School Choice and Switching Costs

Juan Gallegos

School of Engineering, Pontificia Universidad Católica de Chile and Department of Economics and Administration, Universidad Católica de la Santísima Concepción, jagalleg@uc.cl

Rómulo Chumacero

Full Professor, Department of Economics, Universidad de Chile, rchumace@econ.uchile.cl

Ricardo D. Paredes

(corresponding author), Full Professor, School of Engineering, Pontificia Universidad Católica de Chile, and CEPPE; Vicuña Mackenna 4860, Macul, Santiago.

Phone (562) 3547927

e-mail: rparedes@ing.puc.cl

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Abstract

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The voucher in education firmly relies on the parent´s ability to choose their child´s school. One factor which may reduce this choice is the presence of switching costs, caused by factors such as the stress that children experience and the loss of social networks. We develop a methodology which quantifies the switching costs. We then analyze the existence of these costs in Chile, a country with a more than 90% of the students covered by that system. Using flexible estimation techniques, that consider the existence of structural changes in the probability to change school, we found that switching costs are statistically significant and economically relevant.

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

JEL Classification: I21, L12.

1. Introduction

There is a growing body of literature that highlights the importance of school choice and competition on school performance. The educational reform which Chile introduced in the early 1980s featured the introduction of vouchers which were meant to create competition and large scale decentralization, a change from the prior highly concentrated educational system. The voucher system affects over 90% of students yet has shown, as elsewhere, inconclusive results.

The lack of consistent evidence suggesting that competition improves educational performance, and the relatively small effects found in most part of the literature could be explained by the existence of the switching costs parents face. For competition to have an impact on efficiency, parents must first have the ability to choose, but this ability can be hindered by lack of information or the existence of switching costs. In fact, switching costs are presumably relevant in education. Changing a child´s school involves, at a minimum, changing social circles and creating stress. It is common for parents to resist changing their children to another school.

Despite the importance of this issue, to our knowledge there is no study relating switching costs in education. In this paper we define a metric of switching costs in education in the case of Chile, and estimate if these costs affect parents´ decision once a first school has been chosen. 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.

1. Background

2.1 Switching Costs.

Economic theory suggests that for competition to have a positive impact on resource allocation, consumers must play an active role in selecting the best supplier. However, consumers are limited due to the cost of changing suppliers or because they have difficulties evaluating and comparing different offers (Wilson & Waddams, 2007). Naturally, the strategy literature has emphasized the economical and psychological interest companies may have in creating switching to limit substitution (Farrell & Klemperer, 2006; Nakamura, 2010; Klemperer, 1987a, 1987b, 1995; Burnham, Frels & Mahajan, 2003; Shy, 2002; Kahl, 2004; Kim, Choi & Kim, 2010); and also, to discourage the entrance of new competitors (Porter, 1998; Hess & Ricart, 2002; Fornell & Larcker, 1981; Klemperer, 1987c).

 While the identification of switching costs and their causes is relatively new (Maicas, 2006), they have been identified for a broad variety of product and service industries, such as airlines, financial services and wireless communications (Grzybowski, 2006; Kim, Park & Jeong, 2004; Maicas & Sese, 2008; Maicas, Polo & Sese, 2009). In general, literature regarding switching costs has focused on determining attributes which provide companies with a degree of monopolistic power and estimating their impact on prices, instead of providing a measurement of the switching cost that would apply to a typical customer.

The first attempts to empirically estimate the impact of switching costs were in the 1990s, with research by Borenstein (1991) on gas stations. He found that gas stations differentiate customers, charging a higher price to those who have more inelastic demands and that have a lower probability of switching to an alternative supplier. Then, Sharpe (1997) for bank deposits, Knittel (1997) for long distance telecommunications, and Elzinga & Mills (1998) for cigarette distribution during the price war of the 1980s, show that switching costs are important, but they vary by type of client . 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 & Hitt (2002), Johnson, Bellman & Lohse (2002), Kim, Kliger & Vale (2003) analyzed switching costs in new technologies industries. Shum (2004) evaluated how brand loyalty affected opportunity costs in the cereal industry. Maicas, Polo & Sese (2009) concluded that portability of cell phone numbers reduced switching costs, favoring the decision to change supplier. Aydin, Gökhan, Kazan & Doğruer (2009) calculated the sources of switching costs and evaluated their impact on the credit card market, emphasizing the psychological nature of switching costs. Wilson & Waddams (2007) calculated switching costs for the residential electrical market, which showed that clients do not always choose the best supplier. Thus, whilst switching cost have been analyzed for a wide range of industries, to our knowledge no study of the education industry exists.

