 \end{aligned} \tag{2}$$

Equation (3) presents the logit model that predicts the probability that a parent uses one of the three types of sources of information we analyze in the previous section:

$$Pr(y = 1|x) = \frac{e^{\mathbf{x}\beta}}{1 + e^{\mathbf{x}\beta}} \tag{3}$$

The x's are our ten independent variables we describe below including a constant and the β's are the coefficients, which are estimated using maximum likelihood. The independent variables for which we estimate coefficients are:

- SES, represented by two indicator variables indicating whether the parent has completed high school (Parent has completed high school = 1) or college (Parent has completed college = 1).[11].

- School type, represented by two binary variables. The first variable indicates whether the parent has chosen a private voucher school (Private Voucher = 1) and the second shows if the parent chose a private non voucher school (Private non Voucher = 1)

- Employment status, measured by an indicator variable indicating whether the parent

[11]We did not use household income to create an SES index variable because of potential underreporting bias, wich is common in Chilean surveys (see, for example, Larrañaga (2005))

works outside the home (Employed parent = 1)

- Gender, represented by an indicator variable indicating if the parent is female (Female parent = 1)

- Proximity, measured by whether or not a student walks to school (Student walks to school = 1)

- Church attendance, measured by an approximately continuous variable measuring the frequency of a parent's church attendance per annum.[12] (coded 0 = never; 1 = rarely; 3 = only on major holidays; 6 = five or six times a year; 12 = about once a month; 26 = about every two weeks; 52 = about once a week; 365 = every day).

- Length of residence, a continuos variable that measures the number of years a parent has lived in a municipality.

Table 9 shows the coefficients for the years 2003 and 2009. It also shows the Average Marginal Effects (AME) associated with each independent variable. The AME is the average of each individual's marginal effect. That is the change in the probability that a parent uses a source of information. In the case of the binary variables related to SES and school type the AME indicates the change in the likelihood with respect to the reference variable, that is, a parent with less than a high school education in the SES case and if the school sector chosen was public in the latter case.[13]

[12]Church attendance is included as a general measure of involvement with the social life of a community and a school-based activities (Schneider et al. 1997) and a preference for teaching moral values (Weiher & Tedin 2002)

[13]To achieve this result we follow the Bartus strategy (Bartus 2005)

Finally, to analyze whether the changes in the results between 2003 and 2009 are due to changes in the demographic characteristics of parents, such as higher levels of education, we use the Oaxaca decomposition technique. This technique is based on the works of Oaxaca and Blinder in 1973 that linearly estimated a common set of parameters intending to explain different outcomes for two differents groups of individuals (A and B). The differences in their outcomes are explained by two factors: i) the different endowments between group A and B ($\overline{\mathbf{x}}_{A,B}$), and ii) the different coefficients that measure the effect of each independent variable on the outcome ($\hat{\beta}_{A,B}$). The results will vary depending on the structure considered as reference (A or B): equation (4) shows the explained differences between gruop A and B when A is considered as the reference and equation (5) when is B:

$$\overline{\mathrm{Y}}_A - \overline{\mathrm{Y}}_B = (\overline{\mathrm{x}}_A - \overline{\mathrm{x}}_B) \cdot \hat{\beta}_A + \overline{\mathrm{x}}_B \cdot (\hat{\beta}_A - \hat{\beta}_B) \tag{4}$$

$$\overline{\mathrm{Y}}_A - \overline{\mathrm{Y}}_B = (\overline{\mathrm{x}}_A - \overline{\mathrm{x}}_B) \cdot \hat{\beta}_B + \overline{\mathrm{x}}_A \cdot (\hat{\beta}_A - \hat{\beta}_B) \tag{5}$$

The $\overline{\mathrm{Y}}_{A,B}$ are the outcomes for each group and the $\overline{\mathrm{x}}_{A,B}$ are the common set of characteristics of each group and $\hat{\beta}_{A,B}$ are the coefficients associated to the set of characteristics. The Oaxaca-Blinder strategy is not applicable to non linear models such as the logit model. For this reason, we use the extension of the Oaxaca-Blinder model proposed by Bauer & Sinning (2008). We use group A as a reference in the non-linear decomposition, which is defined as:

$$\Delta_A^{NL} = \left[E_{\beta_A}(Y_{iA}|\,\mathrm{x}_{iA}) - E_{\beta_A}(Y_{iB}\big|\,\mathrm{x}_{iB})\right] + \left[E_{\beta_A}(Y_{iB}|\,\mathrm{x}_{iB}) - E_{\beta_B}(Y_{iB}\big|\,\mathrm{x}_{iB})\right] \tag{6}$$

Where $E_{\beta_g}(Y_{ig}\big|\,\mathrm{x}_{ig})$ is the conditional expectation of Y_{ig} and $E_{\beta_g}(Y_{ih}\big|\,\mathrm{x}_{ih})$ is the condi-

tional expectation of Y_{ih} evaluated in the vector β_g, with g,h=(A,B). In the case that the B group is considered as the reference group the expression is:

$$\Delta_B^{NL} = \left[E_{\beta_B}(Y_{iA}|\, \mathrm{x}_{iA}) - E_{\beta_B}(Y_{iB}\big|\, \mathrm{x}_{iB})\right] + \left[E_{\beta_A}(Y_{iA}|\, \mathrm{x}_{iA}) - E_{\beta_B}(Y_{iA}\big|\, \mathrm{x}_{iA})\right] \tag{7}$$

Table 9 reports the results of the non linear decomposition. In this case group A are the parents surveyed in 2003 and group B are the parents interviewed in 2009. The results of the decomposition consider the two scenarios, the set of estimated parameters A as a reference and B.

Table 9 Here

Table 9 presents the results of the three logit models related to the sources of information (Internet, school marketing and social network). As set out in table 9, the digital gap persists, despite the across the board increase in the use of the Internet as a source of information on schools. The results also indicate that parents are less likely to walk to school in 2009 than they were in 2003. In 2009, the variable *student walks to school* is statistically significant at the 10% confidence level. A parent that walks her child to school is less likely (-7.7%) to use the Internet as a source of information. Parents that choose private schools, all else equal, are more likely to use the Internet as a source of information and more likely to choose a school outside of their neighborhood (less likely to walk to their child to school). Table 9 also shows that the differences across education levels and school types are no longer statistically significant in a parent's decision to use school marketing materials. Moreover, parents that choose neighborhood schools are more likely to use school marketing materials (18.1%) as a source of information about schools. Distributing school marketing materials seems to be a

popular strategy to attract parents to neighborhood schools. Finally, we also report changes in a parents likelihood to use their social networks to gather information on schools. In 2003, high school graduates and parents that worked had a higher probability of using social networks to gather information about schools than other parents. In 2009, the differences are no longer statistically significant.

In all three models, the Oaxaca-Blinder decomposition for non-linear models suggests that the changes found between 2003 and 2009 are mainly explained by changes in the coefficients. In short, the demographic changes between 2003 and 2009, such as more years of schooling, higher labor participation and greater share of single parents, explain only a small portion of the changes. These results suggest that the shifts in policy and other unobservable traits explain a substantial part of the differences in parent school search behavior.

