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Understanding How Universal Vouchers Have Impacted Urban School Districts' Enrollment in Chile

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Abstract: Findings from this study show that educational and mobility opportunities for families and students participating in the Chilean voucher system are not homogeneously distributed. Some families and students use and benefit from the system, while others will remain marginalized. The quantitative results in this study demonstrate that students of relatively higher SES living in mid-high or mid-low poverty districts receive the benefit from vouchers. These students may move from one public school to another, from a public school to private-voucher school in the same area, from one district to another, or from a public school in an area to a private-voucher school in another district. Meanwhile, low-income counterparts living in high-poverty areas are excluded from the system and tend to remain at their public neighborhood school.

Keywords: Vouchers; school choice, Chile; urban education; privatization.

Política universal de vouchers en Chile: Comprendiendo su impacto sobre la educación pública municipal chilena

Resumen: El presente estudio muestra que las oportunidades de movilidad educativa y elección de escuela de familias y estudiantes que participan del sistema de vouchers chileno no están homogéneamente distribuidas. Algunas familias y estudiantes se benefician del sistema, mientras otros se ven segregados o marginalizados. Los resultados cuantitativos de este estudio muestran que los estudiantes de clase media que poseen una posición relativamente más aventajada, y que viven en áreas urbanas de nivel socioeconómico medio-alto o medio-bajo, son quienes más se benefician. Estos estudiantes pueden trasladarse de un establecimiento educacional público (municipal) a otro, de un establecimiento público a uno privado (subvencionado) en la misma comuna, de un municipio o distrito escolar a otro, o de un establecimiento público (municipal) de una comuna a uno privado (subvencionado) de otra. Como contrapartida, los estudiantes de menor nivel socioeconómico, y que viven en las zonas urbanas de mayor pobreza, son quienes más excluidos están del sistema y quienes tienen las menores posibilidades de moverse y elegir un establecimiento educacional, por lo que permanecen estudiando en la escuela pública (municipal) de su barrio, altamente segregados y marginados, y sin generar vínculos sociales con otros.

Palabras-clave: Vouchers; elección de escuela; Chile, educación en contexto urbano; privatización.

Política universal de vouchers no Chile: Compreendendo seu impacto sobre a educação pública municipal chilena

O presente estudo mostra que as possibilidades de mobilidade educativa e a escolha de escolas por famílias e alunos que participam do sistema de vouchers chileno não estão homogeneamente distribuídas. Algumas famílias e alunos se beneficiam do sistema, enquanto outras se veem segregados ou marginalizados. Os resultados quantitativos do estudo mostram que os alunos de classe média que vivem em áreas urbanas de nível socioeconômico médio-alto ou médio-baixo são os que mais se beneficiam. Esses estudantes podem se movimentar de um estabelecimento público (municipal) a outro, de um estabelecimento público a um privado (subvencionado) na mesma área, de um município ou distrito escolar a outro, ou de um estabelecimento público (municipal) de uma área a um privado (subvencionado) de outra. Em contrapartida, os alunos de menor nível socioeconômico, que vivem nas zonas urbanas de maior pobreza, são os que estão mais excluídos do sistema e os que têm as menores possibilidades de deslocar-se e escolher um estabelecimento educacional, tendendo a permanecer estudando na escola pública (municipal) de seu bairro, altamente segregados e marginados, como dificuldades para criar vínculos sociais com outros.

Palavras-chave: Vouchers; escolha de escola; Chile, educação em contexto urbano; privatização.

Introduction

Voucher programs, which provide public funding for students to attend private schools, have become more popular in the United States in the last several decades. Such programs currently exist in six states (Florida, Maine, Ohio, Vermont, Utah and Wisconsin) plus the District of Columbia, enrolling between 650 and 13,000 students (Heritage Foundation, 2005). In addition, seven states (Arizona, Georgia, Florida, Illinois, Indiana, Iowa, Minnesota, North Carolina, Oklahoma and Pennsylvania) currently offer tax-credits or deductions to enterprises that offer scholarships to low-income students to attend private schools (American Federation for Children, 2011). Notably, a Louisiana voucher law was struck down as unconstitutional in May 2013 by the state Supreme Court (Strauss, 2013).

While most existing voucher programs in the U.S. have been small-scale and targeted at low-income students (e.g. the Milwaukee Parental Choice Program, the Cleveland Scholarship and Tutoring Program, and the Washington DC program), there has recently been a push to expand programs to include students from middle-income families. For example, Florida, Indiana and Pennsylvania have considered legislation recently to either create new or expand existing school voucher programs for the middle class by loosening income requirements to apply (Cavanagh, 2011).

The push to extend voucher programs rests on the assumption that vouchers will spur competition between public and private campuses, make schools more responsive to families and students, increase student achievement, and improve the effectiveness of all schools (Chubb & Moe, 1990; Friedman, 1962; Gallego, 2002; Gallego, 2004; Peterson, 2009; Sapelli & Vial, 2002). In addition, some researchers (e.g. Ladner & Brouillette, 2000) have argued that vouchers will improve school effectiveness by promoting competition between districts and between districts and private schools. A second assumption for supporting vouchers consists of the belief that vouchers will improve the educational opportunities of disadvantaged students (Sugarman, 1999), as well as contribute to their social integration with middle- and upper-class students. The argument is as follows: Since school choice is already available to upper-class families through residential mobility or through enrollment in private schools, expanding this right to low-income families through vouchers reduces stratification as parental income becomes less important in determining who attends private schools (Neal 2002, Nechyba, 2000).

Contrarily, voucher opponents posit that scaling-up vouchers will result in “cream skimming” and greater stratification between and within the public and private education sectors (Bellei, 2009; Goldhaber, 1999; Ladd, 2003, Hsieh & Urquiola, 2004; Hsieh & Urquiola, 2006; Torche, 2005). As a result, some schools (those that enroll more able or higher-income students) will improve, while others will remain low-performing. Voucher critics also argue that similar “cream skimming” effects may be seen at the district level. According to Lubienski (2005) and Lubienski, Gulosino and Weitzel (2009), public school districts facing competitive pressures may respond like private organizations targeting potential consumers according to their hierarchical position in the market, rather than taking a more mission-driven approach of serving students in need.

