SCHOOL CHOICE AND SWITCHING COSTS

ABSTRACT

Voucher systems in education firmly rely on the parent´s ability to choose their child´s school at any time during their schooling years, even after the student is currently enrolled in a school they had previously selected. This ability, however, is reduced by switching costs, caused by factors such as the stress and the loss of social networks associated with moving a child from one school to another. We propose a methodology to estimate switching costs and then we apply it to Chile, a country with more than 90% of the students covered by a voucher system. Using the multi-dimensional nature of school valuation, we find that on average, switching costs are statistically significant and economically relevant. Our results also suggest that switching costs are very different among individuals, but that they are particularly smaller in the case of parents deciding to leave their children in public schools.

Keywords: academic performance; school choice; switching costs; Chile.

JEL Classification: I21, L12.

1. INTRODUCTION

As previously indicated, the educational reform which Chile introduced in the early 1980s was expected to create competition through large scale decentralization and the introduction of choice through a voucher system. In 1991, a new law allowed schools with State funding to supplement income from the voucher payments with private tuition (shared financed schools). This generated a huge increase in private voucher schools, and represented one of the most relevant transformations in a short period of time in the supply of schools in Chile's history. Whilst this structural change significantly increased choice possibilities, it is not clear what effect this had on real choices and hence, in educational performance. Switching costs, defined

as the cost of changing a decision that was previously taken, have been analyzed in a context of industrial organization and strategy (e.g., Porter, 1979; Day, 1986; and Aaker, 1988). In the case of education they may be particularly relevant, since changing a child from the school they were previously attending involves, at a minimum, affecting their social circles, increasing their stress and in the Chilean example, incurring direct costs such as an enrollment fee, specifically designed uniforms, and so. If switching costs were important, they would reduce choice and the effect of a voucher system on academic performance. In that case, relevant choices would mainly apply for children entering into their first grade, and not to students whose parents had already chosen a school for them. Thus, a sudden increased competition and choice possibilities, as occurred in Chile, would not have a relevant impact in the short run if parents lack capacity to move their children to a different school once a first decision was taken. Despite the importance of switching costs in a voucher context, to our knowledge there is no study that measures their importance and impact. The fact that choosing a school implies at least considering distance, academic performance, and costs, makes switching costs necessary to analyze in a multidimensional setting. The paper is structured in four sections, in addition to this introduction. Section two summarizes the literature on switching costs and includes a brief overview of the educational system in Chile. Section three presents the methodology and results, and section four presents the conclusions.

2. BACKGROUND

2.1 SWITCHING COSTS.

Economic theory suggests that for competition to have a positive impact on performance, consumers must play an active role through their choice. However, consumers may be limited by the provider's switching costs or difficulty to evaluate and compare the different offerings (Wilson and Waddams, 2007). In fact, a line in the literature emphasizes the advantages for

firms to create and rise switching costs to reduce substitution, and finally, increase monopoly power (Fornell and Larcker, 1981; Klemperer, 1987c; Porter, 1998; Hess and Ricart, 2002; Farrell and Klemperer, 2006; Nakamura, 2010; Klemperer, 1987a, 1987b, 1995; Burnham, Frels and Mahajan, 2003; Shy, 2002; Kahl, 2004; Kim, Choi and Kim, 2010). A first attempt to empirically measure switching costs was Jackson (1985), who classified "psychological and economic" costs. He concluded that switching costs increase with product complexity and with post sales services (Gremler and Brown, 1996; and Fornell, 1992). Maicas (2006) identifies a broad variety of product and service industries where switching costs are relevant (see also, Grzybowski, 2006; Kim, Park and Jeong, 2004; Maicas and Sese, 2008; Maicas, Polo and Sese, 2009). Guiltinan (1989) associates switching costs with economic and psychological costs. This idea was followed by a number of scholars, including Bitner (1995), Bendapudi and Berry (1997); Jones, Mothersbaugh and Beatty (2000); Colgate and Lang (2001); Berné, Múgica and Yagüe (1996), Jones and Sasser (1995), Dick and Basú (1994), Ganesh, Amold and Reynolds (2000), García (2000), Sharma and Patterson (2000), Lee and Cunningham (2001), and Wathne, Biong and Heide (2001).