4.2 Number of sources

To determine which variables affect the likelihood that a respondent will consult a larger education network independent of the effects of other variables, we estimated an ordered logit model. An ordered logit is a multinomial model in which the dependent variable has ordered outcomes, in this case the number of education discussants. In this non-linear model the ordered outcomes are modeled to arise sequentially as a latent variable y_2^*, that has a range from $-\infty$ to ∞, and crosses progressively higher thresholds. In this case, y_2^*, represents how likely parents are to discuss with other people about the school they will choose for their child. Formally,

$$y_{2i}^* = \mathrm{x}_i^{'}\beta + u_i \tag{8}$$

Where x represents the vector of independents variables (the same used in the above logit models) without considering a constant, β are the coefficients to estimate and y^*_{2i} is the latent variable, that has a correspondence with each category of answer according to the cut points or thresholds (τ_i):

$$y^*_{2i} = \begin{cases} 0 \text{ discussants if } \tau_0 = -\infty \leq y^*_{2i} < \tau_1 \\ 1 \text{ discussants if } \tau_1 \leq y^*_{2i} < \tau_2 \\ 2 \text{ discussants fi } \tau_2 \leq y^*_{2i} < \tau_3 \\ 3 \text{ or more discussants if } \tau_3 \leq y^*_{2i} < \tau_4 = \infty \end{cases}$$

Therefore, when the latent variable crosses a threshold, the observed category also changes. The three thresholds τ_1, τ_2 and τ_3 define the four levels of the latent variable associated with each observable category. The β coefficients are estimated by maximum likelihood. Table 10 presents the estimation of these coefficients and the AME for having three or more discussants associated with each variable in 2003 and 2009

Table 10 Here

The results of the multivariate presented in table 10 confirm most of the bivariate patterns. In 2009, the differences in the number of discussants are no longer statistically significant by parent education level or school sector chosen. In 2003, all of the remaining control variables, with the exception of *private non voucher school* are statistically significant at a 10% confidence level. In 2009 none of the control variables are statistically significant. Parents, across the board, are discussing their school choice options with a larger network

of people. The Oaxaca-Blinder decomposition for non-linear model also indicates that these changes are mainly explained by structural factors (coefficients), and not due to demographic changes in the sample population.

4.3 Distrance traveled

Finally, we use a logit model to examine the factors that explain whether or not a parent chooses a school outside of her neighborhood. Private voucher school parents, all else equal, are less likely to walk their child to school than parents that chose a public school. A parent that chose a private voucher school has a 20.8% lower probability of choosing a neighborhood school compared to similar parents that chose a public school. Differences between parents employed and families that own a car remain significant. Both are associated with a lower probability of choosing a neighborhood school (12% and 19.3% respectively in 2009).

Table 11 Here

In short, the results of the multivariate analysis, presented in Tables 9, 10 and 11, confirm most of the bivariate patterns. It appears that parents are stepping up to the plate and taking advantage of the improved school choice environment and opportunities and searching for better schools for their children. While voucher advocates may take this as confirming that a well designed voucher system can benefit parents of all social classes, the above analysis only examines the demand side of school choice. School choice programs also rely critically on the availability of a diverse set of quality options for parents to choose among. In the next section we explore the changes in the supply side of school choice between 2003 and 2009.

5 Supply side of choice: Do parents have real options?

5.1 School Diversity

Given the centrality of school diversity to theories of school choice (Friedman 1962, Coleman 1990), we begin our investigation of the supply side of school choice in Chile by examining the variability of school types in the private voucher sector. Prior to the voucher reforms in 1981, most subsidized private schools were non-profit and mostly Catholic schools (Aedo 2000). When private subsidized schools began to receive the same per-pupil payment as the public schools, a number of for-profit voucher schools entered the market. Table 12 shows how primary school students are distributed across school types in the R.M. In the R.M. 48 percent of first grade students attend for-profit secular schools, 18 percent religious (mostly Catholic) schools, 3 percent non-denominational non-profits and 31 percent public schools. Over the period 2003 and 2009, the total number of for-profit schools increased by 19 percent (see table 12). The total number of religious non-profit schools increased by 9 percent. The number of public schools declined by 5 percent.

Table 12 Here

For-profit schools have outpaced growth rates of other school types across municipalities with different socioeconomic environments in the R.M. (see figure 5). Figure 5 displays the changes in religious non-profit sectors across municipalities by socioeconomic status. Religious non-profits have consolidated over the years yielding a moderate growth in the number of schools in the most advantaged municipalities (quintiles 1 and 2). However, religious school growth rates have been stagnant in the most disadvantaged municipalities (quintiles 4 and 5). Parents that live in poor neighborhoods have limited access to subsidized

Catholic schools.

Figure 5 Here

Figure 6 Here

In short, a homogeneous schooling market has emerged in the R.M., in which few religious agencies and other private schools that offer diverse missions and pedagogies have come forward. While parents, especially families that live in disadvantaged communities, have access to more private schooling options in 2009 than they did in the past, most of the new schools are for-profit secular schools, which, according to recent survey evidence, do not offer very different curricula and educational models (Corvalán & Salazar 2008). Parents, in other words, are choosing among more of the same types of program offerings.

While school diversity is an important issue for choice advocates, the concern that school systems have high quality schooling options is likely even more crucial to governments and families. Moreover, some scholars have argued that experimentation in an educational market can be high risk for schools. For example, Brown (1992) theorizes that parents are risk averse and seek schools that are tried and true. He maintains that in a competitive schooling market, parents will drive schools to offer similar programs. Private schools may differentiate themselves from other schools not through their pedagogical approach, rather through offering higher quality academic services (e.g. test scores).

5.2 School performance

Voucher advocates have identified at least two ways that increasing competition and the supply of schooling options will improve the quality of the education market (Friedman 1962). First, vouchers will induce high quality schools to enter the marketplace and serve

as models for other schools. Proponents argue that high quality private schools will come forward - prompted in part by the perceived ineffective public schooling - to fulfill a parental demand for better quality schools (Hoxby 2000). Second, competition may change the schools themselves. Advocates maintain that increased competition will make schools feel under pressure to increase the quality of their educational program and to deliver better schooling at a lower cost. Indeed, improving the efficiency of schools was one of Friedman's main arguments in support of vouchers.

Our methodology compares the quality of public and private voucher schooling options available to parents in the R.M. in 2003 and 2009. The Ministry of Education administers the School Quality Assessment System (*Sistema de Medicion de la Calidad de la Educación*-SIMCE) to students in grades four, eight, and ten in reading, mathematics, history and geography.[14] and uses the reading and math results to determine the desired levels of achievement (niveles de logro - NL). The NL system is designed to hold schools accountable for their achievement levels and expose test score gaps within a school.

There are three NL: advanced, intermediate, and initial. They are defined according to the curricular standard that the students are required to meet on the SIMCE test. Each NL is associate with a minimum SIMCE score. For example a score of 286 or higher in math is considered an advanced level for a fourth grade student. When a student reaches the advanced level she has achieved the expected performance for her grade level.[15]

Figures 7 shows the percentage of fourth grade public and private voucher school students in the R.M. scoring at the advanced level on the SIMCE math assessment between 2002 and

[14]For additional information on the SIMCE test, see www.simce.cl. SIMCE employs an Item Response Theory Methodology.

[15]NL were defined in 2007 and, since the SIMCE methodology hasn't changed since 1999, we replicate the same definitions in 2002.

2008.[16] The results indicate a slight increase in the percentage of students scoring at the advanced level in math and a larger increase in reading.

Figure 7 Here

Since the data in Figure 7 only provide information on the student's scores and not on the quality of schooling options, we developed a criteria to distinguish between "high performance" and "low performance" schools. Schools are measured both by status (the percent of students proficient in 2003 and 2009) and consistency (schools had to be proficient for two consecutive years.) To be considered a "high performing" school, at least 25 percent of a school's students need to score advanced or higher in reading and math over two consecutive tests.[17] "Low performance" schools perform below this standard on two consecutive tests. In addition to these two categories, schools that perform above the standard on one test and below the standard on a second test, schools that had fewer than 20 students take the SIMCE, and schools that did not take the SIMCE on one or more of the years under consideration are designated as "undetermined performance".[18] We have excluded schools that only serve special needs students from the analysis. We have also excluded highly

[16]We used SIMCE 2002 and 2008 to measure school quality in 2003 and 2009 because the Ministry of Education publishes the 2002 and 2008 results in 2003 and 2009.

[17]In Chile, the government has not set a national proficiency goal for schools to reach. There are mandatory minimum content and expected learning per grade standards for students, but schools are not held accountable for reaching a specific goal like they are in other countries (e. g. see IFF (2010)). We used several different percentages of students in the advanced level in math and reading to classify schools to define a minimum standard of performance.

