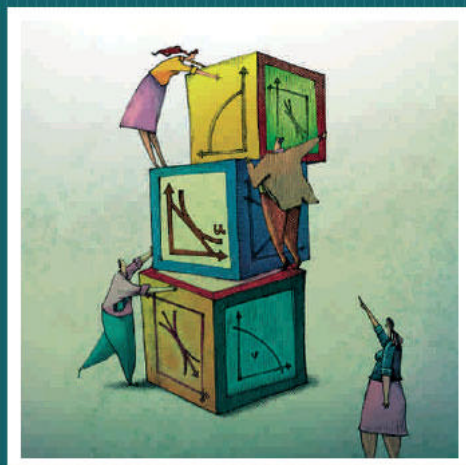


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N° 269 PARENTAL DECISIONS IN A CHOICE BASED SCHOOL SYSTEM: ANALYZING  
THE TRANSITION BETWEEN PRIMARY AND SECONDARY SCHOOL

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**Parental decisions in a choice based school system:  
Analyzing the transition between primary and secondary school**

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## Abstract

We study parental choice focusing on the transition between primary and secondary school, taking advantage of the fact that most Chilean students have to switch school at the end of the 8<sup>th</sup> grade, the last year of primary school. Using a recursive probit model we estimate jointly the probability of attending private voucher versus public school, taking explicitly into account the endogeneity of the school choice at primary level. We find that parents caring more about school academic performance are more likely to have their children enrolled in public schools at the secondary school level, while parents taking into account peers' socioeconomic background and school values are more likely to select voucher schools. We also show that while private voucher schools “cream skim” the best students from the socioeconomic standpoint, this does not necessarily hold for high ability students.

JEL classification: I2

Key words: parental choice, primary-secondary school transition, cream skimming, Chile

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## 1. Introduction

The impact of educational competition on academic outcomes may depend on the extent to which parents are informed and care about school quality. A broad literature in fact raises the possibility that parents are either uninformed about school quality, or else select schools using other criteria, such as school proximity to home, students socioeconomic status, infrastructure, or whether the school has extracurricular activities, among others.

This is relevant because if parents do not respond to school academic performance, then it is not clear that implementing a school choice system would be the best way to provide schools with incentives to increase their academic quality. If parents care about schools characteristics other than academics, then schools might respond, for instance, by attracting parents with higher socioeconomic status rather than by implementing better teaching techniques or taking care of disadvantage students.

Chile's education system was decentralized in 1981, and a voucher-type subsidy was introduced to encourage private providers to enter the market. This represents a nationwide experience of school choice, which is especially interesting to analyze as it has been in operation for more than 28 years. Thus, since 1981 the Chilean educational system consists of a three-tier K-12 system formed by public (municipal), private-voucher and private-paid schools. All families are allowed to choose the public or private voucher school of their choice.

In this paper we study parental choice focusing on the transition between primary and secondary school, using a new data set tracing parents and their children in two points in time (8<sup>th</sup> grade in 2004 and 10<sup>th</sup> grade in 2006).

The first empirical question we try to address is how parental preferences affect school choice between public and private voucher schools and whether parents who care more about the academic performance of their children's schools are more likely to prefer one school type with respect to the other. Using a recursive probit model we jointly estimate the probability of attending private voucher versus public school at secondary level, taking explicitly into account the endogeneity of the school choice at primary level. We show that parents valuing more school academic performance are more likely to have their children enrolled in public schools in secondary education, while parents taking into account peers' socioeconomic background and school values are more likely to select voucher schools.

The second research question we investigate in the paper is whether private voucher schools "cream skim" the best students from public schools in the transition between primary and secondary education. We find that while students with better socioeconomic background and coming from highly-ranked primary schools are more likely to choose private voucher secondary schools, high ability students are more likely to be enrolled in public schools. By focusing on the demand side, we show that an important explanation for this phenomenon can be the existence of "elite" public schools which can result particularly attractive to the best performing students given their good results in the "*prueba de selección universitaria*" (PSU), a standardized national examination which all students need to undertake to enter university.

Further, in order to ascertain whether high ability students choose public schools exclusively on the basis of academic quality, we estimate the probability of attending a top-ranked school for students attending public and private voucher schools. We find that high ability students have a higher probability of ending up in a top ranked school (public or private voucher) in secondary education when they switch to a private voucher secondary

school, but this difference disappears for top performing students coming from high income households and top performing primary schools.

The paper is organized as follows. The next section illustrates the Chilean school system, the literature relevant to our study is discussed in section three, section four describes the data, while the results of the estimation of the school choice model and of the probability of attending a top ranked school are presented in section five and six respectively; the last section summarizes the main conclusions.

## **2. The Chilean school system**

In early 1980s a decentralization process transferred the administration of public schools to municipal governments. The reform also opened the way for private sector participation as a provider of publicly financed education by establishing a voucher-type student-based subsidy.

Three types of schools were established - public (municipal) schools, financed by the student-based subsidy granted by the State and run by municipalities; private voucher schools, financed by the State student-based subsidy and run by the private sector; and private-paid schools, financed with tuition paid by parents and run by the private sector. The size of the subsidy paid per student is the same for both public and private voucher schools.<sup>1</sup> In contrast to US voucher systems, in which the subsidy is given directly to the

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<sup>1</sup> The monthly per student subsidy amounted to approximately US\$61.5 for primary school and US\$73.3 for secondary schools in 2006, the exchange rate was 530 pesos per dollar.

family, in the Chilean design funds are allocated directly to the school selected by the family, a system known as “funds follow the student” (Mizala and Romaguera 2000).

After the 1981 reform a large number of new private schools willing to take the voucher were created and a substantial migration from the public sector to this new type of school followed. By 2006 private-voucher schools accounted for 45.1 percent of the enrollment, while public schools had dropped from 78 percent in 1981 to 46.6 percent in 2006, and private-paid schools accounted by the remaining 7 percent.<sup>2</sup> Private-paid schools were conspicuously unaffected by this transformation. Their fees are, on average, five times the per-student voucher and they did not enter the competitive educational market created by the voucher reform and remained catering to the Chilean elite.

Private-paid schools are generally for profit, whereas private voucher schools can be either non-profit or for profit. Non-profit private schools include church schools and those dependent on foundations or private corporations, some of which are linked to sectors of industry. For-profit schools mostly operate like firms, generating returns for their owners (Elacqua, 2009a).

The most important differences between private and public (municipal) schools relate to:

- (i) the student admission process, as private voucher schools can select their students while public schools are required to admit all students interested in enrolling. Private schools (both subsidized and non-subsidized) have complete freedom to accept, reject, and dismiss students through their own selection procedures. In contrast, public schools are required to accept any student who wishes to enrol

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<sup>2</sup> A small portion of the school population attends schools run by educational corporations linked to business organizations.

unless it can be demonstrated that there are no vacancies at the school, i.e., only oversubscribed public schools are allowed to administer admission tests;

- (ii) teacher contracting, including the authority to directly hire and dismiss teachers, which private voucher schools have but public schools do not, because teachers in public schools are governed by a special legislation, the Teacher Statute; and
- (iii) the ability to raise alternative sources of financing. A 1993 reform allowed private-voucher schools to charge “add-on” fees to parents to supplement the government voucher, under a withdrawal schedule that reduces the subsidy as parental fees increase. Primary public schools cannot charge fees, and although secondary municipal schools can charge fees but few of them do.

The K-12 Chilean school system is divided into primary education (from kindergarten to 8<sup>th</sup> grade) and secondary education (from 9<sup>th</sup> to 12<sup>th</sup> grade). Since 2003 both primary and secondary level education are mandatory. Tracking starts at the secondary level where students choose between vocational and academic high schools. Students can, however, switch track at any time and there are no track-related restrictions in the access to post-secondary education. Almost all private paid schools offer primary and secondary education. However, this is not the case for public and private voucher schools: 88 percent of public schools and 61 percent of private voucher schools offer primary education only. In terms of enrollment, in the year 2004, 64 percent of students had to switch schools at the end of the 8<sup>th</sup> grade to continue to their secondary education.

One important feature of the Chilean school choice system is that there are no restrictions on the location of the schools the students can attend. Except for time constraints and other costs, students can travel to any part of a town or city to attend the school of their choice.