Borenstein (1991) pioneered the measurement of switching costs in gas stations, and associate these costs to price differentiations. That pioneering work influenced Sharpe (1997) for bank deposits, Knittel (1997) for long distance telecommunications, and Elzinga and Mills (1998) for cigarette distribution during the price war of the 1980s. Shy (2002), for the Israeli cellular phone and financial industries, linked switching costs to market share and prices charged by each company. Kahl (2004) measured huge variations by industry. Chen and Hitt (2002), Johnson, Bellman and Lohse (2002), Kim, Kliger and Vale (2003) analyzed switching costs in new technologies industries. Shum (2004) evaluated how brand loyalty affected opportunity costs in the cereal industry. Wilson and Waddams (2007) estimated switching costs for the residential electrical market. Maicas, Polo and Sese (2009) concluded that portability

of cell phone numbers reduced switching costs, favoring the decision to change supplier. Aydin, Gökhan, Kazan and Doğruer (2009) estimated the sources of switching costs and evaluated their impact on the credit card market, emphasizing the psychological nature of switching costs. To our knowledge no empirical research on switching cost in education exists. This is not surprising, since in one way or another, most countries limit parents' school choice, a sort of institutionally imposed switching prohibition. In the U.S., for instance, most school enrolment is defined by the county where the family lives. Furthermore, in most cases where parents can choose a school in a different county, lotteries are required to deal with the excess of demand. For countries or areas where school choice is allowed, there is research on the effect that choice has on education quality (see, Hoxby, 2000; Ladd and Fiske, 2001; Böhlmark and Lindahl, 2008; Gibbons, Machin and Silva, 2008, Hanushek, Kain, Rivkin, and Branch (2007) and Imberman, 2011). For Chile, the literature on vouchers has focused on its learning consequences (Carnoy and McEwan, 2000; McEwan and Carnoy, 2000; Elacqua and Fabrega, 2004; Gallego and Hernando, 2008; Chumacero, Gallegos and Paredes, 2012); on the real possibility families have to choose (Gallego and Hernando, 2008; Chumacero, Gomez and Paredes, 2012; Chumacero and Paredes, 2012; Elaqua, 2012), and on the role of information (Gallego, Cortés, Lagos and Stekel, et al, 2008; Gomez, Chumacero and Paredes, 2012). A different approach, partially connected to switching costs is followed by Bravo, Mukhopadhyay and Todd (2010). They analyze the effect of the introduction of the voucher system on employment and wages. Using panel data, they develop a model to explain how the choice was affected by the reform, a choice that had to do with the type of school available before and after the reform, and labor market participation. As expected, the cost of staying in the same type of school (public, private subsidized, or private nonsubsidized) is estimated to be substantially lower than the cost of switching types of schools, and the highest switching costs are associated with the transition from private subsidized, unsubsidized primary to public

secondary and public primary to nonsubsidized primary. The costs are relatively lower for transiting from one type of private primary to another type of private secondary. Nonetheless, our research proposes a methodology for identifying and estimating switching costs in the education industry and how they affect parents' decisions on changing their children's schools for a better one according to a set of previously identified and weighted preferences in our choice selection model. This is relevant, as the capacity of a voucher system to improve schools and students' academic performance depends on the parents' ability to select the best option in terms of quality and the establishment's ability to respond to the incentives created by competition. However, the benefits of competition can be negatively affected by the existence of switching costs, as changing a students from one school to another includes changing their social circles and friendships, which may cause stress for both the student and their family. This is of importance, as the effect a voucher system has on academic performance is a highly controversial topic and the literature does not show consensus regarding the results of competition.

2.2 THE CHILEAN EDUCATIONAL SYSTEM AND THE INCREASE IN OPTIONS.

In the 1980s, Chile transformed its educational system. Since then, education has become more decentralized, handing the State schools to the municipalities. The goal was that the system would induce students to choose the best school, and private voucher-funded schools were created. Since then, the educational sector is composed of three types of schools: public, subsidized private and private paid. As was previously stated, there were multiple objectives of this reform, one of which was to increase the coverage rate via the participation of private entities. One effect of the reform was the increase in voucher enrollment, which in 2013 was over 53% (see Table N°1).

Table N°1.Student enrollment according to type of school.