[18]We tried two alternative methods to measure the performance of schools. The first considered that the performance should be defined relative to the results of all schools in the R.M. Since we are trying to compare schools between 2003 and 2009, we decided against using this strategy because there are differences in the global performance of schools between the two years. The second strategy we attempted was to define the performance of schools holding constant the socioeconomic status of students. We decided not to use this method because some schools that were classified as high performance, had low academic achievement (more than 30 percent classified as high performance by this method had less than 25 percent of their students in the math advanced level). The results, not reported here but available upon request, do not change the substantial conclusions of this paper.

selective private non-voucher schools from this analysis because they enroll students mainly from high income families. Table 13 summarizes the schools across these categories.

It is important to note that we are not explicitly modeling the effects of competition and choice on student achievement. Rather, we are examining the objective changes in school test scores that parents can observe. We acknowledge that a number of observable and non-observable factors likely explain the changes observed. In a separate analysis, that is not reported here but available upon request, we show that most of the improvements we observe in the percent of students and schools that are considered "high performance" can be explained by observed changes in parent demographics. Since we are interested here in examining changes in the observable quality of the schooling options that parents can choose among, instead of attempting to disentangle the factors that influence the changes, this is not crucial for our analysis. We argue that parents are likely trying to get their child into the highest performing school possible, regardless of the quality of the inputs and the value added

5.2.1 Results

In 2003, 5 percent of public schools and about 20 percent of private voucher schools were ranked as high performance. The proportion of high performance public and private voucher schools is about the same in 2009. However, despite the decline in overall first grade students in the R.M. (see table 13) between 2003 and 2009, the number of first grade students who are enrolled in high performance schools has increased (table 13). This suggests that more parents are demanding and choosing high performance schools. When students do not get into a "high performance" school, they must either choose a "low performance" school or a

school of untested quality. Table 13 indicates that the two most common options in 2003 and 2009 were to attend a low performing public school or a private voucher school with no consistent track record of success. The next most common choice was to choose a low performing private voucher school. While the proportion of low performing public schools has remained constant over time, the percentage of low performance private voucher schools has increased by 5 percent since 2003. Overall, these results indicate that parents are more willing to take a chance with a low performing or untested quality private voucher school than with most public schools.

Table 13 Here

Table 13 indicates the number of students enrolled by the quality designation of the income quintile of their municipality. Fewer than one-third of all students in the wealthiest two income quintiles and fewer than 20 percent of students in the bottom three income quintiles attend high performance schools. As is evident in table 13, the most common choice, across the board, was to attend a low performance school. In the bottom three quintiles, the second most common choice was to attend a school of untested quality. Table 13 also indicates that parents in the most disadvantaged municipalities are more likely to attend low performance or untested quality private voucher schools than public schools. They are betting that these schools will provide their children with more opportunities than public schools.

The promising news is that the number and percentage of students enrolled in high performing schools has increased across municipalities with different socioeconomic environments in the R.M. In contrast, fewer parents are enrolling their children in low performance

schools. This trend likely reflects families increased preferences for higher performing schools.

Table 14 Here

5.2.2 Willing to pay for higher performing schools

Private voucher schools in R.M. offer most of the high performance choices in middle class and low-income municipalities. Without these schools, thousands of disadvantaged students may not have had a chance to attend a high performance school.

However, most high performing private voucher schools are oversubscribed. An increased demand for the limited number of seats at high performance private voucher schools has translated into higher fees for parents. Over the period 2003 and 2009, the average tuition at high performance private voucher schools increased by 41 percent (table 15). This pattern is consistent across municipalities with different socioeconomic environments in the R.M. Parents who chose a high quality private voucher school located in the most advantaged municipalities (quintile 1) or in a municipality in the fourth quintile experienced the largest tuition fee increases, 60 and 75 percent respectively (table 15).

Table 15 Here

Private voucher school tuition rates have far outpaced household income increases in the same period. While the average tuition at high performance voucher schools has increased by 41 percent between 2003 and 2009, average family incomes in the R.M. have increased at a much slower rate, at approximately 15 percent during the same 6 year period. Parents are willing to pay more for high performance private voucher schools.

Clearly, private voucher schools are providing high performance options to many parents in R.M., but access is still limited in these schools. As a result, parents are either forced to pay

more for the scarce seats at these schools or to enroll in low performing or untested quality schools. The most disadvantaged parents are often left without any options. Moreover, since not many families will choose to leave a high quality school, it is unlikely that opportunities will arise for students to transfer to these schools from lower performing schools. Therefore, parents have a small window of opportunity (usually in preschool through first grade) to apply to the high performance private voucher schools.

6 Conclusion and policy implications

This paper examines the role of vouchers as instruments of school policy and investigates the effect of major changes in Chile's national voucher program between 2003 and 2009 on parent search behavior and on public and private school incentives and performance. We find robust evidence that parents and schools have responded to some of the changes in key aspects of Chile's voucher program. Parents are willing to spend more time and resources to search for and enroll their children in high performing schools. Many new private voucher schools have entered the market and established in middle class and disadvantaged municipalities in response to parents' greater demand for private schools and the increased incentives to educate disadvantaged children. Today, parents, across the board, have more schooling options available to them. However, there is little diversity in the educational mission and pedagogies of the new private schools (most are for-profit secular schools), and most of the schooling options available to them have are either low performance or do not have a consistent track record. The few high performing schools in the market tend to be oversubscribed and/or charge higher fees.

In sum, Chile's national voucher program offers considerable school choice to parents,

but without many options. As a result, parents either have to pay more for a seat at a high performing school or must choose a school with no consistent record of success or a low performing school. Parents that live in disadvantaged communities have the fewest number of options. For any form of voucher program to work, it needs to have a sufficient number of high quality and affordable seats. The Chilean government has the opportunity to expand the supply of high performing schools when it implements some of the current school reforms on the national agenda.

First, the government should design policies and programs that attract better quality teachers to most disadvantaged and low performing schools. For example, the School Quality and Equity Act (LCE), enacted in January 2011, is designed to strengthen school autonomy and attract and reward high quality principals and teachers. LCE includes higher performance incentives for teachers that work in disadvantaged public and private voucher schools. The law also amended the public school statute to allow greater flexibility for hiring and firing teachers. LCE also gives more resources to disadvantaged urban municipalities to attract higher quality principals and municipal education directors.

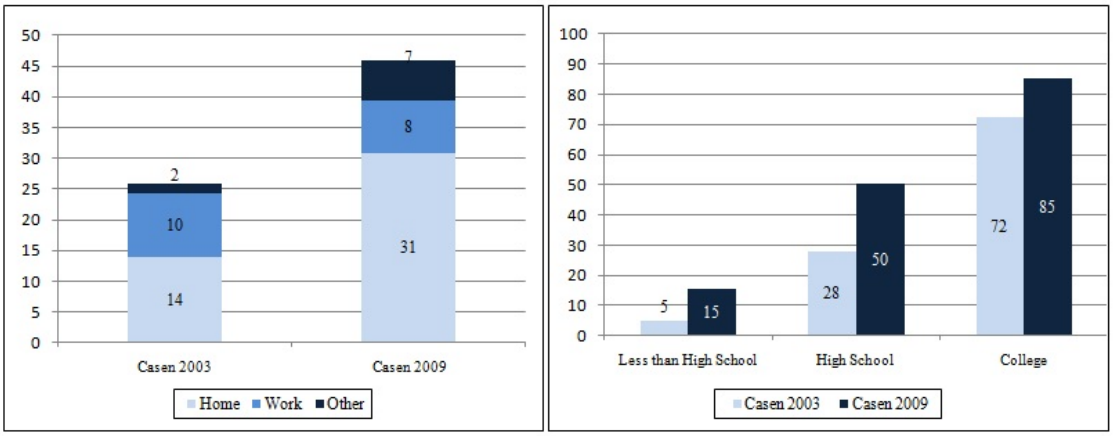
Second, the data clearly show that parents who live in disadvantaged neighborhoods have limited options to enroll their children in a high performing school. In April 2011 the SEP law was amended as part of a larger policy strategy designed to combat educational disadvantage. To achieve this, the funding system was altered in two significant ways. First, the weights were changed. In particular, the priority students were divided into two groups: .58 for children whose parents have low education and income and .65 for children whose parents have very low education and income. Second, weighted funding increased by 20 percent over the SEP voucher for students enrolled in high poverty schools. These changes

could create incentives for higher quality private voucher schools to locate in disadvantaged communities. The additional weighted funding is also intended to narrow the achievement gap between disadvantaged and advantaged pupils in existing schools

Third, although the SEP law initially centered on inequities in per pupil spending and individual school accountability, the government is beginning to refocus national attention on the failures of individual schools across the country. For example, the Quality Assurance System Act (LAC), enacted in April 2011, not only creates the institutional architecture responsible for school supervision and accountability, it also addresses the issue of improving low achieving schools with two strategies. The first strategy is the Quality Agency visits low performing schools frequenlty and conducts an overall assessment of teachers and principals to develop an school improvement plan. The second focuses on providing targeted technical assistance including implementing professional development strategies and supplemental educational services from the Ministry of Education or another provider approved by the Ministry of Education.