### 3. Relevant Literature

The economics literature has produced evidence that parents do care about school quality as measured by test scores. Black (1999) and Figlio and Lucas (2004), for instance, present quasi-experimental evidence suggesting that consumers in the US are willing to pay more for houses tied to schools with higher mean scores.<sup>3</sup> This result is consistent with those obtained by Bayer, Ferreira and McMillan (2007), who analyze residential choice to study households' willingness to pay for school quality, finding that families in the US were willing to pay around US\$26 in monthly rent for one standard deviation increase in school quality. However, there is also evidence that parent's preferences are heterogeneous, for instance, Hastings, Kane and Staiger (2006), find that richer parents and more able students tend to value more test scores than poorer parents and students of lower academic performance, Bayer, Ferreira and McMillan (2007) also find heterogeneous parental preferences. These studies also find that parents valued school proximity.

Lai, Sadoulet and de Janvry (2009) conclude that less educated parents, whose children have low academic performance in primary school, and who were less attentive to teachers' opinions about schools were more prone to make mistakes in exercising choice in the Beijing middle school open enrollment program. They suggest that providing assistance to less educated parents to make informed school choices is important for sustaining more efficient and equitable open enrollment programs. The proposal of informing parents is supported by Bast and Walberg (2004) who review empirical research that test the hypothesis that parents would do a better job choosing school for their children than do experts in government agencies and find strong empirical support for it, and by Hastings,

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<sup>3</sup> See also Bogart and Cromwell (1997), Brunner et al. (2001), and Downes and Zabel (2002).

Van Weelden, and Weinstein (2007), who present results from a randomization suggesting that even lower income parents' school choices respond to information on school test scores.

Nevertheless, the sensitivity of parents to school quality is affected by transaction costs of switching schools, mainly the need to change residence. Hanushek, Kain, Rivkin and Branch (2007) find that transaction costs of switching schools are reduced in a school choice system; particularly, they show that parental decision to exit a charter school in Texas is significantly related to school quality and this relationship is substantially larger than the relationship between the probability of exit and quality in the regular public school sector.

In this sense, educational vouchers might improve the educational opportunities available to the most disadvantaged students who do not have the option of school choice through residential mobility. Advocates of school choice also argue that parents would sort themselves by different schools based on their preferences, so creating the conditions for the development of effective school communities and competition among schools for students, which in turn would drive higher quality education (Nechyba, 2000, Neal, 2002).

However, in practice the issue of stratification cannot be set aside lightly. In fact, it represents one of the central issues in the debate over school choice. If parents care about peer quality in itself, and if more educated parents are the ones that demand more from schools, then choice may lead to stratification, concentrating the children of parents with the best education and the highest socioeconomic status in the best schools, relegating those

from lower socioeconomic backgrounds to the worst schools.<sup>4</sup> Also, voucher schools may respond to competitive pressures selecting high ability students worsening outcomes for those students left behind in public schools.<sup>5</sup>

In Chile, while much research exists on the individual correlates of achievement and on the relative performance of public and private voucher schools (see, for instance, McEwan, 2001, Mizala and Romaguera 2001, Sapelli and Vial 2002 and 2005, Anand et al, 2009, Lara et al, 2009), a smaller amount of research exist about the variables parents consider to select their children's schools.

Most studies for Chile have analyzed school choice for primary education in the Metropolitan Region of the country; though, the evidence produced by these studies is not conclusive.

Elacqua and Fabrega (2004) and Elacqua, Schneider y Buckley (2006) use a survey about school search behavior of parents in the Metropolitan Region. Elacqua and Fabrega (2004) conclude that parents are not informed and they choose schools for practical reasons, only a small percentage of parents consider a large group of schools and exercise pressure to the educational market, parents mainly consider socioeconomic characteristics and if the school teaches values. Elacqua, Schneider y Buckley (2006) examine how parents construct their school choice sets and compare this with the variables they declare to consider when they choose schools for their children who are entering first year of primary school. They find

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<sup>4</sup> See for instance Henig (1990), Epple and Romano (1998), Ladd (2002), Schneider and Buckley (2002), Ladd and Fiske (2001), Bayer and McMillan (2005), Cullen, Jacob and Levitt (2005), Hsieh and Urquiola (2006), Rothstein (2006), Card, Mas, and Rothstein (2007), and Gallego and Hernando (2008).

<sup>5</sup> There is still an important debate on whether cream skimming will worsen educational outcomes. For instance, Dills (2005) examines the impact of the introduction of a magnet school in a school district and finds that the loss of the most able students lowers the performance of low-scoring students that remains in regular public schools. However, Walsh (2009) finds that existing within-school heterogeneity is so small in the US that cream skimming do not substantially affect school composition and thus do not have any effect on the achievement of those left behind.

that parental decisions are more influenced by demographics, like the socio-economic composition of the school than for academic performance, and argue that free school choice may reduce the pressure on schools to improve their academic performance and increase socioeconomic stratification. Hsieh and Urquiola (2006) found that private voucher schools “cream skim” students from more advantaged families, while relegating disadvantaged ones to the public sector.

Sapelli and Torche (2002) estimate a binary choice model to study the determinants of choice between primary public and private voucher schools in Chile. They find that more educated parents with higher income have higher probability of choosing a private voucher school. Also, they find that the presence of high quality public schools decrease the probability of choosing a private voucher school.

Gallego and Hernando (2008) estimate a structural model of school choice, modeling the school choice of a family as a discrete choice of a single school. Working with data for 2002 on 4<sup>th</sup> graders in the Metropolitan Region of Santiago they find that the variables that have the greatest impact on parents’ choices are performance in standardized achievement test and school proximity; however, they find significant heterogeneity in parents’ preferences, richer parents value more schools’ academic results and tend to travel more kilometers to the school.

Mizala and Urquiola (2009) investigate whether parental choices and schools’ outcomes would respond to data on effectiveness per se, even if it were not necessarily correlated with peer quality. They consider how Chilean schools’ (enrollment) market shares, their tuition, and their student composition react when they are identified as performing well relative to schools that serve similar children. Specifically, they analyze Chile’s SNED, a scheme that seeks to measure effectiveness in a manner the public might understand.

Perhaps surprisingly, they fail to find systematic evidence that the information on school effectiveness generated by the SNED affects schools' market outcomes. The authors argue that this result is consistent with the possibility that even if parents might value school effectiveness, information on it might in the end not sway school choices based on characteristics like peer composition, explaining stronger reactions to data on average performance (test scores) than to information approximating effectiveness.<sup>6</sup>

In terms of school behavior, Elacqua (2009a) examines public and private voucher school segregation in Chile and finds that public schools are more likely to serve underprivileged students than private voucher schools. He also finds that a typical public school is more internally diverse with regards to students' socioeconomic status and ethnicity than the typical private voucher school, although he finds differential behavior across private voucher schools. Moreover, Elacqua (2009b) develops a model of school behavior in a competitive market, where parents choose whether or not to remain in their current school or change schools, using local schools to evaluate the performance of their child's school. The empirical analysis is based on a panel of geo-referenced schools. He finds that the quality of the school affects its chances of maintaining and increasing its enrollment, also he finds that school behavior can be affected by the fact that parents use neighboring schools as a benchmark, although there is heterogeneity across private voucher schools and across socioeconomic groups.

We contribute to the existing literature as follows: first, by improving the specification of the parental choice decision, taking into account factors affecting choice both in primary and secondary education; second, by analyzing cream skimming from the point of view of

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<sup>6</sup> In Chile there is a high correlation between socioeconomic level and results in standardized achievement tests (Mizala, Romaguera and Urquiola, 2007).

the probability of access to the private voucher school sector; third, by gaining new insights on the determinants of the probability of attending top ranked schools in the public and private voucher sectors.

#### **4. Data**

The empirical data used in this study come from the SIMCE (*Sistema de Medición de la Calidad de la Educación*, Education's Quality Measurement System), which is administered annually throughout Chile to 4<sup>th</sup> graders and rotates every year between the 8<sup>th</sup> and 10<sup>th</sup> grades. This rotation implies that, except for the case of the data used in this paper, the SIMCE tests do not track students over time.