Year	Enrollment according to school type						
	Public	%	Subsidized private	%	Private	%	Total
2004	1,921,969	51.4%	1,534,349	41.0%	284,257	7.6%	3,740,575
2005	1,889,669	50.4%	1,608,077	42.9%	254,163	6.8%	3,751,909
2006	1,816,329	48.5%	1,681,105	44.9%	250,800	6.7%	3,748,234
2007	1,737,417	46.9%	1,716,258	46.3%	254,031	6.9%	3,707,706
2008	1,662,538	45.1%	1,764,355	47.9%	256,380	7.0%	3,683,273
2009	1,617,682	43.7%	1,825,031	49.3%	255,864	6.9%	3,698,577
2010	1,536,230	42.1%	1,852,661	50.8%	258,716	7.1%	3,647,607
2011	1,482,937	41.2%	1,861,754	51.7%	258,311	7.2%	3,603,002
2012	1,408,981	39.7%	1,884,934	53.1%	255,233	7.2%	3,549,148
2013	1,374,094	38.8%	1,897,949	53.7%	265,044	7.5%	3,537,087

Source: MINEDUC.

In addition, and according to this, the total offer of schools has increased, especially subsidized private: in 1993, 2,653 of these types of establishments existed, while in 2013, there were a total of 6,017 schools (see Table N°2), presenting an increase of 127% during this period.

Table N°2 Number of schools according to type.

Year	Total	Public	Private subsidized	Private
1993	9,831	6,347	2,653	831
1994	9,810	6,313	2,637	860
1995	10,296	6,448	2,790	1,058
2001	10,799	6,309	3,459	1,031
2010	12,144	5,796	5,674	674
2011	12,063	5,650	5,756	657
2012	12,174	5,584	5,965	625
2013	12,114	5,495	6,017	602

Source: MINEDUC

Chilean education performance is relatively poor by international standards. For example, in the 2009 PISA test, Chile placed 44th of a total of 65 countries, with an average of 449 points, below the average of 493 points for the countries belonging to the OECD that took the reading comprehension test (see Table N° 3).

Table N°3: Trends in text book reading from 2000 - 2009.

Reading Score	2000	2006	2009

Average Score OECD	501	495	499
Average Score CHILE	410	442	449

Source: MINEDUC

Moreover, we know the voucher model in education greatly depends on parents' ability to choose the best school for their children; however, one factor that can decrease this capacity is the existence of switching costs, caused by different factors such as stress experienced by the children, and the loss of social networks. Thus, even if better quality schools were available, some families will keep their children in the schools they originally chose, limiting the effect of competition on performance in the medium or long term. The evidence for Chile suggests that the percentage of students who change schools is significant. Table N°4 shows the total students for the year 2000 in the Santiago Metropolitan Region who were in 4th grade in schools imparting primary and high school education, and could therefore continue to study at the same school or could be at another school by 2004, when they entered 8th grade. From the total group of 17,455 students, 2,921 students changed to another school (16.7%). Consequently, the relevance of switching costs is an empirical rather than a conceptual matter.

Table N° 4: Decision to stay in same school or switch schools during the 2000-2004 periods.

Total	Stay	Male	Female	Public	Private subsidized	Private paid
2,921	No	1,272	1,649	364	1,841	716
14,534	Yes	6,962	7,572	1,537	7,318	5,679
17,455		8,234	9,221	1,901	9,159	6,395

Source: Authors based on SIMCE.

3. METHODOLOGY.

3.1.1 DEFINITION AND MEASUREMENT OF SWITCHING COSTS.

The methodology we follow can be explained in three steps. First, based on a decision model, we estimated the effect three different observed characteristics, quality, distance and price, had on the decision parents make to choose schools in 2000. The weights each of these

characteristics has on their decisions to choose schools are parameters of their utility function we assume are stable over time. Second, using these estimates, we compare the expected utility parents derive from the school chosen in 2000 and every new school that was not available in that year but was available in 2004. Third, we observe whether parents changed or did not change their children to a new school that was not previously available for them. We expect that in absence of switching costs, parent should change students to a new school if the new school provided a higher expected utility than that previously chosen. On the contrary, if there are switching costs, only high-enough differences in utilities favoring a new school will produce that change. The magnitude of the switching cost can thus be obtained and be expressed in utility gap, cost, distance or quality. For the first part we follow Chumacero, Gomez and Paredes (2012), assuming parents have utility functions that depend on a number of school attributes and whit this estimations, we define a vector of parameters to be estimated: quality of school, tuition, and distance between school and home. The parameters associated with these characteristics may be estimated using a maximum likelihood, and from there, we can get the relevant tradeoffs or weights in the school choice.