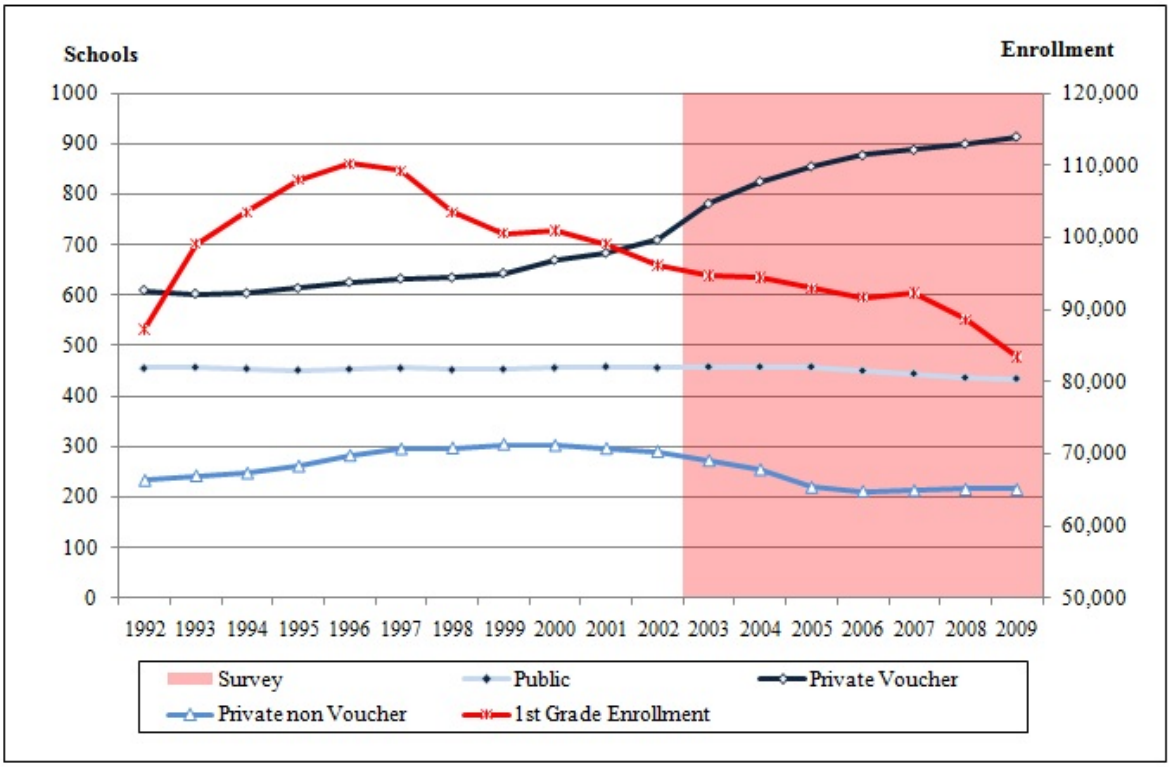
Finally, the government should set higher standards to open new public and private voucher schools. Between 2003 and 2009, 25 percent of the new schools are the lowest performing school of their neighborhood and only 23 percent are the highest. The design should encourage the creation of high quality private voucher schools and deter the establishment of low quality schools. For example, for new schools with no previous track record of success, the government could set minimum standards for education program design and staff.