In debates around the expansion of voucher programs, however, there is little discussion in the U.S. about data and research from large-scale and/or universal voucher policies implemented elsewhere in the world. Chile, for example, has one of the oldest large-scale, universal school voucher programs in the world, providing vouchers to all families and students in the country to choose to study at either public-municipal schools (public campuses administered by local municipalities) or private-voucher schools (private campuses that accept

vouchers given by the state and that can be religious or non-religious and non-profit or for-profit). The existing system finances both school types based on their student enrollment and attendance throughout the year, giving the vouchers directly to public school districts (municipalities) or private campuses.

Considering that many proponents of the choice movement in the U.S. are persistently seeking the expansion of vouchers, the Chilean system is instructive for voucher debates in the U.S. (and elsewhere) due to its immense scale and scope. Since its creation in 1981, the system has grown steadily, increasing enrollment throughout the years to the point that, since 1990, 92% to 93% of students are included in the voucher system (only 7% to 8% of students attend private-paid independent schools that do not receive vouchers). Overall, the Chilean government has generated an expansion of student enrollment within the private-voucher sector from 33% in 1990 to 51% in 2009 at both primary and secondary schools (Larrañaga, Peirano & Falck, 2009a). In addition, there has been a 228% increase in the number of private-voucher schools from 2,425 in 1990 to 5,545 in 2009 (both primary and secondary levels), largely within urban areas and cities with more than 100,000 inhabitants.

As a result, vouchers have resulted in steep enrollment losses in the public-municipal sector. Traditional public schools have seen a decrease in student enrollment from 59% in 1990 to 42% in 2009, particularly at the primary level. In addition, the overall number of public-municipal schools has decreased from 6,000 in 1990 to 5,811 in 2009. Vouchers have closed public schools in Chile, mainly at the primary level, and within urban areas (Larrañaga, Peirano & Falck, 2009a). In sum, the Chilean government has fashioned a voucher system that has created universal choice. As a result, the Chilean case provides a useful “test case” for the impact of expanded vouchers on urban education in the U.S. and elsewhere.

The main purpose of this research is to examine how Chilean municipalities have been affected by the threat of competition for students under the Chilean voucher system, and to test whether between-district stratification has been a relevant or irrelevant outcome of such pressures. More specifically, this study analyzes which key municipal factors (such as degree of private school competition within an area, municipal funds and resources available for education in a locality, socioeconomic demographics of municipalities and mean student achievement results for local public schools) are associated with municipal enrollment gains, retention or losses under the voucher system. Considering these goals, this study asks the following research question: What characteristics of urban municipalities in Chile—and in Santiago, the Chilean capital city—constitute significant factors that are associated with attracting, maintaining, or losing public school students over time at the district level?

The Chilean Voucher System

During the 1980s, the military dictatorship that governed the country between 1973 and 1990, designed and implemented a large-scale, universal school voucher system. According to Carnoy (1998), this system was part of an overall “degovernmentalization” free market package involving both decentralization and privatization of the entire educational system. As a result of these trends, three distinct types of schools emerged: public-municipal, private-voucher and private-paid schools.

Education Decentralization

Concerning decentralization, the reform transferred responsibility for public school management from the National Ministry of Education to local municipalities through partial devolution. This change implied new responsibilities for local officials, especially in terms of contracting principals, teachers and administering resources for school maintenance and

improvement. However, finance matters largely remained at the central level of the Ministry of Education, while pedagogical and technical issues remained at the regional and provincial levels.

During the early 1980s, for aiming their new functions, municipalities created either Municipal Education Departments or delegated these responsibilities to a Municipal Corporation that administered both decentralized education and primary health functions in a more independent and flexible manner than Municipal Education Departments (Parry, 1997). Corporations were a popular choice among the larger cities, including most of the municipalities of Santiago Metropolitan Region, but the majority of localities had Municipal Education Departments.

Education Privatization

Prior to 1981, as in much of Latin America, Chilean school budgets were largely determined by the need to sustain an existing plant of teachers and facilities, and resources were mainly distributed among public schools. Then, as a result of a set of privatization reforms enacted in the early 1980s, school financial arrangements began to be determined by enrollment and overall attendance of students throughout the year, and resources were distributed in per-student same amounts among public-municipal and private-voucher schools (McEwan & Carnoy, 2000; Parry, 1996).

Chile had a tradition of public financial support of private education, mainly of Catholic schools, before the implementation of the voucher system in the 1980s. Prior to the reform in 1979, 82% of students attended public primary schools while 14% of students attended private-voucher primary schools (mainly Catholic). The remaining 4% attended private-paid independent schools. However, with its implementation, a large and increasing number of private-voucher schools started appearing, and these were not only religious or non-profit as before, but also for-profit schools subsidized by the state (Parry, 1997; Torche, 2005). By 1982, only one year after the implementation of the privatization reforms, 73.8% of students attended public primary schools while 21.5% attended private-voucher schools (either Catholic or non-religious profit maximizing) and 4.7% attended private-paid schools (Carnoy, 1998).

Overall, school vouchers have generated a school system organized under three main types of schools: public-municipal, private-voucher and private-paid (independent) schools. Public-municipal schools correspond to public campuses which are administered by local municipalities, but which still depend on the Ministry of Education for both finance and pedagogical/technical issues. In general, these schools are free and open to all types of students, and tend to concentrate the enrollment of middle-low and low-income students. Larrañaga, Peirano and Falck (2009a) confirm this when reporting that, in 2006, 67% of public-municipal students belonged to families in the lower 40% of the income distribution. It is important to acknowledge that, under the voucher system, students living in any municipality can apply to any public school within any other municipality with theoretical chances of being accepted. However, public schools in better-off areas tend to attract and enroll families and students with better-off backgrounds (of higher SES or with more educated parents), while excluding low-income counterparts by setting admission criteria or by transferring students to other schools if they are retained in a grade (see e.g. Bellei, 2009). As a result, and as Elacqua (2006) has pointed out, relevant student enrollment and SES composition differences exist between public schools depending on the municipality.