Secondly, we define Si as the gain an individual i who choose a given school in period t, if he had the (larger) options that were available in$period_{t+k}$ and this can be expressed as in (1)

$$U_{i,school\ would\ choose\ t+k} - U_{i,effectively\ chosen\ school\ t} = S_i \qquad (1)$$

In our case, we understand S_i, as the cost a student must face when (s) he decides to change the chosen school for another which reports a greater level of utility. Also, in (1) it is observed that in order for a student to switch to the better option, the benefit must outweigh said cost. If this occurs, then the benefits of competition will be observed. In our case, switching costs are measured according to a group of appropriately weighted attributes and the level of utility

reported by the chosen provider facing each new market proposal in the market. Therefore, this can be expressed as in (2).

$$U_{i,effectively\ chosen\ school\ t} + S_i = U_{i,school\ would\ choose\ t+k} \qquad (2)$$

Therefore, we suppose that the probability of changing the original school depends on S_i , as in (3).

$$P_i = f(S_i) + u_i \qquad (3)$$

Following with (3), we hope that in the absence of switching costs, our model suggests that a positive value of S_i should induce parents to change the school previously chosen.

3.1.2 THE DATA AND THE EMPIRICAL MODEL.

Using an identification code for each student, we followed this cohort of students who were in fourth grade in 2000, and we went back to observe then in their eighth grade in 2004, so we were able to verify if they changed schools. Thus, we can compare the expected utility associated with the chosen school and that associated with a new school that was not available when they were in 4th grade, but that was available when they were in the 8th grade, as in (1). To this end, we merged a number of databases. The first data base is SIMCE that allows identifying students, the school they attended, and number of socio- demographic characteristics. The second is the database of students applying to universities in 2009 (i.e., those who were in their 12th grade in 2008) to get their addresses at the moment they applied to the university. Assuming the address didn't change in the period considered, we geo-referenced each home and school with digital maps, and we determined the Euclidian distance from each student´s home to every school and we get the parameters associated with distance,

price and quality, and hence, the empirical tradeoffs into the indirect utility function.[3] To estimate the parameters associated with the probability that parents decide to keep the child in the original school, we consider the model (3). The general empirical versions of (3) first directly estimate the probability in terms of S, and second decompose the effect of each variable on the probability of changing school over the period considered as in (4) to estimate a possible differentiated effect.

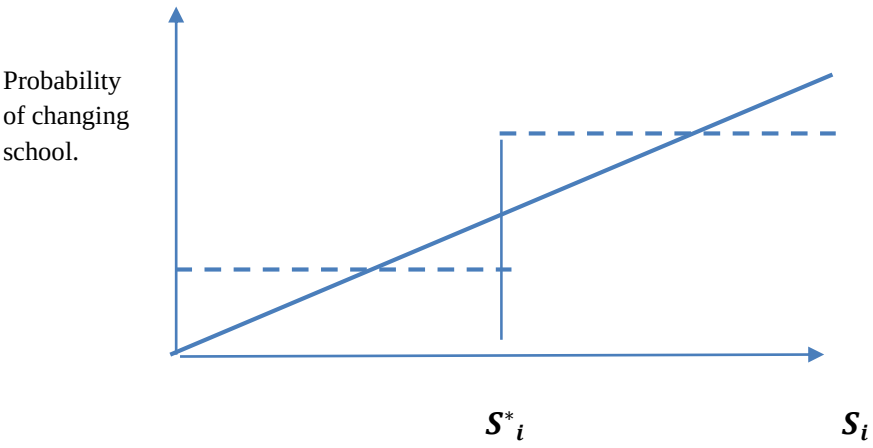
$$P_{i,j} = f\left(\Delta R_j; \Delta Price_j; \Delta D_{i,j};\ L_{i,j};\ G_i\right) \qquad (4)$$