Figure 1: Internet Connection by Location and Educational Level of Parents



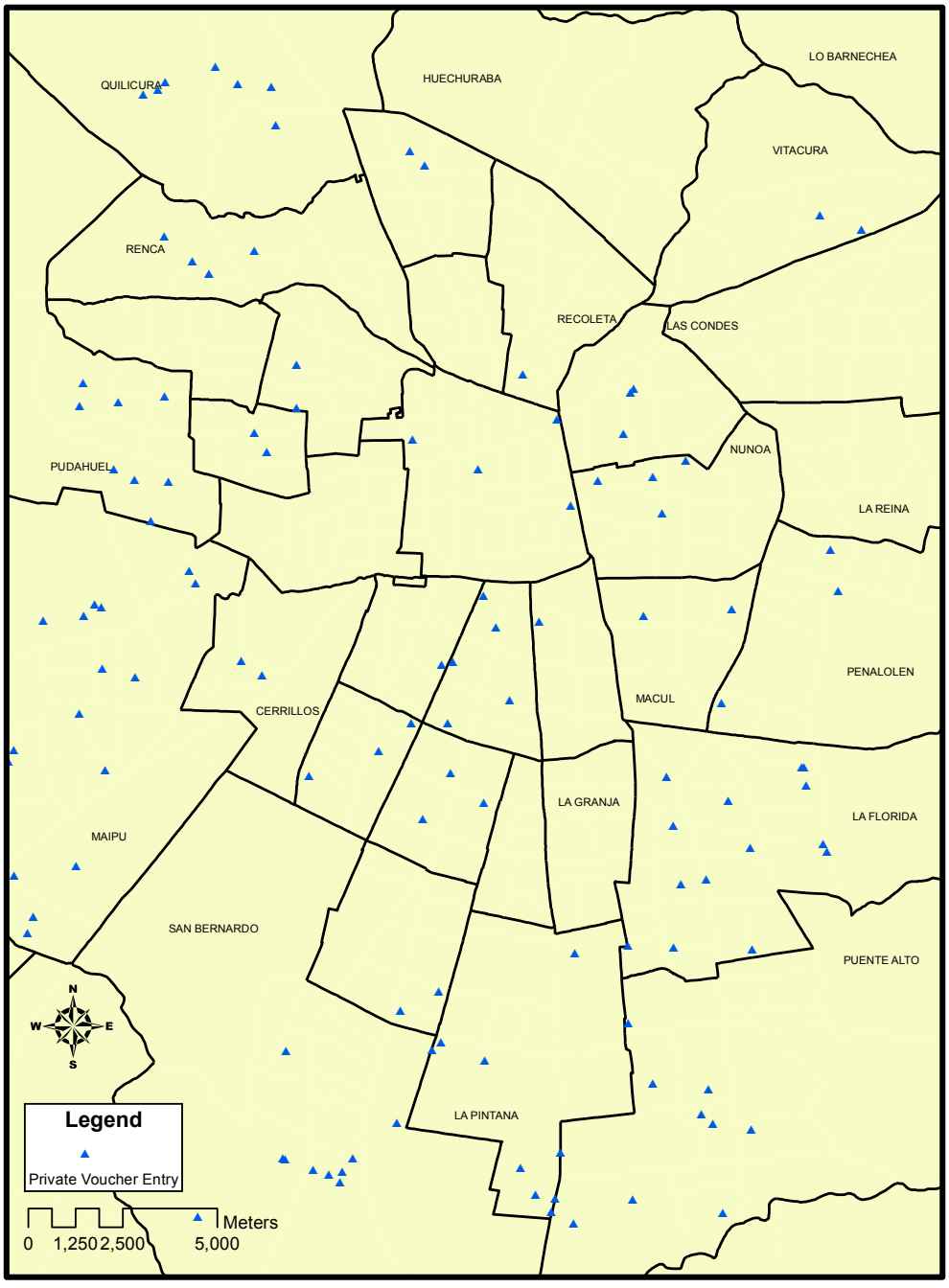
Source: CASEN and authors' calculations

Figure 2: First Grade Schools and Enrollment Evolution



Source: Ministry of Education of Chile and authors' calculations

Figure 3: Location of Private Voucher Schools' Entry Between 2003 and 2009



Source: Ministry of Education of Chile and authors' calculations

Table 1: Number of Schools by school type in 2003 and 2009

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total
Public Schools						
2003	61	125	106	104	62	458
2009	60	116	100	99	59	434
% Diff	−2%	−7%	−6%	−5%	−5%	−7%
Private Voucher Schools						
2003	130	237	201	104	109	781
2009	163	254	229	131	137	914
% Diff	25%	7%	14%	26%	26%	17%
Private non Voucher Schools						
2003	179	48	22	20	3	272
2009	145	37	16	16	1	215
% Diff	−19%	−23%	−27%	−20%	−67%	−21%
All Schools						
2003	370	410	329	228	174	1511
2009	368	407	345	246	197	1563
% Diff	−1%	−1%	5%	8%	13%	3%
First Grade Enrollment						
2003	24,851	25,348	16,666	16,235	11,550	94,650
2009	21,817	23,230	14,726	13,103	10,528	83,404
% Diff	−12%	−12%	−8%	−12%	−19%	−9%

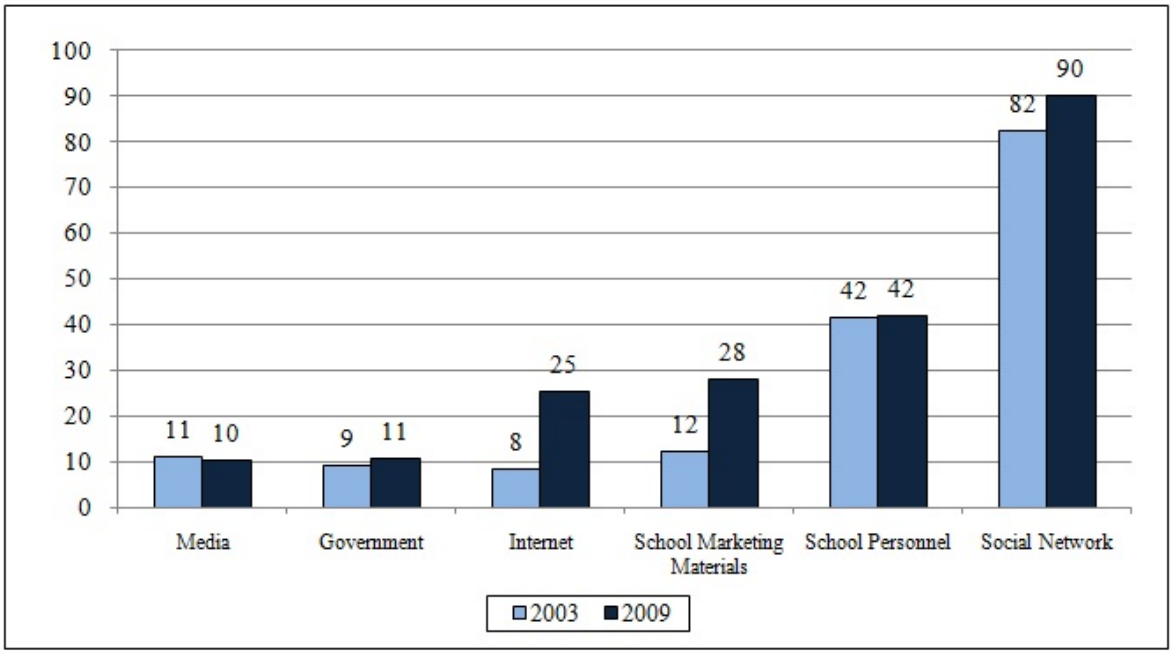
Source: Ministry of Education of Chile and authors' calculations

Table 2: Sample Demographics

Variables	2003 Chosen School Type			2009 Chosen School Type		
	Public	Private Voucher	Private non Voucher	Public	Private Voucher	Private non Voucher
Schools	26	29	12	22	43	8
Surveyed Parents	208	232	96	176	344	64
Educational Level						
Less than High School	57.1%	38.4%	4.6%	60.5%	34.6%	5.0%
High School	33.0%	38.4%	5.6%	27.7%	46.2%	13.9%
College	9.9%	23.3%	89.8%	11.9%	19.2%	81.1%
Car at Home	28.0%	35.6%	90.9%	17.6%	43.6%	100.0%
Employed Parents	33.0%	34.8%	75.9%	38.7%	48.3%	92.7%
Single Parents	25.3%	20.0%	17.3%	33.1%	27.1%	24.6%
Woman	91.5%	91.0%	80.5%	86.6%	82.7%	77.4%
Children Walks to School	72.2%	63.4%	14.6%	66.9%	44.9%	11.7%
Years of residence in comuna	17.8	20.0	14.9	24.6	20.5	12
Attend to Church at least Once a Month	49.1%	57.9%	44.0%	28.6%	35.8%	24.3%

Source: Survey of Parents in Metropolitan Region of Santiago, Chile

Figure 4: How Parents Gathered Information



Source: Survey of Parents in Metropolitan Region of Santiago, Chile

Table 3: Type of Sources, by Parent Education Level

Variables	2003 Parent Education Level				2009 Parent Education Level			
	Less than High School	High School	College	Total	Less than High School	High School	College	Total
Type of Sources								
Internet	0.01%	2.8%	24.4%	8.5%	9.3%	25.7%	49.3%	25.6%
N	195	179	158	532	228	211	143	582
Pearson:	Uncorrected chi^2 (2) = 78.8				Uncorrected chi^2 (2) = 69.08			
	Design-based F(1.02,49.81) = 24.92; p = 0.0000				Design-based F(1.40,81.23) = 12.02; p = 0.0002			
School Marketing	7.7%	10.9%	17.2%	11.7%	28.9%	27.9%	27.3%	28.1%
N	195	179	158	532	228	211	143	582
Pearson:	Uncorrected chi^2 (2) = 7.997				Uncorrected chi^2 (2) = 0.1128			
	Design-based F(1.82,89.05) = 1.39; p = 0.2538				Design-based F(1.68,97.24) = 0.02; p = 0.9667			
Social Network	74.9%	91.6%	82.2%	82.6%	92.1%	89.1%	88.8%	90.1%
N	195	179	158	532	228	211	143	582
Pearson:	Uncorrected chi^2 (2) = 17.58				Uncorrected chi^2 (2) = 16.42			
	Design-based F(1.80,88.14) = 4.12; p = 0.0229				Design-based F(1.66,96.39) = 0.34; p = 0.676			

Source: Survey of Parents in Metropolitan Region of Santiago, Chile

Table 4: Type of Sources, by Chosen School Type

Variables	2003 Chosen School Type				2009 Chosen School Type			
	Public	Private Voucher	Private non Voucher	Total	Public	Private Voucher	Private non Voucher	Total
Type of Sources								
Internet	0.15%	4.3%	36.6%	8.4%	5.8%	25.7%	48.7%	25.4%
N	208	232	96	536	176	344	64	584
Pearson:	Uncorrected chi^2 (2) = 100.23				Uncorrected chi^2 (2) = 27.20			
	Design-based F(1.01,49.55) = 22.21; p = 0.0000				Design-based F(1.80,104.21) = 13.71; p = 0.0000			
School Marketing	13.6%	13.1%	8.0%	12.4%	25.6%	29.6%	14.9%	27.9%
N	208	232	96	536	176	344	64	584
Pearson:	Uncorrected chi^2 (2) = 1.713				Uncorrected chi^2 (2) = 5.0209			
	Design-based F(1.92,94.31) = 0.32; p = 0.7216				Design-based F(1.76,102.24) = 1.98; p = 0.1492			
Social Network	76.3%	85.2%	77.2%	82.4%	92.2%	90.2%	86.6%	90.1%
N	208	232	96	536	176	344	64	584
Pearson:	Uncorrected chi^2 (2) = 5.95				Uncorrected chi^2 (2) = 1.02			
	Design-based F(1.98,97.2) = 1.93; p = 0.1517				Design-based F(1.64,94.83) = 0.5234; p = 0.5581			