Private-voucher schools are private campuses that are subsidized by the state and that can be religious or non-religious, non-profit or for-profit. Consequently, and according to

Parry (1997), these schools can be run by nonprofit or voluntary organizations, trade associations, professional groups, religious organizations, cooperatives, or business firms, and usually accept better-off students (middle-income students or higher performing ones). Larrañaga, Peirano and Falck (2009a) confirm this when reporting that, in 2006, 52.6% of private-voucher students belonged to families in the upper 60% of the income distribution. However, and as Elacqua (2006) has indicated, it is important to point out, that depending on the specific subtype of school (religious or non-religious, non-profit or for profit), different student enrollment patterns could be found. As a result, relevant SES composition differences also exist between private-voucher schools.

Finally, private-paid schools are private campuses that are paid directly and entirely by families and parents with no resources from the state. Due to their high costs, these schools are mainly attended by upper-class students. Larrañaga, Peirano and Falck (2009a) confirm this when reporting that in 2006, only 6.3% of private-paid students belonged to families in the lower 40% of the income distribution. These schools are the more homogenous ones within the Chilean education system.

The Impact of Vouchers

Notably, the impact of vouchers on students is still an open debate in Chile. A number of researchers in the U.S. have, in fact, examined the effects of vouchers on schools in Chile and have found that such systems have led to few improvements in achievement and increased stratification between schools (Auguste & Valenzuela, 2004; Carnoy & McEwan, 2000; Gauri, 1998; Hseih and Urquiola, 2004; Hseih and Urquiola, 2006). For example, at the family/household level, increased between-school stratification has been explained as a consequence of the nature of parental choice, since parents through choice are likely to demand schools that emphasize the values of their social class (Parry, 1996). Elacqua, Schneider and Buckley (2006) indicated that this has been the case in Chile. Chilean parents have stated in surveys that they choose the school for their children based on school academic profiles, but Elacqua, Schneider and Buckley's examination of the choosing process revealed that most parents considered this criterion only after they have chosen a set of schools with similar student demographics.

Parental choice is not the only factor responsible for school stratification in Chile. The features of the voucher policy are also in play. Particularly, two policy measures have contributed to increased between-school segregation— student selection procedures and the charging of additional fees to parents through the implementation of the Shared Funding Law (Bellei, 2009; Gauri, 1998; Parry, 1996; Valenzuela, Bellei & De los Rios, 2006). These policy prescriptions allow all private-voucher schools and secondary public-municipal schools to select the students that are allowed to enroll in a school when there are more applicants than spaces available and to charge fees to parents on a monthly basis.

Despite abundant evidence on stratification effects at the school level in the literature (Auguste & Valenzuela, 2004; Carnoy & McEwan, 2000; Gauri, 1998; Hseih and Urquiola, 2004; Hseih and Urquiola, 2006), few researchers to date have examined how the universal voucher system in Chile has specifically impacted the enrollment and social integration of urban school districts. Voucher proponents posit that vouchers will have similar positive competitive effects on school districts—or municipalities—as upon individual schools in urban areas (Ladner & Brouillette, 2000). However, voucher detractors posit that stratification will operate at both school and district levels. What does the evidence show?

In general, studies of voucher effects in Chile have been analyzed at either the national (aggregate) or school (disaggregate) levels, and only few have considered how vouchers have

affected districts/municipalities (Auguste & Valenzuela, 2004; Hseih & Urquiola, 2004; Hseih & Urquiola, 2006; Larrañaga, Peirano & Falck, 2009b). In addition, to date, most of these studies have focused their analysis on the effects of vouchers on student achievement (Bellei, 2009; Bravo, Contreras & Sanhueza, 1999; McEwan & Carnoy, 2000; Gallego, 2002; Gallego, 2004; Mizala & Romaguera, 2000; Mizala & Romaguera, 2003; Sapelli & Vial, 2002), on between- and within-school stratification and segregation (Elacqua, 2006; Gauri, 1998; Parry, 1996; Valenzuela, Bellei & De los Rios, 2006) or on a combination of both (Auguste & Valenzuela, 2004; Hseih & Urquiola, 2004; Hseih & Urquiola, 2006), and only few have focused their analysis on student enrollment, districts characteristics, districts responses to vouchers and voucher effects at the district level.

A small number of researchers have pointed out that vouchers have had a significant impact on municipalities or districts in Chile, and even a fewer number have indicated that vouchers have affected different types of districts in distinct ways. For example, when analyzing student enrollment gains and losses over time among public-municipal schools at different localities, existing studies (Hseih & Urquiola, 2004; Hseih & Urquiola, 2006; Larrañaga, Peirano & Falck, 2009b; Raczynski & Salinas, 2009; Salinas & Raczynski, 2009) show that the flight of students from public to private schools, and between public-municipal schools, has not been homogenous across municipalities over time. Some local public school systems have lost more students than others under vouchers. Conversely, some local public school administrations have been benefited because better-off students living in surrounding areas have enrolled in their schools. These latter campuses are commonly known in Chile as Traditional Public Schools and correspond to campuses located in middle and/or high income areas that possess auras of historical prestige that persist in the current educational environment. All these findings suggest that municipalities running and administrating public schools under the voucher system have obtained distinct enrollment results depending on their general characteristics and the specific competitive pressures they have faced within the "educational market."

Thus, in study we will seek to determine which municipal factors are associated with whether a public school district or municipality in Chile will attract and increase, retain, or lose enrollment over time, it is important to relate school enrollment outcomes to numerous potentially significant variables and determine which of these are significantly related changes in urban districts.

Methods

Main Hypotheses, Variables and Models of the Study

Previous literature has suggested that relevant local/municipal variables affecting public-municipal school enrollment trends and stratification in Chile are: (A) municipality size understood as total population of a district, (B) the degree of private sector competition in an area (Hseih & Urquiola, 2004; Hseih & Urquiola, 2006), (C) the percentage of low income population in a municipality, (D) the percentage of low-income students enrolled in a district (Elacqua, 2006; Raczynski & Salinas, 2009), (E) student selection policies (Bellei, 2009; Gauri, 1998; Parry, 1996), and (F) the charging of tuition or additional fees to parents (Bellei, 2009; Elacqua, 2006; Parry, 1996; Valenzuela, Bellei & Delos Rios, 2006).