Where $P_{i,j}$ is a binary variable for $student_i$ that chooses $school_j$ in the year 2000, and takes the value 1, when the student remains in the same school in 2004 and 0 if they moved to another school. ΔR_j is the difference in the SIMCE (standardized test score) between the originally chosen school and the best new option; $\Delta Price_j$ is the difference in the tuition charged between the chosen school and the best new option (in US$), $\Delta D_{i,j}$ is the difference in the distance between home to the chosen school and home to the best new option; $L_{i,j}$ is the student's academic performance when he/she was in the 4th year and G_i is a dummy variable that is 1 if the student is male. However, this increase of probability may not be linear, and in particular, can rise sharply once the benefit of the change outweighs its cost. Figure N°1 illustrates this possibility in which two regimes exist. The existence of a non-linear probability is explained by the families' degree of sensitivity facing the change in wellbeing created by new schools, which translates to families not switching their children's schools for small changes in levels of utility, or changing schools when said level reaches a threshold that depends on their preferences. Therefore, we estimate a threshold for each student and re-

[33] We tested our model using the residuals of an equation that considered SIMCE as dependent variable, and socio demographic variables as independent ones, to adjust for the influence of the family. The endogeneity problem arising from the endogenous nature of school location, as treated in that paper was addressed by using as instrument the number of schools in the county and in given ratio around each school. We pursue using SIMCE because the choice predictions were better, and an adjusted quality metric assumes particularly highly sophisticated parents.

calculate the probability of remaining in the chosen school despite the fact that there are better alternatives available Hasen (2000).

Figure 1. Probability of changing school with switching costs.



3.2 RESULTS.

As a first analysis we tested whether S helps to explain the switches and how, we define $C = 1$, when a student switches schools and $C = 0$ otherwise. The sample correlation between C and S is 0.05 and is statistically significant, unlike 0, and we found that, S is statistically larger in cases in which a student switched schools, which would indicate that the changes in the function of utility by the entrance of new schools affect the decision of remaining in the chosen school (see table N°5)

Table N°5: Is s statistically different when $C = 0$ or $C = 1$?

Method	Df	Value	Probability
t-test	17453	-6.534007	0.0000
Satterthwaite-Welch t-test	3499.472	-5.137258	0.0000
Anova F-test	(1, 17453)	42.69325	0.0000
Welch F-test	(1, 3499.47)	26.39142	0.0000

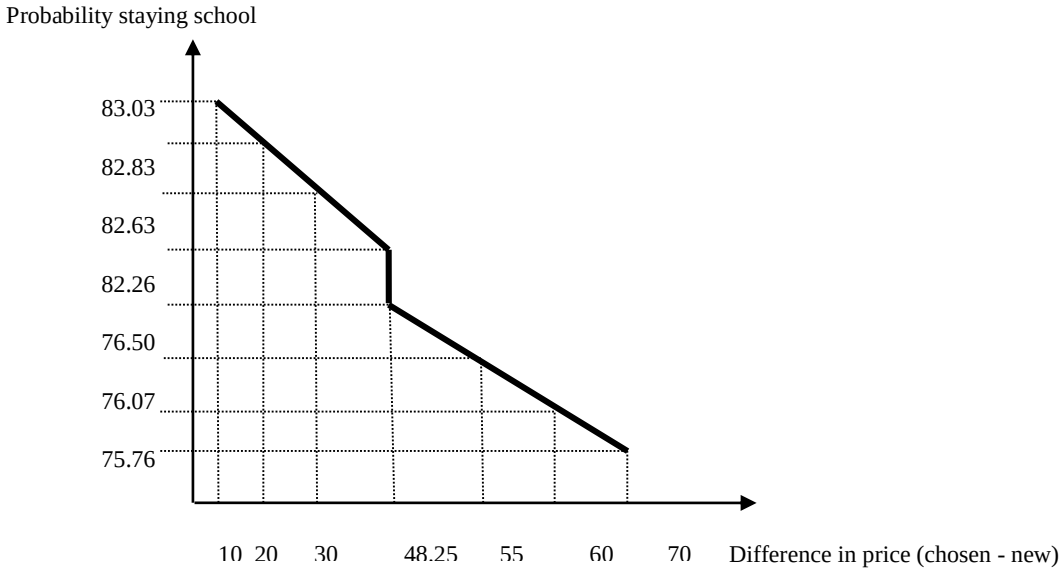
Given what is presented in this paper, it is plausible to maintain that when people experience marginal changes in their levels of utility, they do not change providers, rather they will when this change is sufficiently significant to make such a decision and these changes allow for