This paper uses the 2004 SIMCE data which was administered to 8<sup>th</sup> graders and the 2006 SIMCE data administered to the same students in 10<sup>th</sup> grade; for the first time we have data for the same student in two years. As already mentioned, we take advantage of the fact that the majority of Chilean students mandatorily changes school at the end of the 8<sup>th</sup> grade, the last year of primary school, given the way that the educational system is organized. Thus, we can contrast parents' school choice about primary education with the decision regarding secondary education.

The SIMCE data includes a questionnaire that is answered by the parents of students that participated in the SIMCE in 2004 and 2006. This questionnaire provides information on the socio-economic characteristics of each student, such as dummies of family income and mother and father's education, occupation of the head of household, the reasons parents considered to choose the school, the expectations they have about their children educational performance, the number of books at home, etc. Although it is not mandatory for parents to

complete the questionnaire, there is a high response rate for most of the key variables used in this analysis.<sup>7</sup>

Data about parental characteristics are linked with student level data, in particular the standardized test scores in both math and language obtained in 2004 and 2006, and with school-specific data.

The distribution of the main variables of interest for our analysis by school type in 8<sup>th</sup> and 10<sup>th</sup> grade is summarized in Table 1. Most of parents' characteristics (household income, education, books at home, number of household members, labor market condition) are observed at the time of the interview and not at the time of school enrolment; therefore we gauge them as proxies of the medium-run socioeconomic status of the household. On the other hand, the information on the stated preferences for school choices refers to the time of the enrolment decision.

Table 1 illustrates the strong correlation between socioeconomic characteristics of the family of origin and the type of school attended. The great majority of pupils enrolled in public schools have parents with the lowest socioeconomic background: poorly educated, with household income concentrated in the lowest part of the distribution, living in households with lower scholarly culture (as proxied by the number of books available at home), and with lower expectations about the pupils' future academic achievement.

Table 2 shows instead the transitions occurring between 8<sup>th</sup> and 10<sup>th</sup> grade by school type. The share of students switching school type between primary and secondary school is relevant: 26 percent of students attending public schools in primary education move to private voucher schools in secondary education, and nearly 20 percent of students in the

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<sup>7</sup> To perform our analysis, we only use the observations that have complete information; no data is imputed for missing observations.

private voucher system move to the public one. Since the incidence of students moving out of the mixed public-private system to private-paid schools is relatively small, and since the students enrolled since primary education in private-paid schools represent a highly selected group in terms of socioeconomic background, we will restrict our analysis to the transitions between public and private voucher schools only.

## **5. Estimating parental choice between public and private voucher schools**

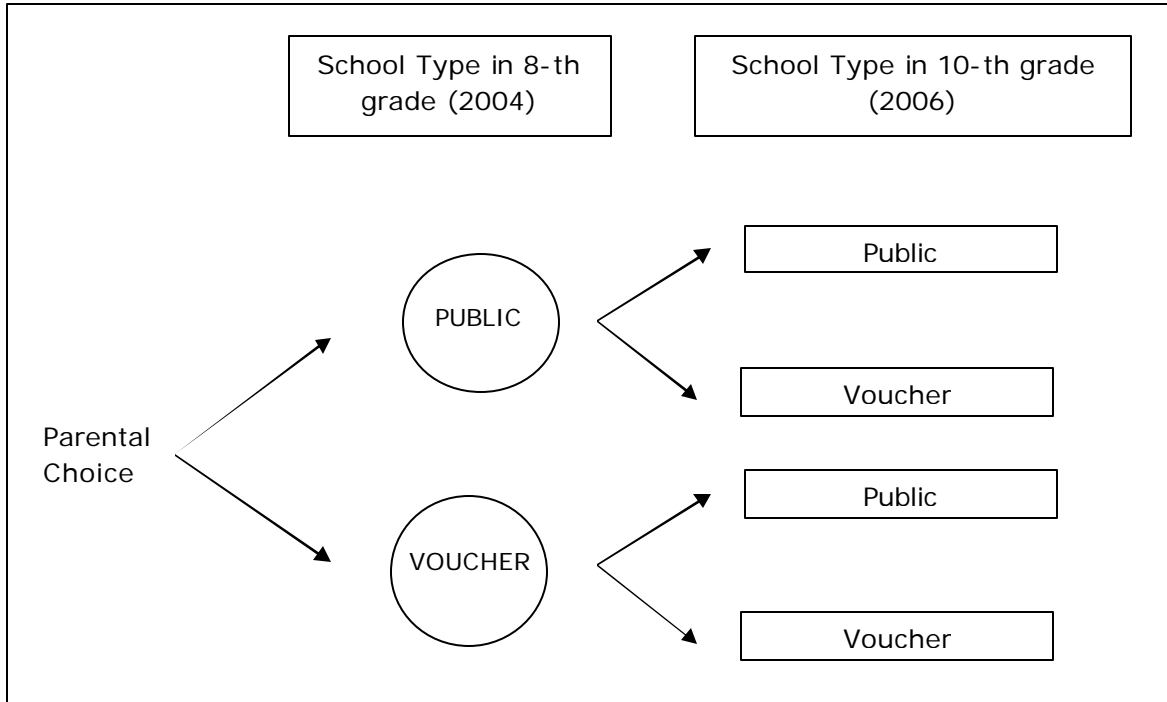
In this section we estimate the determinants of parental choice between public and private subsidized schools: since the efficiency of a choice-based school system depends on the possibility and the capacity of the parents of choosing according to academic quality, the first question we try to address empirically is to which extent preferences about schools' academic performance shape parental decisions.



## 5.1 Methodology

Our aim is to model the following sequential decision tree for parental choice:

**Figure 1**



More formally, the estimated model is the following:

$$\begin{cases} y_{1i}^* = X_{1i} \mathbf{b}_1 + Z_{1i} \mathbf{d}_1 + \mathbf{e}_{1i} & (1) \\ y_{2i}^* = \mathbf{a}_1 y_{1i} + X_{2i} \mathbf{b}_2 + Z_{2i} \mathbf{d}_2 + \mathbf{e}_{2i} & (2) \quad i = 1 \dots N \end{cases}$$

where:

$$\begin{cases} y_{ki} = 1 & \text{if } y_{ki}^* > 0 \\ y_{ki} = 0 & \text{if } y_{ki}^* \leq 0 \quad \text{for } k = 1, 2 \end{cases}$$

and where we assume the error terms  $\mathbf{e}_{1i}$  and  $\mathbf{e}_{2i}$  to be *iid.* with joint distribution bivariate normal:

$$\begin{pmatrix} \mathbf{e}_{1i} \\ \mathbf{e}_{2i} \end{pmatrix} \sim N\left(\mathbf{0}, \begin{bmatrix} 1 & \mathbf{r} \\ \mathbf{r} & 1 \end{bmatrix}\right)$$

We define for each parent  $i$  the unobserved latent utility  $y_{1i}^*$  enjoyed if the child is enrolled in a subsidized private ( $y_{1i} = 1$ ) versus public ( $y_{1i} = 0$ ) school in primary education (8<sup>th</sup> grade in 2004), while  $y_{2i}^*$  represents the unobserved latent utility received if the child is enrolled in a subsidized private ( $y_{2i} = 1$ ) versus public ( $y_{2i} = 0$ ) school in secondary education (10<sup>th</sup> grade in 2006).

We denote by  $X_{1i}$  and  $Z_{1i}$  and by  $X_{2i}$  and  $Z_{2i}$  the variables influencing parental choice in primary and in secondary education, respectively. The group of regressors included in  $X_{1i}$  and  $X_{2i}$  captures the same parental characteristics observed at two points in time (2004 and 2006): household monthly income, parents' education and occupation, reasons determining school choice and expectations.

We indicate by  $Z_{1i}$  the group of variables that we believe affects the enrolment decision at primary school level but that we suppose not to be correlated with unobservables influencing the choice observed in secondary education. Similarly, we indicate by  $Z_{2i}$  the group of variables that we suppose influences parental decisions about secondary school enrolment, for instance primary school quality (as proxied by the quintile of the school attended in 8<sup>th</sup> grade in the school-average national distribution of the SIMCE-math), child's ability (as proxied by the quintile of the child's individual standardized test scores in both SIMCE-math and SIMCE-language), and indicators of the educational supply available in the municipality of residence at the time of enrolment in secondary school. Though the individual SIMCE is unobserved for parents, students, and the receiving school

after 8<sup>th</sup> grade, we decided to include it among our explanatory variables as a proxy of student's individual ability which parents should have been able to learn by the time their children completed 8<sup>th</sup> grade.