In addition to these variables, it is important to take into account other municipal dimensions or aspects in the analysis. According to Raczynski and Salinas (2009), it might be important to consider issues such as: (G) the rural/urban location of a municipality, (H) its

location within a city or region (near the city center or towards the periphery), (I) the average years of schooling of parents in a district, (J) the amount of funds and resources a municipality contributes to education as compared to its total revenue, (K) the municipal funds and resources available per capita in an area, (L) the total expenditures a municipality makes for paying education personnel wages and related fixed costs as compared to the total voucher received from the central government, (M) the percentage of educational funds available for things other than personnel salaries/wages (such as teaching and learning, instructional leadership, extracurricular activities, facilities maintenance and operations, etc.), and (N) the priority the mayor of a municipality assigns to education. Finally, two other relevant variables may be included in an analysis of vouchers in Chile: (N) the mean achievement results of public school students within a municipality, and (O) the municipality residents' average income.

Any of these variables might be considered when quantitatively analyzing the effects of school vouchers on public school enrollment trends and outcomes at the municipal level in Chile, particularly when considering which municipal factors have significantly affected those trends over time. However, due to data availability, parsimony, and simplicity, this study focuses on five main variables of interest— each aligning to a specific hypothesis of the study.¹ The hypotheses are:

- 1) Municipalities with more exposure to competition from private schools in Chile will lose more students over time than less-exposed municipalities.
- 2) Municipalities that contribute more financing and/or resources to education in Chile will gain or retain more students over time than lesser-contributing municipalities.
- 3) Municipalities that receive insufficient vouchers from the central government that do not cover education personnel expenses and related fixed costs will lose more students over time than more solvent municipalities.
- 4) Higher and mixed income districts—or municipalities—in Chile will gain or retain more students over time than low-income municipalities.
- 5) Municipalities with higher levels of student achievement in Chile will gain or retain more students over time than low-performing municipalities.

The statistical testing of these hypotheses is conducted using multiple linear regression (OLS) techniques. The dependent variable corresponds to the percent change of public school enrollment for municipalities in Chile between the years 2000 and 2009. The main independent variables correspond to eight municipal characteristics that are expected to have a significant effect on the dependent variable, by either to increasing or decreasing it. Three of these variables are controls, and the remaining five correspond to independent variables of interest linked to the hypotheses of this study.

Specifically, nine OLS regression models are run, each introducing new independent variables (see Appendix, Table 6 for more details). Multicollinearity is addressed in each of the models by calculating and reporting the variance inflated factors, or VIF, of independent variables (see Appendix, Tables 10 and 11 for more details). The first model introduces the three control variables of the study:

- 1) Municipality size understood as total population change of a district during a specific decade. (*The percent change on the total municipal population 2001- 2009*)
- 2) Total student population change of a district during a specific decade (*The percent change on the total student population of a municipality –including all types of schools- 2000- 2009*)
- 3) Level of urbanicity of a municipality, and/or the urban or rural location of a district. (*The percent of urban territory of a municipality in 2009*)

Model 2 introduces the first variable of interest:

- 4) The degree of private sector competition in an area. (*The percent change on the number of private-voucher schools within a municipality between 2000 and 2009*)

Model 3 adds a new variable to the previous regression equation:

- 5) The percentage of funds and resources a municipality contributes to education as compared to its total revenue. (*The percentage of municipal contributions to education compared to the total municipal revenue received in 2009*)

Model 4 replaces variable N° 5 with a new variable of interest:

- 6) The total municipal expenditures on education personnel wages and related fixed costs as compared to the total voucher received from the central government. (*The percentage of resources spent on education personnel wages compared to the total voucher received in 2009*)

Concerning the two previous variables, Larrañaga, Peirano and Falck (2009b) have indicated that the more the revenue contributions a municipality makes and/or receives for educating their public school students, the more the voucher received from the central government suffices for paying education personnel expenditures and related fixed costs. Thus, the more the education funds and resources are available for things other than paying personnel salaries/wages (such as teaching and learning, instructional leadership, extracurricular activities, facilities maintenance and operations, etc.), the greater the potential benefits for school improvement in an area. This study considers that similar effects unfold for districts when considering their capacity to attract enrollment: the more the education funds and resources contributed by the municipality and/or the more the funds available from the central government to pay education personnel expenditures and related fixed costs, the more the potential benefits for districts to attract students to their public schools.

Model 5 adds a new variable to the previous regression equation:

- 7) The SES demographics of a district. (*The municipality poverty level for 2009*)

Hsieh and Urquiola (2004; 2006) have pointed out that the socioeconomic demographics of a municipality, as well as the degree of private sector competition within a district, appear to be relevant factors for determining how vouchers will affect student achievement and stratification levels of local public schools. Particularly, they have found that the lower the income level of a district, and/or the more private school penetration within an area, the lower the tendency of the mean student achievement results for local public schools. We consider that similar findings may be found when analyzing public school enrollment outcomes at the local/municipal level: When either -or both- the percentage of low-income population and the private school penetration levels are higher, school districts -or municipalities- tend to experience a higher flight of students from their local public schools to other campuses, especially private ones.

Model 6 replaces variable N°7 for an alternative achievement variable:

- 8) The mean student achievement of public-municipal schools in an area. (*The mean student achievement results of public-municipal schools in an area between 2006 and 2008*)

Concerning this last variable, and following the theory supporting vouchers (Friedman, 1962; Ladner & Brouillette, 2000), it is expected that families having the option to choose the school for their children may prefer not only to enroll their children in schools where student achievement results tend to be better, but also in districts where the overall achievement is better. As a result, a district mean student achievement may also be a relevant variable to consider when analyzing the key municipal factors that explain which localities in Chile attract more students to their public schools. We test such assumptions and explore if other municipal factors (such as private school penetration levels, the amount of local funds and resources available for education, and the percent of low-income population in a district) work together

with a district's mean student achievement for determining the potential attractiveness of local public schools.

Model 7 introduces all variables (with the exception of variable N° 5). Model 8 replaces the municipal poverty level variable (N° 7) for dummy variables identifying different municipal poverty levels (high, mid-high, mid-low and low), and deletes variable N° 8, to see if effects vary depending on the level of local poverty. Finally, Model 9 runs the previous regression restoring variable N° 8 to the equation to see how a district's level of poverty and its student achievement results combined with other factors to affect local public school enrollment outcomes.