identifying an eventual threshold, which is unknown, S_i^*. We found three possible thresholds for performance: approximately 33.5 SIMCE points, (2/3 of a standard deviation), 2.8 kms (Euclidian distance), and about US$48 in price. Also, the table N°6, presents the probability of staying at the originally chosen school, evaluating possible thresholds for each one of the attributes. The models explain a small percentage of the total variance, but on a whole, it is significant and the variables considered are also significant and economically relevant. Overall, the probability, to remain in the original school decreases when the new school's performance is better, when it is cheaper and when the student is female. For example, the results for the attribute tuition is illustrated in figure N°2, where the results are easier to interpret, and it is observed that the probability of staying at the chosen school decreases as the chosen school is more expensive than the new entries, more so when it surpasses the threshold of US $ 48.25, when the new school is best alternative and is much cheaper. As observed in figure N°2, the probability of staying in the same school increases when the chosen school is the better alternative to the new schools, that is to say, it is less expensive. The found results are coherent, but that there is a "jump"; a particularly huge reduction appears when the new best alternative is much cheaper (over US$48). It is also observed that the probability of staying in the same school decreases with the entrance of new schools that are a better option than the chosen school.

Table N°6. Probability of staying at the originally chosen school.

	Differences in School Performance (New is better than the chosen)		Differences to School Distance (New is farther that chosen)		Differences in Prices Paid (New is cheaper than chosen)	
Variable	Less than 33.5 points	More than 33.5 points	Less than 2.8 kms	More than 2.8 kms	Less than US$ 48.2	More than US$ 48.3
Constant	0.71 (*)	1.24 (*)	0.75 (*)	0.92 (*)	0.86	0.82 (*)
Differences in School performance	-0.003 (*)	-0.002	0.003 (*)	-0.006 (*)	0.001	-0.004 (*)
Differences in School prices	-0.001 (*)	-0.001	-0.006 (*)	0.001 (*)	-0.002	-0.0008 (*)
Differences in distance to school	0.009 (*)	0.082 (*)	-0.015 (*)	0.07 (*)	-0.014	0.017 (*)
Student Ranking	0.089	-0.92 (*)	0.205	-0.13	-0.082	-0.048
Gender (1 = Male)	0.06 (*)	0.26 (*)	0.098 (**)	0.10 (*)	0.092	0.085 (*)
Significance 0.01 (*); 0.05 (**)						
Number of Observations	16,080	1,375	5,488	11,967	751	16,074
Pseudo R2	0.021	0.08	0.071	0.04	0.005	0.03

Figure N° 2. Probability of remaining in the chosen school facing changes in Price.



4. CONCLUSION.

We proposed an approach to measure switching costs in a context of consumers that value different characteristics simultaneously, and we apply it to the case of education in Chile, where a voucher system covers over 90% of the population. The voucher system in education firmly relies on parents having the possibility to choose their children´s school, and that parents actually make use of that choice. The economic theory suggests the effect of competition on school performance is positive, but it may be small when choice is limited. The speed in which parents respond to quality signals depends on whether they can reverse a previous decision. Thus, the natural concern regarding parents' capacity to react is given by the existence of switching costs. If they are substantial, the impact competition could have on academic performance would only occur through the effect of new students and the short run impact on quality would be very weak. Switching costs would dissuade parents from changing children to a different school once they are already enrolled in a school. Whilst our findings must be taken carefully, as other attributes that allow for more completely estimating a function of utility are missing, the results do illustrate that switching costs exist and they significantly impact the decision to stay or to change schools. Still, we found that the probability that parents

change their children from the original school increases with the presence of new schools and better opportunities. The existence of switching costs, however, may help to solve a main puzzle regarding the contradictory results in different waves of studies. In particular, that the most recent evaluations of the voucher system, focusing on longer periods, are showing a higher impact on results.

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