Source: Survey of Parents in Metropolitan Region of Santiago, Chile

Table 5: Number of Sources, by Parent Education Level

Variables	2003 Parent Education Level				2009 Parent Education Level			
	Less than High School	High School	College	Total	Less than High School	High School	College	Total
Social Network								
No Discussants	12.8%	12.3%	16.2%	13.7%	7.1%	10.4%	5.7%	8.1%
One Discussant	24.0%	18.8%	7.8%	17.2%	14.2%	10.6%	10.2%	11.8%
Two Discussants	20.7%	10.0%	8.9%	13.6%	9.7%	8.2%	9.5%	9.0%
Three or more Discussants	42.5%	59.0%	67.1%	55.5%	69.1%	70.8%	74.6%	71.1%
N	194	177	158	529	225	210	143	578
Pearson:	Uncorrected chi^2 (6) = 36.9				Uncorrected chi^2 (6) = 4.95			
	Design-based F(4.66,228.47) = 3.75; p = 0.0035				Design-based F(3.57,206.89) = 0.39; p = 0.7959			

Source: Survey of Parents in Metropolitan Region of Santiago, Chile

Table 6: Number of Sources, by Chosen School Type

	Public	Private Voucher	Private non Voucher	Total	Public	Private Voucher	Private non Voucher	Total
Social Network								
No Discussants	26.4%	9.0%	20.9%	13.9%	9.0%	7.8%	9.4%	8.1%
One Discussant	23.8%	17.5%	9.4%	17.4%	5.9%	13.3%	4.1%	11.7%
Two Discussants	14.7%	13.3%	12.3%	13.4%	11.8%	8.8%	10.1%	9.2%
Three or more Discussants	35.1%	60.2%	57.4%	55.2%	73.3%	70.2%	76.4%	71.0%
N	207	230	96	533	174	342	64	580
Pearson:	Uncorrected chi^2 (6) = 34.01				Uncorrected chi^2 (6) = 6.39			
	Design-based F(4.37,214.14) = 3.7; p = 0.0048				Design-based F(4.31,250.25) = 1.138; p = 0.3399			

Source: Survey of Parents in Metropolitan Region of Santiago, Chile

Table 7: Distrance Traveled, by Parent Education Level

Variables	2003 Parent Education Level				2009 Parent Education Level			
	Less than High School	High School	College	Total	Less than High School	High School	College	Total
Proximity to School								
Student Walks to School	68.3%	64.5%	37.5%	57.5%	53.6%	44.9%	31.4%	44.7%
N	195	179	158	532	228	211	143	582
Pearson:	Uncorrected chi^2 (2) = 39.68				Uncorrected chi^2 (2) = 16.42			
	Design-based F(1.87,91.63) = 9.94; p = 0.0002				Design-based F(1.51,87.38) = 3.25; p = 0.057			

Source: Survey of Parents in Metropolitan Region of Santiago, Chile

Table 8: Number of Sources, by Chosen School Type

Variables	2003 Parent Education Level				2009 Parent Education Level			
	Public	Private Voucher	Private non Voucher	Total	Public	Private Voucher	Private non Voucher	Total
Proximity to School								
Student Walks to School	72.2%	63.4%	14.6%	57.6%	66.9%	44.9%	11.7%	44.5%
N	208	232	96	536	176	344	64	584
Pearson:	Uncorrected chi^2 (2) = 74.83				Uncorrected chi^2 (2) = 34.69			
	Design-based F(1.97,96.52) = 12.21; p = 0.0000				Design-based F(1.93,112.16) = 12.13; p = 0.000			

Source: Survey of Parents in Metropolitan Region of Santiago, Chile

Table 9: Type of Sources, Logit Model

	Internet				School Marketing				Social Network			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Control Variables	Coef 2003	AME 2003	Coef 2009	AME 2009	Coef 2003	AME 2003	Coef 2009	AME 2009	Coef 2003	AME 2003	Coef 2009	AME 2009
Chosen school is private voucher	3.043***	0.000192	1.382***	0.0831*	-0.284	-0.0220	0.298	0.0544	0.414	0.0703	0.0909	0.00777
	(0.576)	(0.000135)	(0.518)	(0.0457)	(0.461)	(0.0318)	(0.374)	(0.0700)	(0.371)	(0.0550)	(0.425)	(0.0341)
Chosen school is private non voucher	4.294***	0.000693	1.354**	0.0803	-1.243	-0.0674**	-0.361	-0.0559	-0.534	-0.111	0.165	0.0137
	(0.681)	(0.000555)	(0.604)	(0.0535)	(0.877)	(0.0276)	(0.747)	(0.101)	(0.551)	(0.119)	(0.693)	(0.0523)
Parent completed High School	5.383***	0.102	1.029	0.0763	0.334	0.0357	0.0805	0.0142	1.252**	0.129***	-0.129	-0.0124
	(1.258)	(0.108)	(0.618)	(0.0653)	(0.521)	(0.0602)	(0.340)	(0.0594)	(0.535)	(0.0344)	(0.530)	(0.0523)
Parent completed College	6.626***	0.226***	1.851***	0.204**	1.405**	0.229*	0.252	0.0469	0.377	0.0613	0.0992	0.00824
	(1.137)	(0.0426)	(0.583)	(0.0867)	(0.620)	(0.116)	(0.510)	(0.0980)	(0.305)	(0.0442)	(0.607)	(0.0472)
Surveyed parent is female	-0.681	-0.0309	-0.162	-0.0247	-1.208**	-0.0779***	0.577	0.121	-0.237	-0.0310	0.255	0.0193
	(0.636)	(0.0241)	(0.396)	(0.0569)	(0.474)	(0.0225)	(0.515)	(0.111)	(0.748)	(0.102)	(0.431)	(0.0288)
Surveyed parent is employed	0.0868	0.00474	0.227	0.0371	-1.146**	-0.0755***	0.0625	0.0121	0.720**	0.0699***	-0.619	-0.0656
	(0.415)	(0.0224)	(0.265)	(0.0422)	(0.537)	(0.0252)	(0.306)	(0.0582)	(0.339)	(0.0228)	(0.380)	(0.0461)
Student walks to school	-0.744	-0.0386	-0.488	-0.0773*	0.0193	0.00189	0.931**	0.181**	-0.214	-0.0261	0.277	0.0230
	(0.608)	(0.0280)	(0.318)	(0.0433)	(0.253)	(0.0242)	(0.388)	(0.0876)	(0.342)	(0.0433)	(0.341)	(0.0245)
Parent church attendance	-0.00691	-0.000370	-0.00406	-0.000637	0.0000229	0.00000224	-0.00176	-0.000338	0.00178	0.000217	-0.000175	-0.0000146
	(0.00610)	(0.000298)	(0.00262)	(0.000401)	(0.00241)	(0.000229)	(0.00171)	(0.000320)	(0.00195)	(0.000229)	(0.00195)	(0.000158)
Years of residence in comuna	-0.0294*	-0.00158*	-0.00433	-0.000681	-0.0106	-0.00104	0.00287	0.000550	0.0106	0.00129	0.0261	0.00218
	(0.0172)	(0.000905)	(0.0120)	(0.00183)	(0.0171)	(0.00166)	(0.0116)	(0.00217)	(0.0132)	(0.00155)	(0.0178)	(0.00151)
Constant	-10.121***		-3.0118***		-0.588		-2.278***		0.797		1.718***	
	(1.513)		(0.874)		(0.706)		(0.799)		(0.825)		(0.646)	
N	520	520	562	562	520	520	562	562	520	520	562	562
pseudo R^2	0.388		0.131		0.076		0.050		0.069		0.032	
Reference Group	**2003 (A)**	**2009 (B)**			**2003 (A)**	**2009 (B)**			**2003 (A)**	**2009 (B)**		
Percentage due to:												
Characteristics	12.457	-6.521			-13.309	-5.702			-11.023	45.645		
Coefficients	87.543	106.521			113.309	105.702			111.023	54.354		