Methodological Limitations

In general, the statistical methods performed allows obtaining valuable information about which municipal characteristics seem to be significantly associated with public school enrollment gains, retention or losses at the municipal level in Chile and constitute a relevant departure point for future studies on the topic and field. However, is important to recognize some methodological limitations in the research.

First, when using simultaneous multiple regressions, the specific variables entered into the models may change the regression coefficients obtained (Keith, 2006). In other words, the introduction of additional variables or the replacement of a variable with another may change the regression coefficients attained. We recognize that there may be other student, district and school level factors that help to understand the impact of vouchers in Chile, such as the classification of student that changed school (low-SES, high-SES, has repeated a grade), the concentration of poverty in schools, the level of proximity between municipalities (since choice is not restricted to a municipality in Chile, inter-municipality competition may play a role in changes to enrollment), and the way in which the co-payment at private schools may have shaped the changes in enrollment. As a result, inferences made from the regression analysis may be taken cautiously and further confirmed by future studies. In any case, it is important to remember that all variables included in the models have been considered in prior peer-reviewed voucher studies conducted in Chile.

The second limitation is that the regressions performed in this study correspond to a cross-section analysis and not to a longitudinal one, which may mean that non-observed municipal variables that are constant through time, and that are not considered in the models, may have an effect on the results. Such a situation may introduce bias into the statistical results obtained preventing direct causal inferences between the variables considered in the models.

A third limitation is that some of the independent variables used in the models could be considered either an independent or dependent variable of the main dependent variable of this study. For example, the mean student achievement results for local public school obtained (SIMCE results) could either influence or be influenced by the public school enrollment trends experienced by a municipality. This statistical problem relates to the endogeneity of variables in OLS and the simultaneity bias. This limitation also prevents making direct casual relationships between independent and dependent variable(s) in the study. Instead, talking about association between variables is more appropriate.

A final limitation is that the dependent variable corresponds to a percent change in public school enrollment between 2000 and 2009. This characteristic reduces the variability of the variable that could be increased if a raw indicator of enrollment is used. In addition, this characteristic prevents performing a time series analysis, which is a statistical procedure that could better control for biases in the statistical results obtained through OLS.

Overall, the limitations identified introduce various biases to the statistical analysis that prevent making direct causal relationships between independent and dependent variable(s) of the study. Nevertheless, results allow establishing association between these variables and constitute a relevant first step for understanding the municipal factors and characteristics that are related to public school enrollment changes –gains, retention or losses- across Chilean districts under vouchers.

Main Findings of the Study

The main purpose of this study is to understand how municipalities have been affected by the threat of competition for students the voucher system generates between public and private schools, and between public-municipal schools and districts themselves. To address this issue, this study focuses on analyzing the impact of vouchers on public school enrollment at the local/municipal level and examines what municipal factors are associated with enrollment gains, retention or losses over time.

As discussed above, a shift has occurred in enrollment from public-municipal to private-voucher schools in Chile. This change has closed hundreds of public schools and financially hurt many public school districts, especially in urban areas. According to Larrañaga, Peirano and Falck (2009a), the loss of public school enrollment was particularly acute from 2000 onward. Descriptive results of our study confirm this trend by showing that since 2006, the number of private-voucher students has surpassed the number of public-municipal schools in the country (see Figure 1).

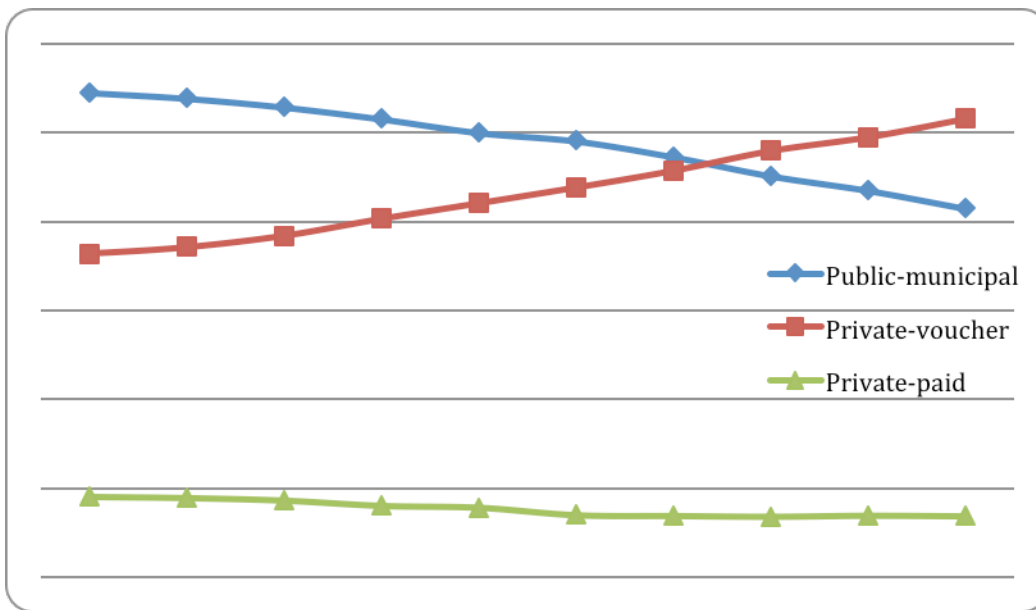


Figure 1. Nationwide student enrollment in Chile by school type (2000-2009)

In addition, descriptive results from this research indicate that between 2000 and 2009, the enrollment of public-municipal schools has dramatically decreased at the national level, from 55% to 42%. In comparison, private-voucher schools have expanded from 36% to 51%, and private-paid enrollment has decreased from 9% to 7%. Additionally, Chilean municipalities have lost, on average, 22% of public school enrollment at the national level. Meanwhile, their private-voucher school enrollment has increased 38%, on average (see Appendix, Table 1).

Figures for the Santiago Metropolitan Area are even more illustrative of the change in the Chilean education system. Between 2000 and 2009, the enrollment of public municipal schools has dramatically decreased in the Metro Area from 39.8% to 30.8%. In comparison, private voucher schools have expanded from 46.6% to 58.5%, and private-paid enrollment has decreased from 13.4% to 10.6%. In addition, municipalities have lost, on average, 25% of public school enrollment, while their private-voucher school enrollment has increase 37%, on average (see Appendix, Table 2).