Under the assumption of joint normality of the error terms  $e_{1i}$  and  $e_{2i}$ , we can estimate equations (1) and (2) jointly as a recursive probit model by maximum likelihood. The model is recursive in the sense that the type of school attended in 8<sup>th</sup> grade endogenously influences the probability of attending a private voucher or a public school in 10<sup>th</sup> grade.

The nonlinearity of the model is sufficient to achieve the statistical identification of the coefficient of the endogenous variable  $y_{1i}$  in equation (2), but the group of regressors in  $Z_{1i}$  can be interpreted as a set of instrumental variables introduced to identify an exogenous variation affecting the enrolment decision in primary school but unrelated to unobserved factors influencing the enrolment decision in 10<sup>th</sup> grade. These variables consist in indicators of relative supply of school types in the municipality of residence of the parents at the time their children's enrolment in primary school, computed therefore for the year 1994. In particular, we exploit the variation in school-type attendance induced by the heterogeneity in the length of the career track offered across school types and municipality of residence. In the Chilean system, not every school offers a full 12-grade educational track: some schools offer up to the 8<sup>th</sup> grade, after which students have to switch, others offer only up to the 6<sup>th</sup> grade or from 7<sup>th</sup> until 12<sup>th</sup> grade only, others offer only upper secondary education (from 9<sup>th</sup> to 12<sup>th</sup> grade). Our identifying assumption is that the different availability of school and career track types in the area of residence of the parents at the moment of enrolment represents an exogenous variation influencing enrolment decisions not correlated to the unobservables influencing school choice in 10<sup>th</sup> grade.

Using these indicators as a source of exogenous variation in the Chilean case is much less subject to critique of “endogenous location choice” raised normally in the US context. In Chile in fact, parents do not move or relocate across municipalities because they want to live closer to high quality schools, as they do in the US, since they are not compelled to enroll their children in the municipality of residence. Our identification strategy could be weakened by the presence of strong sorting of parents across different school types (including those for which we are observing an exogenous variation in career length) according to some observable characteristics, for instance household income. For this reason, we include among  $Z_{1i}$  also indicators relative to the socioeconomic level of the municipality of residence measured at the time of the enrolment (1994), such as the log of the average per capita income and the log of the number of residents.

Further, because of the heterogeneity in the length of the school career offered across school types, we estimate the recursive probit model separately for three subgroups: parents whose children are obliged to switch school after the 8<sup>th</sup> grade, those who voluntarily decide to switch school between 8<sup>th</sup> and 10<sup>th</sup> grade but are not obliged by the structure of the career track, and those whose children have been enrolled in the same school for the whole length of the educational track. Parents whose children are enrolled in schools offering a full education track, in fact, might have taken their decision in a different moment and possibly considering a different set of factors than parents whose pupils are enrolled in schools offering the 1<sup>st</sup> to 8<sup>th</sup> grade track only. The distribution of the sample considered in the analysis among these three subgroups is shown in Table 3.

## 5.2 Results

The results of the recursive probit estimation for both children obliged to switch school and for those who decided to switch school between the primary (8<sup>th</sup> grade in 2004) and secondary school (10<sup>th</sup> grade in 2006) are reported in Tables 4 to 6. For each subgroup, the tables report the estimated conditional probabilities of attending a private subsidized versus public school in secondary education given the probability of attending a private subsidized versus public school in primary education. The marginal effects of a change in the explanatory variables on the probability of attending a private subsidized versus public school in primary education are also reported. For the subgroup of students who never switch school, the tables simply show the marginal effects associated to the probability of attending a voucher versus a public school in primary education.

The results summarized in Table 4 are those relevant to our first two research questions: do parents care about school performance at the moment of choice? And do private subsidized schools “cream skim” the best students from public schools? We deal hereby with the first question while the second is left to the following section.

The first row in Table 4 reports the estimation of the endogenous dummy for the type of school attended in 2004 and shows that students attending a private voucher (public) school in primary education are more (less) likely to enroll in the same type of school in secondary education. Besides, the table reports the effects on school choice associated to marginal changes in parental preferences and expectations, students’ ability and school quality. First of all, the results suggest that parents caring about school performance as measured by the school-average PSU (standardized test undertaken to enter university) in secondary education are more likely to have their children enrolled in public schools. In particular, valuing the school performance in the PSU increases by 10-18 percent (nearly 30 percent

for the “stayers”) the probability of enrolment into a public school at the secondary school level, but does not appear to be always a significant explanatory factor for the private versus public choice at the primary level, meaning that during secondary education informed parents are mainly concerned about the probability that their children will enroll into university.

Second, when parental decisions are motivated by the socioeconomic background of the children’s peers and by the values enhanced by the school as opposed to academic performance, parents are more likely to choose subsidized private schools in both primary and secondary education, the finding being robust for both “movers” and “stayers”.

In our specification we also control for parental expectations and for other factors which may potentially influence parental choice. We find that parents with higher expectations about the possibility that their children will complete tertiary education are more likely to have them enrolled in private voucher schools, at both the primary and the secondary school level. On the contrary, parents seem to prefer enrolment in public schools when the school is chosen for its proximity, when it has been previously attended by other family members, when it is more affordable and when it represents the only school available in the municipality of residence. These results are robust to the inclusion among the explanatory variables of indicators of pupils’ individual ability, proxied by their quantile in the national distribution of the individual standardized math test score (SIMCE), and of the quality of the school of origin in the 8<sup>th</sup> grade, captured by the ranking of the school in the school-average distribution of the SIMCE math test.

Besides, our specification is also robust to variables capturing the effects of the household socioeconomic background on school choice, included in Table 5. The table points out that parents with higher income levels and with higher educational attainments are more likely

to have children enrolled in private voucher schools in both primary and secondary education, for both subgroups of “movers” (those obliged to switch school and those who voluntarily switch) and for the “stayers” (those who never switch school), a result which is consistent with the existing literature on Chile on the determinants of school choice in primary education.

In Table 6, we explore the role played by the education supply at the municipality level at the time of the enrolment decision at both primary and secondary education level. The marginal effects computed for the probability of attending a private voucher versus public school in 8<sup>th</sup> grade (2004) correspond to the indicators of education supply in the municipality of residence calculated at the time of the enrolment decision in primary school (1994), included in  $Z_{1i}$ , while the estimated conditional probabilities correspond the indicators of education supply in the municipality of residence at the time of enrolment decision in secondary school, included in  $Z_{2i}$ . In general, we find that parental decisions respond significantly to the local composition of the education supplied by different type of career tracks and schools. A higher concentration of private voucher (public) schools in the municipality of residence at the moment of school enrolment for different career tracks increases the probability of choosing a private voucher (public) school, though in few cases, this correlation turns out to be negative, suggesting possible negative congestion effects.

Finally, the estimated correlation coefficient between the error terms in equations (1) and (2) appears positive and significant, though not too high (0.182), for parents whose children are obliged to switch school, suggesting that for this subgroup the unobservable characteristics influencing positively the probability of attending a private voucher school

in 8<sup>th</sup> grade, also positively affect the probability of attending a private voucher school in 10<sup>th</sup> grade. The significance of the correlation coefficient  $\rho$  justifies the choice of the recursive model for the subgroup of parents who mandatorily switch schools after 8<sup>th</sup> grade, while this appears less the case for the subset of parents who voluntarily decide to switch schools, for which the estimated  $\rho$  is not statistically significant.

### **5.3 Cream skimming effects**

In the previous section we have shown that the main determinants of enrolment in private subsidized schools are the socioeconomic status of the household of origin, parental expectations and the preferences for children's peers' socioeconomic background and for the values enhanced by the school. School quality also matters, in the sense that students enrolled in top-ranked schools in 8<sup>th</sup> grade (according to the school-average SIMCE distribution) are more likely to attend private voucher schools in 10<sup>th</sup> grade than students enrolled in schools performing more poorly (Table 5).