2.2 The Chilean educational system and the increase in options.

To understand why switching costs may be relevant in the education sector, particularly in Chile, it is necessary to have an idea of the context where Chile’s education sector stands. In the 1980s, Chile transformed its educational system, which had showed low academic results and high dropout rates, as well as high rates of repeating coursework (Cox, 2003). This reform mainly consisted of a large scale decentralization that was first implemented by transferring schools to the municipalities which had previously been managed by the Ministry of Education, and creating private schools financed with public funds by means of a voucher or a demand subsidy. Since then, this sector is now made up of three types of schools: public, subsidized private and private pay schools.

The voucher program used in Chile is interesting given that it was based on a system which closely followed proposals by Friedman (1962) and because it is the voucher program with the broadest reach when compared to other countries in the world; in 2010, more than 90% of enrolled students were covered. The government finances schools based on student attendance, in an attempt to create competition between schools to drive quality improvements (Mizala & Romaguera, 1998; Garcia & Paredes, 2010; Paredes & Ugarte, 2011).

After the 1980s educational reform, the most important change in the education sector was in the 1990s, when private schools that received public funds could compliment this with private contributions. As shown in Table 1, the introduction of shared financing created a large influx of schools, which absolutely changed the competitive scenario and lead to a significant reduction in public education, to favor subsidized private schools (Paredes & Pinto, 2009).

 Table 1 around here

One of the goals of introducing the mass influx of schools was to increase student performance. For the voucher system to be able to drive higher academic achievement, parents must choose schools for their children based on academic performance and schools should react positively to that choice. However, research of the impact of competition on academic performance does not show robust results and does not provide a clear indicator of this relationship (Epple & Romano, 1998; McEwan & Carnoy, 1998; Sander, 1999; Ladd & Fiske, 2001; Hsieh & Urquiola, 2003; Auguste & Valenzuela, 2003; Bayer & McMillan, 2005; Braun-Munzinger, 2005; Gallego, 2006; Böhlmark & Lindhal, 2008; Gibbons, Machin, & Silva; 2008; Chumacero, Gallegos, & Paredes, 2011).

One possible explanation for the relatively weak effect that competition has on student performance is the presence of switching costs. Even if better quality schools were available, families would keep their children in the schools they originally chose, which would limit entry and its effect on performance.

Even though switching costs are probably high in the case of education, the percentage of students that change schools is significant in Chile. Table 2 shows, for the year 2000, the total students who were in 4th grade in schools imparting primary and high school education in the Santiago Metropolitan Region, so, they could continue to study at their original school or could be seen in another school by 2004, when they were in 8th grade. From the total group which included 17,455 students, 2,921 students changed to another school. This first evidence may be suggesting that perhaps, switching costs are not so high as to prevent massive changes.

 Table 2 around here

3 Methodology.

3.1 Definition and measurement of switching costs.

A first methodological issue we face was that the consumer weighs a set of demand attributes, something that seems particularly true in education. To that end, we strictly follow Chumacero, Gomez and Paredes (2011), who develop and estimate the following school choice model:

Let index the individuals (students) in the sample and Let index the possible choices (schools). Denote by the vector of characteristics of the student and its household that do not depend on the school, by the vector of characteristics of the school that do not depend on the student, and by the vector of attributes of the school that are specific to each student. Then define as the (indirect) utility of child i attending school j, so that:

 where corresponds to a systematic component and is a (random) non-systematic component. Given (1), agent i chooses school h if .

Let denote the distance between household i and school j. Let be the distance between household i and the nearest school and the value of the utility function in (1) associated with choosing that school. On the other hand, let be the value of the utility function associated with the choice of the school that maximizes (1). Note that the school that minimizes and the one that maximizes may be different for each student i. Clearly, when the nearest school maximizes (1), and will coincide.