This aggregated –national/regional- data obscures the heterogeneity of situations that occur among municipalities regarding its public school enrollment. Not all municipalities lose students equivalently; some lose a large percentage of public school enrollment, some experience smaller change. Notably, some municipalities across the country did actually increase their public school enrollment between 2000 and 2009 (see Appendix, Tables 3 and 4 for more details).

Considering these data, we conduct descriptive statistical analyses of Chilean municipalities including 345 districts that report information on school enrollment. From these, 29 (8.4%) lost more than 40% of public school students, 175 (50.7%) lost between 20% and 40% of students, 123 (35.7%) lost between 0.1% and 20% of students, and only 18 municipalities (5.2%) increased their public school enrollment from 2000 to 2009.

In comparison, from the total of 346 municipalities, 256 (71.9%) have private-voucher school competition within their limits. From these, 91 (35.5%) increased their private-voucher enrollment more than 40%, 50 (19.5%) increased their enrollment between 20% and 40%, 50 (19.5%) increased their enrollment between 0.1% and 20%, and only 65 (25.3%) experienced a decrease in their private voucher enrollment. These percentages show that both public school enrollment losses and private-voucher enrollment gains have heterogeneously occurred across municipalities. In other words, the phenomenon of public school enrollment change –gains, retention or losses- under vouchers in Chile appears to vary depending on the main characteristics of the municipality and/or on the type of municipality to which we are referring.

How Chilean Municipalities Vary and are cCharacterized: Descriptive Statistics

For our inferential analyses, we consider eight main attributes; five of them correspond to the main hypotheses of the research and three are control variables. All of the attributes are expected to be significantly associated with public school enrollment trends and outcomes across time. This section provides a brief description of each of the independent variables both at the national level and within the Santiago Metropolitan Area (see Appendix, Tables 1 and 2 for more details).

First, municipalities vary depending on their total municipal population change for the period 2000-2009. Data reported show that, on average, the Santiago Metro Area has grown more than the overall country (13.7% versus 9.8%). However, extreme cases (with lower –negative- and higher –positive- growth) are located outside the capital city.

Second, districts vary according to their total student population change for the period 2000- 2009. Percentages show that student populations within municipalities in Santiago and the overall country have decreased (-2.2% and -9.1% respectively), however, reductions have been higher outside the capital city both on average and considering the municipalities that have lost students.

Third, municipalities vary depending on their urbanicity levels and/or on their urban/rural condition. Percentages indicate that municipalities in Chile have, on average, a relatively high level of urbanicity (62%). In addition, data reported shows that the average

percentage is higher for the capital city (87.7%). This means that most municipalities in the Santiago Metro Region are urban, and few have low levels of urbanicity.

Fourth, districts vary according to the private voucher penetration they have experienced during the 2000s. Percentages indicate that on average private –voucher- school penetration was higher in Santiago than in the overall country (53.9% versus 31.6%). In addition, extreme cases (with lower –negative- and higher penetration) are also located in the Santiago Metro Area.

Fifth, municipalities vary depending on the percentage of funds they contribute to education as compared to the total revenue they received in 2009. On average, such contributions were higher in districts located within the Santiago Metro Area than outside the capital city (8.6 thousand million pesos versus 7.09 thousand million pesos on average). However, the higher-contributor and lower-contributor districts are located outside of Santiago's area.

Sixth, districts vary according to the percentage of total expenditures made on education personnel wages and related fixed costs as compared to the total voucher received from the central government in 2009. Overall, the majority of municipalities in the country operate with insufficient vouchers, and they have to make contributions to cover the deficit. On average, this deficit is higher for districts located within the Santiago Metro Area than outside the capital city (39% versus 20% of deficit, on average); however, the districts that have the higher deficits are located outside Santiago, mainly in rural areas.

Seventh, municipalities varied according to their poverty level in 2009. Percentages show that a great variation of poverty levels exists among districts in the country, and that the poorer districts are located outside of the capital city, mainly in rural areas (the average municipal poverty level is 16% in the overall country and only 10.7% in Santiago).

Finally, municipalities vary depending on student achievement results (SIMCE results). Outcomes show that the average student achievement results of local public schools in the Santiago Metro Area are similar to, although slightly lower than, to the results in Chile (231.1 points versus 234.8 points) however, the lowest scores are located outside of the capital city, mainly in rural areas.

In sum, Chilean municipalities vary according to multiple characteristics. This study has taken eight attributes as main aspects to distinguish and differentiate districts. The overall picture is that variation rather than homogeneity is what predominates when comparing local areas. Such heterogeneity is a critical component for understanding the different public school enrollment trends and outcomes observed at the local/municipal level in Chile between 2000 and 2009. As previously stated, public school enrollment has suffered a relevant decrease in the overall country during the period studied; however, this decrease varies depending on the main characteristics of the municipality and on the type of municipality to which we are referring. Which municipal factors are critical for understanding such variations?

Factors Associated with Public School Enrollment Loss under Vouchers: OLS Analysis

In order to determine which local/municipal factors are significantly associated with the gain or loss of public school enrollment in an area, a series of inferential linear multiple regressions (OLS) were performed that test each of the main hypotheses presented earlier. OLS allows considering both the joint effect and individual direct effect of various independent variables over the dependent variable while controlling for all the other independent variables (Keith, 2006). In comparison to independent sample T tests, the procedure allows testing the effect of multiple variables without the necessity of conducting

separate measures, which may inflate the chance of falsely rejecting some of the hypotheses of the study. In other words, by conducting multiple linear regression (OLS) techniques instead of separate independent sample T tests, the type I error is significantly reduced from the statistical analysis (Keith, 2006).

The regression models performed explain between 30.4% and 43.7% of the variance in public school enrollment outcomes observed at the local/municipal level in Chile between 2000 and 2009 (see Table 7). In addition, independent variables entered into the models do not show high variance inflated factors or VIF (see Appendix, Tables 10 and 11), indicating that multicollinearity is not an issue.