We can therefore point out that secondary private voucher schools “cream skim” the best students from the standpoint of the socioeconomic background and those enrolled in top-performing schools, a finding which has already been documented by the literature relevant to the United States. The results of Table 5, though, suggest that private voucher schools do not necessarily “cream skim” the best students in terms of academic ability, as proxied by the student's ranking in the national distribution of the individual standardized math test score (SIMCE). Top-ranked students in 8<sup>th</sup> grade in fact are more likely to attend a public than a private voucher school in 10<sup>th</sup> grade than students in lower quintiles of the math-test distribution.



A possible explanation of such finding lies in the existence of elite public schools (the so called “*liceos tradicionales*”) with a recognized tradition of excellence at the country level which are able to guarantee high quality education at affordable costs and therefore can be attractive for pupils coming from both municipal and private voucher schools with parents interested in academic quality.

In order to check this hypothesis, we estimate the model by excluding from the sample of interest the “*liceos tradicionales*”<sup>8</sup>, and by focusing on urban areas only, where their relative importance for school choice is likely to be higher, and we find a much weaker effect of students’ ability on the probability of attending a public school, significant only at 10 percent (Table 7a). In order to obtain further insights on the result, we re-estimate the initial model by restricting it to schools in the two lowest quintiles of the distribution on the PSU (Table 7b): in this case, the effect of individual ability on school choice disappears, meaning that top-ranked students are more likely to attend public schools mainly in middle-high ranked schools of the PSU distribution. Finally, in order to ascertain that our result is not driven by a particular population subgroup (for instance by credit constrained households), we estimate the initial model separately for two income groups (below US\$754.7 and between US\$754.7 and US\$1,886.8) and we find out that the finding is still robust (Tables 7c and 7d).<sup>9</sup>

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<sup>8</sup> The students enrolled in “*liceos tradicionales*” in 10<sup>th</sup> grade correspond to 11% of the sample analyzed (9251 observations).

<sup>9</sup> The exchange rate was 530 pesos per dollar in 2006.

## 6. Estimating the probability of attending a top-ranked school

It is important to investigate further whether the finding that top performing students are more likely to attend public schools represents uniquely a demand phenomenon, or whether other factors could be playing a role. For instance, the phenomenon could be partly determined by supply side factors, and the result could be driven by top performing students from low socioeconomic background not selected to enter subsidized private schools, since these latter might be more oriented at maximizing the homogeneity of the socioeconomic composition of their pupils. Besides, the result might also point out the existence of some mismatch in the allocation of talent across schools: some top-performing students might fail to enroll in top performing schools because of lack of appropriate information or because of resource constraints. Among private subsidized schools in fact, some have introduced add-on fees (*“financiamiento compartido”*) in addition to the voucher, which might reinforce the selection of students from higher socioeconomic origin into the private voucher system.

Therefore, the third research question we address in the paper is: do top performing students end up in better performing schools when they switch to public or to private voucher schools? In order to answer such question we estimate an ordered-probit model to predict the probability of attending a high-ranked school in 10<sup>th</sup> grade, for those students obliged to switch school at the end of the 8<sup>th</sup> grade and moving either to a public or to private voucher school.

The dependent variable is the quintile achieved by the school attended by a given student in the national distribution of the PSU (*Prueba de selección universitaria*) test, a standardized test taken at the national level during the last year of secondary school determining which

university students can have access to. The explanatory variables are socioeconomic background, parental preferences and expectations, individual ability as proxied by the student's quintile in the national distribution of the 2004 8<sup>th</sup>-grade SIMCE-math, and school-specific characteristics.

The results of the predicted probabilities are reported in Tables 8, concerning students attending either public or subsidized schools in 8<sup>th</sup> grade. The tables show the predicted probabilities of attending a school in a given quintile for different groups of students, and aims at comparing the outcomes of high-ability students (those in the top quintile of the 2004 8<sup>th</sup>-grade SIMCE-math distribution) to those of "average" students, taking into account the quality of the school of origin (school in top versus bottom quintile of the school 8<sup>th</sup> grade math test distribution in 2004) and to the socioeconomic status of the household of origin (students from "high income households" corresponding to a monthly income ranging between US\$1,509.4 and US\$1,886.8 versus "average" students).

Focusing for instance on the probability of attending a school in the 4<sup>th</sup> quintile of the PSU in 10<sup>th</sup> grade<sup>10</sup>, the table shows that both average and high ability students have a higher probability of attending a school in this quintile when they move to a private voucher rather than to a public school: 17 versus 12 percent for average students and 26 versus 20 percent for top performing students (column (1) of each panel in Table 8). Besides, the probability of attending a top-ranked school is even higher for top performing students of richer households switching to voucher rather than to public schools (30 versus 24 percent, column (4)). Interestingly, school quality contributes to balance such differences out for average income households, since top performing students seem to enjoy the same

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<sup>10</sup> We focus on the 4<sup>th</sup> quintile of the PSU distribution since the number of public and private voucher schools in the 5<sup>th</sup> quintile (top) of the distribution is small. For this reason we also obtain large standard errors for the predicted probability for the 5<sup>th</sup> quintile, this is not the case for the other quintiles. The results of the ordered probability model are available under request.

probability of attending a top-ranked school in both the public and the voucher system when they come from top performing schools in 8<sup>th</sup> grade (column (3)). In addition, top performing students from richer households, coming from top performing primary schools (column (6)), might even enjoy a slightly higher probability of attending a top-ranked school when they move to the public rather than to private voucher schools, a result which is consistent with our initial finding of section 5.2, since students with such characteristics are more likely to be enrolled in the “*liceo tradicionales*” or in similar high performing public secondary schools. In conclusion, although on average we expect high ability students to be more advantaged when switching to private voucher schools, we also find supporting evidence that for “elite” students the public system might perform as well as the private voucher one.

## **7. Conclusions**

In this paper we study parental decisions about school choice in the mixed public-private Chilean education system. By using a novel dataset where the same pupils and the same parents are followed in two points in time (8<sup>th</sup> grade in 2004 and 10<sup>th</sup> grade in 2006), we estimate the most relevant factors influencing parental choice at both primary and secondary education level.

We find that parents with better socioeconomic background, higher expectations about their children’s future academic achievement, and valuing more peers’ socioeconomic background and school values are more likely to choose private voucher schools, while parents caring more about school performance in terms of average standardized score tests (PSU) are more likely to enroll their children in public schools at the secondary school level. We also show that while voucher schools “cream skim” the best students from the

socioeconomic standpoint, this does not necessarily hold for high ability students, who are more likely to be enrolled in “elite” public schools (“liceos tradicionales”), particularly in urban areas, or in public schools with relatively high performance in the national standardized test of admission into university.

This study has mainly focused on demand side explanations of parental behavior; nonetheless, future research should further investigate supply side factors, such as schools’ selection mechanisms, which are relevant in the Chilean case since private voucher schools can establish their own selection criteria.

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**Table 1**  
**Descriptive statistics of the initial sample ( by school type)**