Let

that is, is the (observed) variable that takes the value of 1 when the student attends the school nearest to the household and 0 otherwise.

 Evaluating (2) instead of (1) is convenient as now we can focus on modeling the determinants of choosing the nearest school using binary response models. The model considered is:

where F is a postulated distribution function (the standard normal), is a vector of determinants, and a vector of parameters to be estimated.[[1]](#footnote-1) The parameters associated with each of the characteristics parents consider in choosing a school may be estimated using a maximum likelihood, and are the relevant trade offs or weights in their decision.

Aa second issue was related with the data considered, since in general, the data does not allow to follow students over time. Fortunately, there is a cohort that took the Simce test in 2000 and again, four years later, again took the same test. Using an identification code for each student, we followed this cohort who was in fourth grade in 2000, and we went back to observe it in their eighth grade in 2004, so we were able to verify if they changed schools. For each of the fourth grade students in 2000, we estimated the indirect utility associated with the school she was attending that year, and the indirect utility associated with all the schools that were not available in 2000, but were available for eighth graders in 2004. Thus, we can compare their expected utility as in (3).

 (3)

From (3) we can predict whether a new school could increase the utility for a family that already had chosen another school. Thus, if our estimates in (3) suggests that changing the student to a new school would have increased the utility achieved for the family, we can predict that a student who does not have switching costs would in fact change schools. On the contrary, if a family chose a school in 2000 and maintained their original choice in spite of the predicted higher utility they could have achieved by changing schools, we interpret the reason to be due to the existence of switching costs.

To estimate the parameters associated with the probability that parents decide to keep the child in the originally chosen school, we consider the model (4):

 (4)

where is a binary variable for student *i* who chose school  *j* in the year 2000, and takes the value 1 when the student remains at the school and 0 if she changes school. is the difference in the SIMCE (standardized test score) between the originally chosen school and the best new option; is the difference in the tuition charged between the chosen school and the best new option (in US$), is the difference in the distance between home to the chosen school and home to the best new option; is the student’s academic performance when he/she was in the 4th year and is a dummy variable that is 1 if the student is male.

Naturally, we expect that the probability of a student changing schools increases as the difference between the utility of the best new alternative and the originally chosen school increases. However, the probability will change linearly with the differences in options only if no switching costs exist. Otherwise, the probability may increase abruptly once the benefit of changing exceeds the switching cost. Figure 1 illustrates this situation. Small difference in performance does not affect the probability of changing schools. However, after a relevant difference D\*, better alternatives increase the probability of changing school.

Figure 1

Estimating (4) the relationship as if it were linear would produce biased estimates. Instead, the specification must consider the possibility that a threshold D\* exists. Since we don’t know the size of the threshold, we don’t know either the error distribution. To face this problem, we follow the Hansen (2000) threshold regression method, applied to student attendance by Paredes & Ugarte (2011). This method allows the identification of a thresholds (D\*) in Figure 1 explained by the existence, as in this case, by two regimes. The two alternative regimes are defined as follows:

 (5)

where γ is a critical value for the differences in school quality that divides the sample into two distinct groups which are not known in advance. We use asymptotic distribution theory to build confidence intervals with Monte Carlo simulations (Hong, Wang & Zhang, 2005). In line with Hansen (2000), we used the Likelihood Ratio (LR) Test to test the null hypothesis γ = γ0. The confidence intervals, robust to heterocedasticity and asymptotically correct for the LR test, are obtained through bootstrap replications.

3.2 The Data.

Since the SIMCE database does not have information on student’s addresses, we integrated a database using the SIMCE and the official Registry of University Applicants. The SIMCE database provides information on the school, academic performance per student, the monthly tuition cost and socio-demographic characteristics of the families, such as gender, family income, educational level of father and mother. We then identified 8th graders in the year 2004 from the SIMCE base in the Vital Records Service, and we track them to 2009 when they took the university entrance exam. Thie Registry of University Applicants provides information on the student´s address, something essential to estimate the distance school-home, under the assumption that students lived in the same location in 2004 as in 2009.