Table 7
R and R² of Regression Models Performed

Model	R ²	Corrected R ²	Significance Level
1	.310	.304	.000**
2	.397	.390	.000**
3	.398	.389	.000**
4	.375	.36.5	.000**
5	.369	.357	.000**
6	.437	.426	.000**
7	.427	.415	.000**
8	.407	.392	.000**
9	.453	.437	.000**

Overall, regressions carried out allow establishing various significant relationships. A first finding from the OLS regressions performed is that the more exposure to competition from— or penetration of— private-voucher schools in a municipality, the greater the loss of public school students. This means that the first *hypothesis* of this study —*municipalities with more exposure to competition from private-voucher schools in Chile will lose more students over time than less-exposed municipalities*- is confirmed in the statistical analysis. Particularly, models 2 to 9 confirm the hypothesis (see Table 8).

Table 8
 Results of Regression Models Performed (Models 1 to 7)

Model	Variables/ Results	Constant	Percent change on the total municipal population (2000- 2009).(DV)	Percent change on the total student population of a municipality (2000- 2009)	Percent of urban territory of a municipality in 2009	Percent change on the number of private- voucher schools within a municipality between 2000 and 2009	Municipal contributions to education compared to the total municipal revenue received in 2009	Total Municipal Expenditures on Education Personnel Expenses over Total Voucher received 2009	Municipality poverty level for 2009	Mean student achievement results of public- municipal schools in an area between 2006 and 2008
1	Coefficient b	-10.749	-.043	.479	-.102	-	-	-	-	-
	Coefficient Beta		-.098	.617	-.205	-	-	-	-	-
	Significance Level	.000**	.054	.000**	.000**	-	-	-	-	-
2	Coefficient b	-8.146	-0.29	.572	-.088	-.089	-	-	-	-
	Coefficient Beta		-.066	.738	-.176	-.330	-	-	-	-
	Significance Level	.000**	.170	.000**	.000**	.000**	-	-	-	-
3	Coefficient b	-7.299	-.031	.569	-.095	-.088	-.069	-	-	-
	Coefficient Beta		-.070	.735	-.190	-.327	-.025	-	-	-
	Significance Level	.000**	.154	.000**	.000**	.000**	.577	-	-	-

Table 8 (cont.'d)
 Results of Regression Models Performed (Models 1 to 7)

4	Coefficient b	-3.142	-0.16	.530	-.086	-.085	-	-.047	-	-
	Coefficient Beta		-.039	.683	-.175	-.325	-	-.102	-	-
	Significance Level	.269	.465	.000**	.000**	.000**	-	.032*	-	-
5	Coefficient b	.966	-.009	.496	-.076	-.085	-	-.065	-.185	-
	Coefficient Beta		-.019	.655	-.159	-.342	-	-.143	-.112	-
	Significance Level	.774	.733	.000**	.001**	.000**	-	.003**	.018*	-
6	Coefficient b	-70.350	-.008	.507	-.073	-.081	-	-.042	-	.279
	Coefficient Beta		-.017	.647	-.146	-.312	-	-.087	-	.273
	Significance Level	.000**	.749	.000**	.001**	.000**	-	.050*	-	.000**
7	Coefficient b	-63.626	-.006	.491	-.065	-.081	-	-.053	-.110	.260
	Coefficient Beta		-.014	.645	-.133	-.330	-	-.114	-.067	.262
	Significance Level	.000**	.796	.000**	.004**	.000**	-	.015*	.147	.000**
** Significant at .01 Significance Level * Significant at .05 Significance Level										

This phenomenon is related with the fact that, in Chile, holding other factors constant, greater public/private school competition means greater public school enrollment losses for local areas. This phenomenon may occur within the country because many families see the movement of their children from a public to a private-voucher school as a source of opportunity and social mobility. This is congruent with findings of previous studies (Hseih & Urquiola, 2004; Hseih & Urquiola, 2006), which state that greater private school competition entails more losses than gains for local public schools because of the various comparative advantages private campuses usually possess over public ones (selecting middle class students and retaining out low-income counterparts, having a pool of more educated parents, receiving private donations, etc.), all of which transform them into more attractive campuses for the middle class within local areas.

A second finding from this analysis is that the more insufficient the voucher received by a municipality for paying its education personnel expenses and related fixed costs, the more public school students that area will lose over time. This means that the *third hypothesis* of this study – *municipalities that receive insufficient vouchers that do not cover education personnel expenses and related fixed costs will lose more students over time than more solvent municipalities*– is confirmed in the statistical analysis. Particularly, models 4 to 9 confirm the hypothesis (see Table 8).

In contrast, the effect municipal contributions to local public education have on public school enrollment is not significantly related with public school student losses –or gains– over time. This means that the *second hypothesis* of this study – *municipalities that contribute more financing and/or resources to education in Chile will gain or retain more students over time than less-contributor municipalities*– is not confirmed in the statistical analysis. Even more, evidence suggests that municipalities that contribute more Chilean pesos to local public education may lose more students in the period analyzed, although not significantly (see Table 8). Note Model 3 where regression coefficients for municipal contributions are negative and almost significant at the .05 level: Beta - .025, sig. level .577.

The above findings could be related with the fact that, in general, additional resources provided by municipalities are not used for teaching and learning, management or educational investment purposes but for compensating the deficit that an insufficient voucher, one that does not cover education personnel expenses and related fixed costs, produces. Thus preventing municipal contributions from being used on items that add value to the service of education provided by the municipality. As a result, a greater availability of municipal resources for local public education in a municipality may not guarantee that public school enrollment will be increased or maintained. As important as the existence of such additional resources, are the purpose and destiny of such efforts. If those efforts are only used for compensating deficit, they won't produce any significant difference.

Another finding from regressions performed is that the poverty level of a municipality is not consistently associated with the loss of public school students. Whereas model 5 confirms the relationship, model 7 rejects it (see Table 8). This means that the *fourth hypothesis* of this study – *higher and mixed income municipalities in Chile will gain or retain more students over time than low-income municipalities*– is not confirmed in the statistical analysis.