	2004			2006		
	Public	Voucher	Private	Public	Voucher	Private
Pupil Male	0.48	0.47	0.49	0.48	0.46	0.50
0 < Monthly Household.income < 100.000.Ch\$	0.31	0.13	0.01	0.24	0.11	0.07
100.000 < H. income < 200.000 Ch\$	0.41	0.31	0.02	0.42	0.32	0.20
200.001 < H. income < 300.000 Ch\$	0.14	0.19	0.03	0.16	0.19	0.10
300.001 < H. income < 400.000 Ch\$	0.06	0.11	0.03	0.07	0.11	0.05
400.001 < H. income < 500.000 Ch\$	0.03	0.08	0.04	0.04	0.08	0.03
500.001 < H. income < 600.000 Ch\$	0.02	0.05	0.04	0.03	0.05	0.03
600.001 < H. income < 800.000 Ch\$	0.02	0.05	0.08	0.02	0.05	0.05
800.001 < H. income < 1.000.000 Ch\$	0.01	0.03	0.10	0.01	0.03	0.05
1.000.001 < H. income < 1.200.000 Ch\$	0.00	0.02	0.08	0.00	0.02	0.05
1.200.001 < H. income < 1.400.000 Ch\$	0.00	0.01	0.07	0.00	0.01	0.04
1.400.001 < H. income < 1.600.000 Ch\$	0.00	0.01	0.07	0.00	0.01	0.04
1.600.001 < H. income < 1.800.000 Ch\$	0.00	0.00	0.05	0.00	0.00	0.04
H. income > 1.800.000 Ch\$	0.00	0.01	0.40	0.00	0.01	0.25
Mother with primary education or lower	0.53	0.27	0.02	0.46	0.27	0.18
Mother with secondary education	0.39	0.50	0.18	0.45	0.51	0.31
Mother with post-secondary non- tertiary education	0.04	0.12	0.23	0.05	0.12	0.17
Mother with tertiary education or higher	0.03	0.10	0.57	0.04	0.10	0.35
Father with primary education or lower	0.49	0.24	0.02	0.45	0.27	0.18
Father with secondary education	0.42	0.51	0.14	0.44	0.48	0.28
Father with post-secondary non- tertiary education	0.04	0.11	0.14	0.05	0.11	0.10
Father with tertiary education or higher	0.05	0.14	0.70	0.05	0.14	0.44
Books owned 0 to 10	0.43	0.20	0.03	0.45	0.29	0.04
Books owned 11 to 50	0.38	0.42	0.21	0.41	0.46	0.27
Books owned 51 to 100	0.12	0.21	0.26	0.09	0.14	0.23
Books owned >100	0.07	0.16	0.51	0.06	0.11	0.45
N. of household members	4.05	3.83	4.00	3.91	3.75	3.88
Household's head employer	0.08	0.06	0.09	0.11	0.10	0.20
Household's head self-employed	0.22	0.23	0.25	0.21	0.21	0.15
Household's head domestic worker	0.08	0.05	0.00	0.07	0.05	0.00
Household's head public employee	0.12	0.13	0.11	0.12	0.13	0.12
Household's head in the Armed Forces	0.02	0.03	0.02	0.01	0.02	0.02
Households' head unemployed	0.19	0.11	0.03	0.15	0.10	0.02
Expecting pupil to complete at least second. education	0.31	0.12	0.01	0.40	0.23	0.00
Expecting pupil to complete at least post-secondary non-tertiary education	0.33	0.26	0.03	0.21	0.18	0.03
Expecting pupil to complete tertiary education	0.36	0.62	0.96	0.40	0.58	0.97
School chosen for proximity	0.69	0.51	0.37	0.36	0.27	0.02
School chosen since attended by other family members	0.46	0.35	0.34	0.06	0.01	0.00
School chosen for prestige	0.35	0.56	0.64	0.18	0.17	0.20
School chosen for SIMCE performance	0.09	0.10	0.08	0.05	0.07	0.06
School chosen for PSU performance	0.02	0.06	0.18	0.09	0.07	0.18
School chosen for peers' socioeconomic background	0.04	0.10	0.23	0.03	0.06	0.19
School chosen for its values	0.35	0.60	0.65	0.21	0.45	0.59
School chosen for full-day attendance	0.25	0.20	0.16	0.17	0.16	0.08
School chosen for affordable costs	0.54	0.50	0.26	0.44	0.35	0.16
School chosen as the only one where pupil got accepted (2004 only)	0.03	0.03	0.01	0.33	0.35	0.32
Resident in Santiago	0.23	0.42	0.53	0.22	0.42	0.53
Resident in V Región	0.09	0.11	0.13	0.09	0.11	0.13
N° Observations	52,594	36,426	6,991	47,709	42,141	6,662
%	0.55	0.38	0.07	0.49	0.44	0.07

The exchange rate was 530 Chilean pesos per dollar in 2006.

**Table 2**  
**Transitions by school type in the initial sample**

School type in 8th grade (2004)	School type in 10th grade (2006)			
	Public	Private subsidized	Private	Total
Public	35,271	13,826	3,438	52,535
	67.1	26.3	6.5	100%
	82.9	33.1	29.7	54.8
Private subsidized	7,153	27,152	2,121	36,426
	19.6	74.5	5.8	100%
	16.8	64.9	18.3	38.0
Private	132	856	6,014	7,002
	1.9	12.2	85.9	100%
	0.3	2.1	52.0	7.3
Total	42,556	41,834	11,573	95,963
	44.4	43.6	12.1	100%
	100%	100%	100%	100%

**Table 3**  
**Transitions by school type in the relevant sample**

	School type in 10th grade (2006)						
	Obliged to switch school in 8th grade			Decide to switch school between 8th and 10th grade			Never switch school
School type in 8th grade (2004)	Public	Private subsidized	Total	Public	Private subsidized	Total	
Public	27,213	11,713	38,926	3,061	1,871	4,932	4,671
	69.91	30.09	100%	62.06	37.94	100%	100%
	84.5	57.52	74.05	63.48	36.81	49.79	24.06
Private subsidized	4,990	8,649	13,639	1,761	3,212	4,973	14,747
	36.59	63.41	100%	35.41	64.59	100%	100%
	15.5	42.48	25.95	36.52	63.19	50.21	75.94
Total	32,203	20,362	52,565	4,822	5,083	9,905	19,418
	61.26	38.74	100%	48.68	51.32	100%	100%
	100%	100%	100%	100%	100%	100%	100%

**Table 4**  
**Marginal effects parental expectations, parental preferences, pupil's and school ranking**

	Decide to switch school			Obligated to switch school			Never switch school
	Pr(Priv. Subs. 2006   Priv. Subs. 2004)	Pr(Priv. Subs. 2006   Public 04)	Pr(Priv. Subs. 2004)	Pr(Priv. Subs. 2006   Priv. Subs. 2004)	Pr(Priv. Subs. 2006   Public 04)	Pr(Priv. Subs. 04)	Pr(Priv. Subs. 04)
School type in 8 <sup>n</sup> grade (2004)	0.131 ***	-0.131 ***		0.101 ***	-0.092 ***		
Pupil will complete post-sec. non-tertiary edu.	0.026	0.026	0.076 ***	0.007	0.007	0.012 *	0.068 ***
Pupil will complete tertiary education	0.069 ***	0.069 ***	0.141 ***	0.032 ***	0.029 ***	0.047 ***	0.103 ***
<i>Pupil will complete second. Edu. (Ref.)</i>							
school chosen for proximity	-0.057 ***	-0.057 ***	-0.118 ***	-0.016 **	-0.014 **	-0.061 ***	0.046 ***
school chosen for other family members attended	-0.200 ***	-0.201 ***	-0.130 ***	-0.255 ***	-0.208 ***	-0.037 ***	-0.018 **
school chosen for prestige	0.000	0.000	0.053 ***	-0.005	-0.004	0.049 ***	0.008
school chosen for SIMCE performance	0.013	0.013	-0.114 ***	0.023	0.021	-0.058 ***	-0.060 ***
school chosen for PSU performance	-0.181 ***	-0.181 ***	0.043	-0.117 ***	-0.101 ***	0.123 ***	-0.291 ***
school chosen for peers' socioeconomic background	0.134 ***	0.134 ***	0.199 ***	0.113 ***	0.106 ***	0.086 ***	0.081 ***
school chosen for its values	0.235 ***	0.235 ***	0.178 ***	0.244 ***	0.229 ***	0.150 ***	0.176 ***
school chosen for full-day attendance	0.044 **	0.044 **	-0.021	0.029 ***	0.026 ***	-0.022 ***	0.034 ***
school chosen for affordable costs	-0.120 ***	-0.120 ***	-0.048 **	-0.109 ***	-0.097 ***	-0.006	-0.046 ***
school chosen as enhances good technical skills (2006 only)	0.068 ***	0.068 ***		0.035 ***	0.032 ***		
School chosen as the only one where pupil got accepted (2004 only)			0.003			-0.007	0.035 *
school chosen since it was the only one present in the municipality	-0.075 ***	-0.075 ***	-0.261 ***	-0.068 ***	-0.061 ***	-0.122 ***	-0.350 ***
Pupil in II quintile of the SIMCE-math	0.001	0.001		0.011	0.010		
Pupil in III quintile of the SIMCE-math	0.022	0.022		-0.012	-0.011		
Pupil in IV quintile of the SIMCE-math	-0.007	-0.007		-0.010	-0.009		
Pupil in V quintile of the SIMCE-math	-0.053 *	-0.053 *		-0.050 ***	-0.044 ***		
<i>Pupil in I quintile of the SIMCE-math (Ref.)</i>							
School in II quintile of the SIMCE-math	0.079 ***	0.079 ***		0.028 ***	0.025 ***		
School in III quintile of the SIMCE-math	0.004	0.004		0.028 ***	0.025 ***		
School in IV quintile of the SIMCE-math	0.047 *	0.047 *		0.049 ***	0.044 ***		
School in V quintile of the SIMCE-math	0.126 ***	0.126 ***		0.076 ***	0.070 ***		
<i>School in I quintile of the SIMCE-math (Ref.)</i>							
Number Observations	7102			35158			14848
Log likelihood	-7377.941			-34836.8			-5794.7
Rho	-0.011			0.182			
Athrho	-0.011			0.184 ***			
Chi-square for the null: Rho=0	0.030			26.302			

\*\*\* indicates significant at 1%, \*\* at 5%, \* at 10%.