To determine the distance traveled by each student to the originally chosen school, as well as the distances to new schools, we geo- referenced each home and school using digital maps. With the integrated database, we re-estimated the Chumacero, Gomez & Paredes (2011) school choice probit model, to get the parameters associated with the utility of each originally chosen school and from where we can get the tradeoffs associated with distance, payment and school quality. Table 3 show this results, that were very consistent with those found in Chumacero, Gomez and Paredes (2011).

 Table 3 around here

3.3 Results.

To estimate the probability that a student observed in a school in 2000 can be observed in the same school in 2004 (ie. does not change schools), we estimated (4) and (5). The results are reported in Table 4 in coefficients and marginal effects differentiating when the model was allowed flexibility to have two alternatives regimes and existence of a threshold (5), and when it was restricted to a single regime (4). As expected, in both cases, the model explains a small percentage of the total variance, but still, the variables considered are significant and relevant.

Under both models, the probability of staying at the school diminished when the best alternative has better performance, when the best alternative was closer to the student’s home, and when the student was female. We also observed that the probability of staying in the original school diminished when the student´s level of performance was better. Even more relevant, we cannot reject the existence of a threshold. Thus, columns 3 to 6, with the estimates of the model allowing the existence of a threshold, show that the decision to remain at school changes drastically in the case of a substantially better alternative. We also found that there is a critical level for what we understand to be substantially better quality: of 33.5 points. Therefore, when the new choice implies a SIMCE score which is better by 33.5 or more points, the probability of staying at the chosen school diminishes considerably.

The above results are illustrates in Figure 2, which shows the probability of changing school for a student with characteristics in line with the population´s average. This probability increases slightly (no more than 3 points) if the difference in quality is less than 33 points; however when the alternative choice is substantially better, with a difference of over 33 points, the probability of changing school increases by almost 8 points.

 Table 4 around here

 Figure 2 around here

5. Concluding Remarks.

The voucher system in education firmly relies on parents having the possibility to choose their children´s school, and that the parents actually make use of that choice. Whilst some recent literature regarding the impact of competition on performance suggests that when the effect is positive, the possibility of choice may be very powerful, the speed at which competition´s disciplinary effect occurs can vary widely. That effect will depend on how quickly parents respond to quality signals.

A natural concern regarding parents’ capacity to react is the existence of switching costs. If they are substantial, the impact competition would 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 dissuade parents from changing children to a different school once they are already enrolled in a school.

In this paper we estimated the switching cost for parents who have already made their original school choice. Not surprisingly, we found that switching costs exist and they significantly impact the decision to stay at a school or to change schools. We found that the probability of parents changing their children from their current school in general increases slowly with the presence of new schools and better opportunities. However, we also detected a threshold, which shows the impact of switching costs and their relevance.

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Table 1. Number of schools by type in Chile.

|  |  |
| --- | --- |
| Yr. | Type of Administration |
| Total | Public | Private Subsidized | Private Pay |
| 1996 | 10,296 | 6,448 | 2,790 | 1,058 |
| 1997 | 10,318 | 6,411 | 2,857 | 1,050 |
| 1998 | 10,631 | 6,407 | 3,065 | 1,159 |
| 1999 | 10,712 | 6,367 | 3,170 | 1,175 |
| 2000 | 10,610 | 6,325 | 3,217 | 1,068 |
| 2001 | 10,799 | 6,309 | 3,459 | 1,031 |
| 2002 | 10,879 | 6,248 | 3,640 | 991 |
| 2003 | 11,223 | 6,209 | 4,084 | 930 |
| 2004 | 11,296 | 6,160 | 4,274 | 862 |
| 2005 | 11,561 | 6,168 | 4,630 | 763 |
| 2006 | 11,671 | 6,041 | 4,897 | 733 |
| 2007 | 11,763 | 5,979 | 5,054 | 730 |
| 2008 | 11,905 | 5,917 | 5,262 | 726 |

Source: Educational Statistics 2008. MINEDUC

Table 2. Decision to stay in same school or switch schools during the 2000-2004 period.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Total | Stay | Male | Female | Public | Private Subsidized | Private Pay |
| 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: Created by authors using SIMCE [Educational Quality Measurement System] databases.