Standard errors in parenthesis
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Number of discussants, Ordered Logit Model

Control Variables	(1) Coef 2003	(2) AME 2003	(3) Coef 2009	(4) AME 2009
Chosen school is private voucher	0.952***	0.215***	-0.214	-0.0459
	(0.244)	(0.0570)	(0.289)	(0.0620)
Chosen school is private non voucher	0.130	0.0270	0.116	0.0232
	(0.371)	(0.0763)	(0.437)	(0.0835)
Parent has completed high school	0.389*	0.0861*	0.152	0.0294
	(0.225)	(0.0503)	(0.352)	(0.0642)
Parent has completed College	0.969***	0.216***	0.416	0.0736
	(0.293)	(0.0589)	(0.441)	(0.0667)
Surveyed parent is female	1.184**	0.227***	0.0195	0.00396
	(0.505)	(0.0758)	(0.404)	(0.0792)
Surveyed parent is employed	0.619**	0.129***	-0.188	-0.0397
	(0.250)	(0.0465)	(0.262)	(0.0550)
Student walks to school	0.418**	0.0920**	-0.0427	-0.00869
	(0.205)	(0.0454)	(0.271)	(0.0540)
Parent church attendance	-0.00201*	-0.000444*	0.000818	0.000166
	(0.00119)	(0.000248)	(0.00179)	(0.000353)
Years of residence in comuna	0.0150*	0.00331*	0.0114	0.00232
	(0.00803)	(0.00173)	(0.0137)	(0.00271)
Threshold 1	0.868		-2.267	
	(0.5934)		(0.4785)	
Threshold 2	1.968		-1.234	
	(0.602)		(0.468)	
Threshold 3	2.618		-0.736	
	(0.556)		(0.471)	
N	517	517	558	558
R^2	0.0542		0.0054	
Reference Group	**2003 (A)**	**2009 (B)**		
Percentage due to:				
Characteristics	11.493	-180.015		
Coefficients	88.507	280.015		

Standard errors in parenthesis
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Distance traveled, Logit Model

Control Variables	(1) Coef 2003	(2) AME 2003	(3) Coef 2009	(4) AME 2009
Chosen school is private voucher	-0.338	-0.0688	-0.939***	-0.208***
	(0.491)	(0.101)	(0.311)	(0.0651)
Chosen school is private non voucher	-1.979***	-0.416***	-2.213***	-0.452***
	(0.707)	(0.120)	(0.686)	(0.0956)
Parent has completed high school	-0.167	-0.0338	0.0543	0.0112
	(0.308)	(0.0614)	(0.236)	(0.0467)
Parent has completed College	-0.0740	-0.0146	0.145	0.0293
	(0.427)	(0.0824)	(0.589)	(0.113)
Family has a car	-0.819*	-0.167*	-0.996***	-0.193***
	(0.462)	(0.0855)	(0.284)	(0.0455)
Surveyed parent is female	0.415	0.0788	-0.0462	-0.00960
	(0.508)	(0.0888)	(0.232)	(0.0470)
Surveyed parent is employed	-0.843***	-0.172***	-0.595*	-0.120**
	(0.308)	(0.0575)	(0.315)	(0.0583)
Parent church attendance	-0.00239	-0.000472	-0.00200	-0.000416
	(0.00351)	(0.000670)	(0.00180)	(0.000361)
Years of residence in comuna	0.00436	0.000861	-0.0216*	-0.00449*
	(0.00959)	(0.00183)	(0.0125)	(0.00253)
Constant	1.226		1.899***	
	(0.785)		(0.481)	
N	520	520	562	562
pseudo R^2	0.1652		0.1124	
Reference Group	**2003 (A)**	**2009 (B)**		
Percentage due to:				
Characteristics	21.506	13.713		
Coefficients	78.494	86.287		

Standard errors in parenthesis
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12: Schools and Student Enrollment at 1st Grade, by School Type

School Type	School Number 2003	2009	% Change
Public	458	434	−5%
For profit voucher	574	681	19%
Religious voucher	174	189	9%
Other voucher	33	44	33%
Total	1,239	1,348	9%

Source: Ministry of Education of Chile and authors' calculations

Table 13: Public and private voucher schools, by quality classification

School Classification	Public schools 2003	Public schools 2009	Private voucher schools 2003	Private voucher schools 2009	1st grade students 2003	1st grade students 2009
High Performance	22	19	145	183	14,402	16,590
	(5%)	(4%)	(19%)	(20%)	(18%)	(22%)
Low Performance	376	350	260	345	42,040	37,801
	(82%)	(81%)	(33%)	(38%)	(51%)	(51%)
Untested Quality	60	65	376	386	25,813	19,419
	(13%)	(15%)	(48%)	(42%)	(31%)	(26%)
Total	458	434	781	914	82,255	73,810

Source: Ministry of Education of Chile and authors' calculations

Table 14: First grade students, by quintile of municipality

School Classification	Quintile 1 2003	Quintile 1 2009	Quintile 2 2003	Quintile 2 2009	Quintile 3 2003	Quintile 3 2009	Quintile 4 2003	Quintile 4 2009	Quintile 5 2003	Quintile 5 2009
High Performance	3,407	4,211	5,283	5,461	2,762	3,512	1,580	1,321	1,370	2,085
	(25%)	(33%)	(25%)	(29%)	(14%)	(20%)	(11%)	(11%)	(10%)	(16%)
Low Performance	3,681	4,805	10,268	9,109	11,049	9,039	9,424	7,672	7,618	7,176
	(27%)	(38%)	(49%)	(49%)	(54%)	(52%)	(67%)	(62%)	(58%)	(56%)
Untested Quality	6,650	3,616	5,584	4,118	6,468	4,810	3,029	3,380	4,082	3,495
	(48%)	(29%)	(26%)	(22%)	(32%)	(28%)	(22%)	(27%)	(31%)	(37%)
Total	13,738	12,632	21,135	18,688	20,279	17,361	14,033	12,373	13,070	12,756

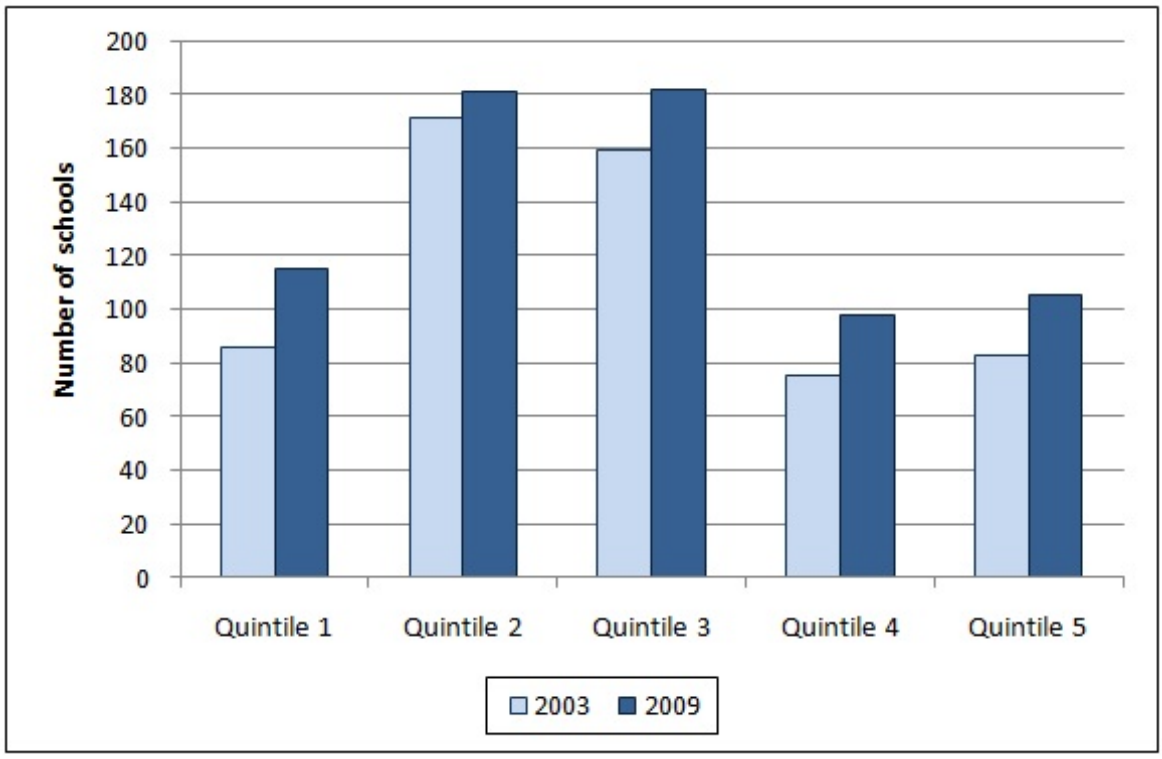
Source: Ministry of Education of Chile and authors' calculations