**Table 5**  
**Marginal effects: socioeconomic background**

	Decide to switch school			Obliged to switch school			Never switch school
	Pr(Priv. Voucher 06   Priv. Voucher 04)	Pr(Priv. Voucher 06   Public 04)	Pr(Priv. Voucher 04)	Pr(Priv. Voucher 06   Priv. Voucher 04)	Pr(Priv. Voucher 06   Public 04)	Pr(Priv. Voucher 04)	Pr(Priv. Voucher 06)
100.000 < h. income < 200.000	0.071 ***	0.071 ***	0.045 **	0.039 ***	0.035 ***	0.018 ***	0.061 ***
200.001 < h. income < 300.000	0.096 ***	0.096 ***	0.138 ***	0.084 ***	0.077 ***	0.063 ***	0.080 ***
300.001 < h. income < 400.000	0.130 ***	0.130 ***	0.202 ***	0.126 ***	0.118 ***	0.072 ***	0.098 ***
400.001 < h. income < 500.000	0.191 ***	0.190 ***	0.194 ***	0.124 ***	0.117 ***	0.105 ***	0.106 ***
500.001 < h. income < 600.000	0.223 ***	0.222 ***	0.205 ***	0.125 ***	0.118 ***	0.116 ***	0.115 ***
600.001 < h. income < 800.000	0.215 ***	0.214 ***	0.207 ***	0.198 ***	0.192 ***	0.118 ***	0.114 ***
800.001 < h. income < 1.000.000	0.197 ***	0.196 ***	0.192 ***	0.230 ***	0.226 ***	0.121 ***	0.113 ***
1.000.001 < h. income < 1.200.000	0.158 **	0.157 **	0.343 ***	0.284 ***	0.287 ***	0.057	0.124 ***
1.200.001 < h. income < 1.400.000	0.320 ***	0.318 ***	0.325 ***	0.234 ***	0.231 ***	0.086	0.119 ***
1.400.001 < h. income < 1.600.000	0.314 ***	0.312 ***	0.061	0.203 **	0.198 **	0.195 **	0.119 ***
1.600.001 < h. income < 1.800.000	0.455 ***	0.450 ***	0.407 ***	0.072	0.066	0.169	0.129 ***
h. income > 1.800.000	0.422 ***	0.418 ***	0.295 ***	0.224 ***	0.221 ***	0.181 **	0.135 ***
<i>0 &lt; h. income &lt; 100.000 Ref.</i>							
Mother with secondary education	0.017	0.017	0.116 ***	0.033 ***	0.030 ***	0.036 ***	0.051 ***
Mother with post-secondary non- tertiary education	0.099 ***	0.099 ***	0.159 ***	0.079 ***	0.073 ***	0.093 ***	0.051 ***
Mother with tertiary education or higher <i>Mother with primary education (Ref.)</i>	0.063 *	0.063 *	0.152 ***	0.062 ***	0.057 ***	0.076 ***	0.051 ***
Father with secondary education	0.017	0.017	0.125 ***	0.011	0.010	0.023 ***	0.039 ***
Father with post -secondary non- tertiary education	0.031	0.031	0.179 ***	0.046 ***	0.042 ***	0.034 ***	0.039 ***
Father with tertiary education or higher <i>Father with primary education (Ref.)</i>	0.089 ***	0.089 ***	0.130 ***	0.080 ***	0.074 ***	0.054 ***	0.039 ***
Books at home 11 to 50	0.008	0.008	0.058 ***	0.015 **	0.013 **	0.029 ***	0.044 ***
Books at home 51 to 100	-0.027	-0.027	0.102 ***	0.017	0.015	0.036 ***	0.052 ***
Books at home >100	-0.051 *	-0.051 *	0.071 ***	0.021	0.019	0.055 ***	0.025 **
<i>Books at home 0 to 10 (Ref.)</i>							
Number Observations	7102			35158			14848
Log likelihood	-7377.941			-34836.798			-5794.7
Rho	-0.011			0.182			
Athrho	-0.011			0.184 ***			
Chi-square for the null: Rho=0	0.030			26.302			

\*\*\* indicates significant at 1%, \*\*at 5%, \* at 10%. Household income in Chilean pesos, the exchange rate was 530 Chilean pesos per dollar in 2006.

**Table 6**  
**Marginal effects: indicators of education supply by career track and school**

	Decide to switch school			Obligated to switch school			Never switch school
	Pr(Priv. Subs. 2006 Priv. Subs. 2004)	Pr(Priv. Subs. 2006 Public 2004)	Pr(Priv. Subs. 2004)	Pr(Priv. Subs. 2006 Priv. Subs. 2004)	Pr(Priv. Subs. 2006 Public 04)	Pr(Priv. Voucher 04)	Pr(Priv. Subs. 2004)
% public schools with 7 -12th grade only in V quintile of the SIMCE-math	-0.008	-0.008		-0.010 ***	-0.009 ***		
% public schools with 1 -12th grade in V quintile of the SIMCE-math	0.002	0.002		-0.005 *	-0.004 *		
% private subs. schools with 7 -12th grade only in V quintile of the SIMCE-math	0.007	0.007		0.005	0.005		
% private subs. schools with 1 -12th grade in V quintile of the SIMCE-math	0.000	0.000		-0.002 ***	-0.002 ***		
% public schools with 1 -6th grade only			-0.008 ***			0.00084	0.004 ***
% private subs. with 1 -6th grade only			0.004 ***			0.000	0.001 ***
% public schools with 1 -8th grade only			-0.004 *			-0.001	0.003 ***
% private subs. with 1 -8th grade only			0.001 **			0.002 ***	0.001 ***
% public schools with 9 -12th grade only	-0.004 **	-0.004 **	0.010 ***	-0.009 ***	-0.008 ***	-0.001 *	0.003
% private subs. with 9 -12th grade only	0.004 ***	0.004 ***	0.001	0.004 ***	0.003 ***	0.001 **	0.002 ***
% private subs. with 7 -12th grade only	0.001	0.001	0.017 ***	0.000	0.000	0.001	0.002
% public schools with 1 -12th grade	0.002 ***	0.002 ***	-0.012 ***	0.000	0.000	0.003 ***	-0.001
% private subs. schools with 1 -12th grade	0.001	0.001	0.002 ***	0.002 ***	0.002 ***	0.000	0.003 ***
% public schools with 7 -12th grade only (2004)	0.006 *	0.006 *		-0.002	-0.002		
% public schools	0.002	0.002	-0.005 ***	-0.001 **	-0.001 **	0.000	-0.003 ***
% private subs.	0.005 ***	0.005 ***	0.001	0.005 ***	0.005 ***	0.008 ***	0.004 ***
Resident in Santiago	0.151 ***	0.151 ***	0.129 ***	0.124 ***	0.113 ***	0.073 ***	-0.122 ***
Resident in V Region	0.053 **	0.053 **	0.042	-0.008	-0.007	0.094 ***	0.009
Log of average income of the municipality of residence	-0.010	-0.010	-0.102 ***	-0.030	-0.027	-0.055 ***	-0.132 ***
Log of population of the municipality of residence	-0.001	-0.001	-0.035 **	-0.036 ***	-0.032 ***	0.022 ***	0.014 **
Number Observations	7102			35158			14848
Log likelihood	-7377.941			-34836.798			-5794.7
Rho	-0.011			0.182			
Athrho	-0.011			0.184 ***			
Chi-square for the null: Rho=0	0.030			26.302			

\*\*\* indicates significant at 1%, \*\* at 5%, \* at 10%.