Table 3. Probit Model for the Choice of the Nearest School.

 Public Schools Private Subsidized Schools Private Pay Schools

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variable | Calculated Value | Std. Error  | Calculated Value | Std. Error  | Calculated Value | Std. Error  |
| Constant | 1.33311 (\*\*) | 0.1733 | -1.67217(\*\*) | 0.1324 | 1.75619(\*\*) | 0.4981 |
| Girls | 0.03291…...  | 0.0346 | 0.0037…... | 0.0208 | 0.12514(\*\*) | 0.0414 |
| Mother´s Educ. Level  | -0.01050…... | 0.0054 | -0.00813. (\*) | 0.0036 | -0.02668 (\*) | 0.0114 |
| Log income | -0.04528…... | 0.0249 | 0.00663…. . | 0.0156 | -0.04145….. | 0.0453 |
| Price of chosen school | -0.01979(\*\*) | 0.0035 | -0.00452(\*\*) | 0.0006 | -0.00793 ...  | 0.0023 |
| Price of closest school | 0.00197… .. | 0.0031 | -0.00368(\*\*) | 0.0005 | -0.00627(\*\*) | 0.0020 |
| Quality of chosen school | -0.01879(\*\*) | 0.0007 | -0.00149(\*\*) | 0.0004 | -0.00423(\*\*) | 0.0010 |
| Quality of closest school | 0.01452(\*\*) | 0.0008 | 0.00631(\*\*) | 0.0004 | 0.00655(\*\*) | 0.0008 |
| Distance to closest school | -0.15412(\*\*) | 0.0176 | -0.24804(\*\*) | 0.0199 | -0.06921(\*\*) | 0.0222 |
| Number of schools | -0.08291(\*\*) | 0.0104 | -0.01935(\*\*) | 0.0018 | -0.03017(\*\*) | 0.0031 |

Significant at 99% (\*) and at 95% (\*\*).

Number of observations 9143 25328 6229

Percent correctly predicted 76.0691 87.3855 86.4184

Pseudo R-square 0.2367 0.0371 0.0576

Table 4. Probability of staying at the originally chosen school.

 Without regime change With regime change

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variable | Estimated Parameters(1) | Marginal Effect(2) | Parameters when the best option is something better(3) | Marginal effect when the best option is something better(4) | Parameters when the best option is significantly better(5) | Marginal Effect when the best option is significantly better (6) |
| Constant | 0.828799 (\*) |  | 0.713043 (\*)  |  | 1.239209 (\*)  |  |
| School perf. old - new | -0.003576 (\*) | -0.000872 (\*) | -0.003145 (\*) | -0.000743 (\*) | -0.002169 …  | 0.000694 … |
| School prices old-new | -0.000952 (\*) | -0.000232 (\*) | -0.001147 (\*) | -0.000271 (\*) | -0.001101….  | -0.000352….. |
| Distance to school old - new | 0.014910(\*) | 0.003635 (\*)  | 0.008982 (\*) | 0.002122 (\*)  | 0.082382 (\*) | 0.026373 (\*) |
| Student Ranking | -0.052150 ..  | -0.012714…. | 0.089048…...  | 0.021035 …  | -0.921463 (\*) | -0.294987 (\*\*) |
| Gender (1 = Male) | 0.082537 (\*) | 0.020077 (\*) | 0.062485 (\*) | 0.014735 (\*) | 0.257982 (\*) | 0.081880 (\*) |

Significance at 99% (\*) .

Number of Observations 17.455 16.078 1.375

Pseudo R2 0.027 0.0210 0.0799

Figure 1

Probability of Changing School with Switching Costs



 Figure 2



1. As considered in Ferreyra (2007), the choice of school and of residence may be jointly determined. Whilst we have no data to control for the choice of residence, this may not be a prevalent problem in Chile because the vast majority of beneficiaries of the voucher program are from middle income and low income households. They tend to use publicly financed housing programs in which the location of the household is “exogenous” to them. [↑](#footnote-ref-1)