Table 15: Cost of private voucher schools, by quintile of municipality (US$ 2008)

School Classification	Quintile 1		Quintile 2		Quintile 3		Quintile 4		Quintile 5		Total	
	2003	2009	2003	2009	2003	2009	2003	2009	2003	2009	2003	2009
High Performance	42	67.1	43.2	57.5	34.4	43.8	32.7	57.1	16.5	20.2	37.5	52.9
Low Performance	19.8	20.8	9.4	13.7	10	13.3	6.5	12.8	5.7	8	9.3	13.3
Untested Quality	35.3	39.8	31	27.4	20.9	18.4	26.9	22.2	12.4	16.8	26.2	25.3

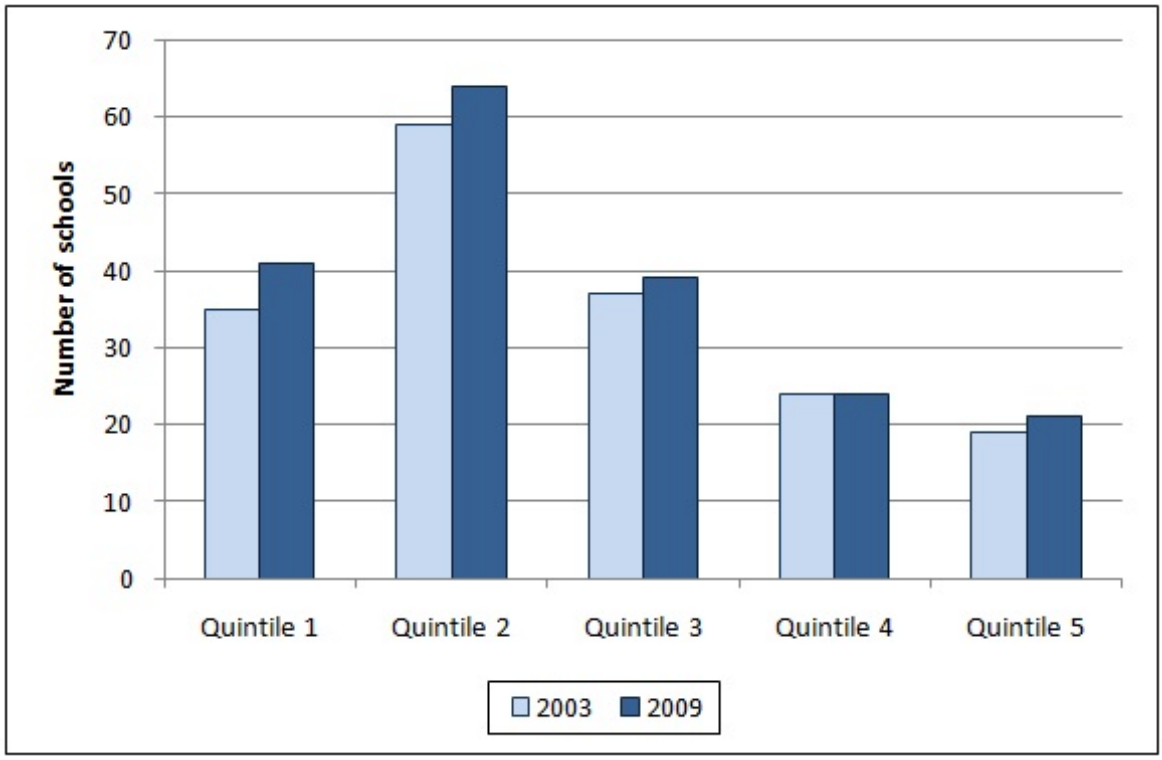
Source: Ministry of Education of Chile and authors' calculations

Figure 5: For profit voucher schools, by quintile of municipality according their poverty



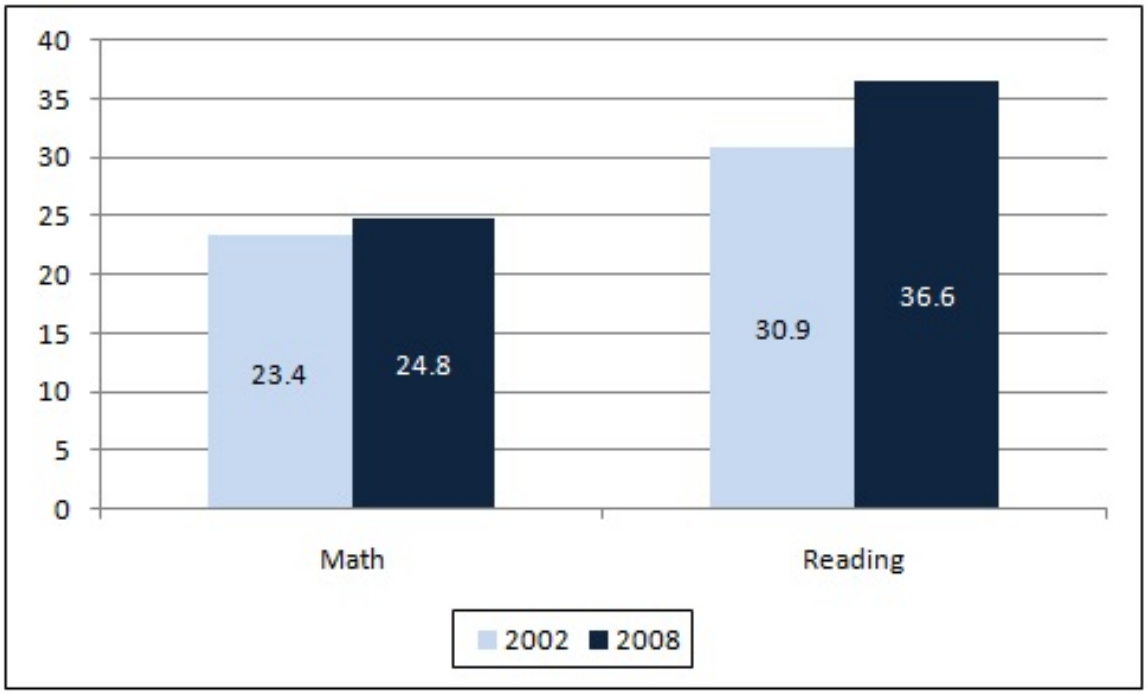
Source: Ministry of Education of Chile and authors' calculations

Figure 6: Religious voucher schools, by quintile of municipality according their poverty



Source: Ministry of Education of Chile and authors' calculations

Figure 7: NL 2002 and 2008



Source: SIMCE and authors' calculations

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