**Table 7A**  
**Marginal effects: urban schools only without “Liceos Tradicionales”**

	Decide to switch school			Obligated to switch school			Never switch school
	Pr(Priv. Voucher 06   Priv. Voucher 04)	Pr(Priv. Voucher 06   Public 04)	Pr(Priv. Voucher 04)	Pr(Priv. Voucher 06   Priv. Voucher 04)	Pr(Priv. Voucher 06   Public 04)	Pr(Priv. Voucher 04)	Pr(Priv. Voucher 06)
<i>Reason for school choice</i>							
school chosen for PSU performance	-0.084 ***	-0.084 ***	0.024	-0.038 **	-0.035 **	0.157 ***	-0.103 ***
school chosen for peers' socioeconomic background	0.128 ***	0.126 ***	0.174 ***	0.120 ***	0.118 ***	0.103 ***	0.048 ***
school chosen for its values	0.209 ***	0.207 ***	0.179 ***	0.242 ***	0.238 ***	0.178 ***	0.119 ***
<i>Student ability</i>							
Pupil in V quintile of the SIMCE-math	-0.048	-0.048		-0.030 *	-0.028 *		
Pupil in I quintile of the SIMCE-math (Ref.)							

**Table 7B**  
**Marginal effects: 1<sup>st</sup> and 2<sup>nd</sup> quintile of PSU only**

	Decide to switch school			Obligated to switch school			Never switch school
	Pr(Priv. Voucher 06   Priv. Voucher 04)	Pr(Priv. Voucher 06   Public 04)	Pr(Priv. Voucher 04)	Pr(Priv. Voucher 06   Priv. Voucher 04)	Pr(Priv. Voucher 06   Public 04)	Pr(Priv. Voucher 04)	Pr(Priv. Voucher 06)
<i>Reason for school choice</i>							
school chosen for PSU performance	-0.108	-0.103	0.082	-0.091 **	-0.073 **	0.045	-0.116 *
school chosen for peers' socioeconomic background	0.002	0.002	0.207 ***	0.049 *	0.041 *	0.067 ***	0.154 ***
school chosen for its values	0.205 ***	0.201 ***	0.151 ***	0.208 ***	0.182 ***	0.090 ***	0.201 ***
<i>Student ability</i>							
Pupil in V quintile of the SIMCE-math	0.009	0.009		-0.026	-0.021		
Pupil in I quintile of the SIMCE-math (Ref.)							

\*\*\* indicates significant at 1%, \*\* at 5%, \* at 10%.

**Table 7C. Marginal effects: household monthly income below US\$ 754.7.**

	Decide to switch school			Obligated to switch school			Never switch school
	Pr(Priv. Voucher 06   Priv. Voucher 04)	Pr(Priv. Voucher 06   Public 04)	Pr(Priv. Voucher 04)	Pr(Priv. Voucher 06   Priv. Voucher 04)	Pr(Priv. Voucher 06   Public 04)	Pr(Priv. Voucher 04)	Pr(Priv. Voucher 06)
<i>Reason for school choice</i>							
school chosen for PSU performance	-0.108 ***	-0.107 ***	0.074	-0.106 ***	-0.090 ***	0.089 ***	-0.297 ***
school chosen for peers' socioeconomic background	0.081 **	0.081 **	0.188 ***	0.098 ***	0.090 ***	0.071 ***	0.084 ***
school chosen for its values	0.235 ***	0.235 ***	0.177 ***	0.241 ***	0.223 ***	0.134 ***	0.196 ***
<i>Student ability</i>							
Pupil in V quintile of the SIMCE-math	-0.020	-0.020		-0.042 ***	-0.037 ***		
Pupil in I quintile of the SIMCE-math (Ref.)							



**Table 7d**  
**Marginal effects: household income between US\$754.7 and US\$1,886.8**

	Decide to switch school			Obligated to switch school			Never switch school Pr(Priv. Voucher 06)
	Pr(Priv. Voucher 06   Priv. Voucher 04)	Pr(Priv. Voucher 06   Public 04)	Pr(Priv. Voucher 04)	Pr(Priv. Voucher 06   Priv. Voucher 04)	Pr(Priv. Voucher 06   Public 04)	Pr(Priv. Voucher 04)	
<i>Reason for school choice</i>							
school chosen for PSU performance	-0.305 ***	-0.282 ***	0.064 *	-0.153 ***	-0.152 ***	0.312 ***	-0.221 ***
school chosen for peers' socioeconomic background	0.162 ***	0.136 ***	0.123 ***	0.133 ***	0.153 ***	0.185 ***	0.053 ***
school chosen for its values	0.220 ***	0.188 ***	0.089 ***	0.232 ***	0.259 ***	0.272 ***	0.121 ***
<i>Student ability</i>							
Pupil in V quintile of the SIMCE-math	-0.186 **	-0.167 **		-0.113 ***	-0.115 ***		
Pupil in I quintile of the SIMCE-math (Ref.)							

\*\*\* indicates significant at 1%, \*\* at 5%. The exchange rate was 530 Chilean pesos per dollar in 2006.

**Table 8**

**Predicted school quintile in 10th grade: students obliged to switch schools, attending either public or voucher schools in 8<sup>th</sup> grade**

<b>Average ability student, obliged to switch school and attending public school in 10th grade</b>						
School quintile in 10th grade (predicted)	Average ability student			Average ability student, high household income		
	All schools (1)	Bottom quintile school in 8th grade (2)	Top quintile school in 8th grade (3)	All schools (4)	Bottom quintile school in 8th grade (5)	Top quintile school in 8th grade (6)
1 (Bottom)	0.087	0.103	0.052	0.065	0.078	0.037
2	0.306	0.328	0.244	0.270	0.293	0.207
3	0.464	0.447	0.493	0.484	0.472	0.496
4	0.139	0.119	0.203	0.175	0.152	0.246
5 (Top)	0.004	0.003	0.009	0.007	0.005	0.013
<b>High ability student (in the top quintile of the 2004 SIMCE-math), obliged to switch school and attending public school in 10th grade</b>						
School quintile in 10th grade (predicted)	High ability student			High ability student, high household income		
	All schools (1)	Bottom quintile school in 8th grade (2)	Top quintile school in 8th grade (3)	All schools (4)	Bottom quintile school in 8th grade (5)	Top quintile school in 8th grade (6)
1 (Bottom)	0.044	0.054	0.025	0.032	0.039	0.017
2	0.226	0.249	0.166	0.190	0.212	0.134
3	0.496	0.491	0.487	0.494	0.496	0.469
4	0.223	0.197	0.301	0.268	0.239	0.350
5 (Top)	0.011	0.008	0.021	0.016	0.013	0.031
<b>Average ability student, obliged to switch school and attending voucher school in 10th grade</b>						
School quintile in 10th grade (predicted)	Average ability student			Average ability student, high household income		
	All schools (1)	Bottom quintile school in 8th grade (2)	Top quintile school in 8th grade (3)	All schools (4)	Bottom quintile school in 8th grade (5)	Top quintile school in 8th grade (6)
1 (Bottom)	0.066	0.077	0.057	0.036	0.043	0.030
2	0.239	0.257	0.222	0.173	0.191	0.158
3	0.451	0.447	0.453	0.444	0.449	0.437
4	0.225	0.203	0.245	0.308	0.284	0.330
5 (Top)	0.020	0.016	0.024	0.039	0.033	0.046
School quintile in 10th grade (predicted)	High ability student			High ability student, high household income		
	All schools (1)	Bottom quintile school in 8th grade (2)	Top quintile school in 8th grade (3)	All schools (4)	Bottom quintile school in 8th grade (5)	Top quintile school in 8th grade (6)
1 (Bottom)	0.030	0.036	0.025	0.015	0.018	0.012
2	0.157	0.174	0.142	0.103	0.117	0.091
3	0.436	0.444	0.427	0.388	0.404	0.372
4	0.330	0.307	0.352	0.410	0.390	0.429
5 (Top)	0.047	0.039	0.055	0.084	0.072	0.097

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