In order to understand the previous finding, Chilean municipalities are grouped into four different clusters according to their quartile distribution on local poverty levels and tested on their differential effects over local public school enrollment outcomes (see Appendix, Table 9 for more details). Groups correspond to high, mid-high, mid-low and low municipal poverty levels. The latter group corresponds to the reference category. Results indicate that districts with mid-high municipal poverty levels significantly lose more students than districts with low

municipal poverty levels (see Appendix, Table 9, models 8 and 9). In comparison, districts with high municipal poverty levels do not significantly lose more students than low poverty districts. Finally, findings for districts with mid-low municipal poverty levels are not conclusive (in model 8 coefficients are significant at the .05 level, but in model 9 are not significant).

The above results can be interpreted as follows: The fact that the relationship between local poverty levels and public school enrollment outcomes only is significant for some municipalities –the mid-high municipal poverty levels ones- and not for others, may be related to how the Chilean voucher system functions and who it benefits the most in terms of both educational opportunities and student mobility. Previous researchers have demonstrated (Hsieh & Urquiola, 2004; Hsieh & Urquiola, 2006; Torche, 2005) that student enrollment changes under vouchers in Chile have been mainly driven by middle class/higher ability students moving from their original public campuses to private ones –or to public schools located in wealthier districts. Meanwhile, low-income/less skilled pupils are still enrolled in their public neighborhood schools. These findings are coherent with results of the current study. Whereas previous research shows that middle class students have benefited the most and low-income counterparts have not, this study shows that greater educational opportunities and mobility have occurred for families and students living in mid-high poverty areas (and mid-low poverty areas to a lesser degree), but not for families and students living in high poverty districts. This means that educational opportunities and student mobility under vouchers are disparate not only for families from different SES backgrounds, but also for families living in different localities. In other words, in Chile, SES levels and place of residence should be coupled to determine differential educational opportunities and mobility for families and students under vouchers.

Another finding that emerges from the quantitative analysis is that the higher the student achievement results of public schools within a municipality, the more the retention capacity of public school students in such area. This means that the *fifth hypothesis* of this study –*municipalities with higher levels of student achievement in Chile will gain or retain more students over time than lower-performing municipalities*- is confirmed in the statistical analysis. Particularly, models 6, 7 and 9 tend to confirm the hypothesis (see Appendix, Tables 8 and 9 for more details).

The most interesting thing about this relationship is that the attraction and/or retention capacity of a public school in an area seems to occur not only due to its individual action but also as a result of the collective action of public schools in the area and the action of the municipality that administrates it. In other words, if the majority of public schools in a municipality obtain good student achievement results, most public schools in the area may benefit by diffusion (or hurt if results are negative). This effect could be related to the idea proffered by Gewirtz, Ball and Bowe (1995), who said that the predominant academic results of public schools in a district help to build the reputation of all public schools in an area. However, it is important to acknowledge that such an effect may not permeate low (or high) performing public schools, only average performing schools within a district.

One last finding that emerges from the analysis is that the larger the urban territory of a municipality, the greater the loss of public school students (see Appendix, Tables 8 and 9). This significant relationship unveils that the Chilean voucher system has had a greater impact on urban areas, and that the greater public school student losses occurred nearby or within cities where student mobility across schools and across districts is easier. Despite the veracity of this finding, rural areas have also lost public school enrollment in the period analyzed, but such loss might be related to additional factors not considered in the current study, such as migration rather than the voucher system.

Summary of Findings of the Quantitative Analysis

Overall, multiple linear regression (OLS) techniques carried out in this study find that four of the five hypothesis of the research are plausible and significant. Specifically, statistical analyses show that the higher the private-voucher penetration, the more insufficient the voucher received from the central government for paying education personnel wages and other related fixed costs, the lower the mean student achievement results of local public schools, and the higher the poverty level of a municipality, the higher the probability of losing public school enrollment at the local/municipal level in Chile. However, for some variables, effects over public school enrollment may not be particularly linear. That is the case of local poverty levels.

When municipalities are compared to a reference category compounded of low poverty and wealthier districts, the loss of public school enrollment only is significantly higher for a specific group of Chilean municipalities: the ones that have mid-high levels of poverty (mid-low poverty level municipalities also lose students but to a lesser degree). In comparison, high poverty areas do not significantly lose more students than low poverty areas. This occurs because school vouchers in Chile have opened greater educational opportunities to students with relatively higher SES, living in mid-high poverty areas. In comparison, the system has offered fewer educational opportunities to lower SES counterparts, living in low-income/high-poverty areas. As a result, under the Chilean voucher system, not only family and student backgrounds are related to enrollment and educational opportunities. Demographics appear to couple with the specific social and economic characteristics and features of local areas where students live to determine the final educational opportunities and mobility they will be able to obtain from the system—both demographics and geography matter in the Chilean voucher system.

Conclusions

As said in the beginning, school choice promoters posit that vouchers will spur competition between public and private campuses, make schools more responsive to families and students, increase student achievement and improve effectiveness of all schools (Chubb & Moe, 1990; Friedman, 1962; Gallego, 2002; Gallego, 2004; Peterson, 2009; Sapelli & Vial, 2002). In addition, some researchers (e.g. Ladner & Brouillette, 2000) have pointed out that vouchers will prompt competition between school districts, and between districts and private schools, that will improve district effectiveness.

Previous research on the Chilean voucher system has shown that these assumptions are questionable (Auguste & Valenzuela, 2004; Carnoy & McEwan, 2000; Gauri, 1998; Hseih and Urquiola, 2004; Hseih and Urquiola, 2006; Mizala & Romaguera, 2003). In general, empirical evidence suggests that student achievement, particularly the mean school achievement of a school, either public or private, largely depends on the student composition of the school and its mean SES. Furthermore, changes in achievement at the school level are significantly related to changes in the student composition of the school. Similar findings may apply at the municipal level; changes in achievement at the district level may strongly correlate with changes in the student composition of the municipality.

The data in this study show that, in the midst of a universal voucher system, the competition has been won by private-voucher schools, at the expense of public-municipal schools. Between 2000 and 2009, enrollment in public-municipal schools has decreased at the national level from 55% to 42%. In comparison, private-voucher schools have expanded from

36% to 51%, and private-paid enrollment has decreased from 9% to 7% (see Appendix, Figure 1). Additionally, Chilean municipalities have lost, on average, 22% of public school enrollment at the national level. Meanwhile, their private-voucher school enrollment has increased 38%, on average (see Appendix, Table 1). The universal voucher system in Chile has lowered enrollment and closed public schools across the nation.

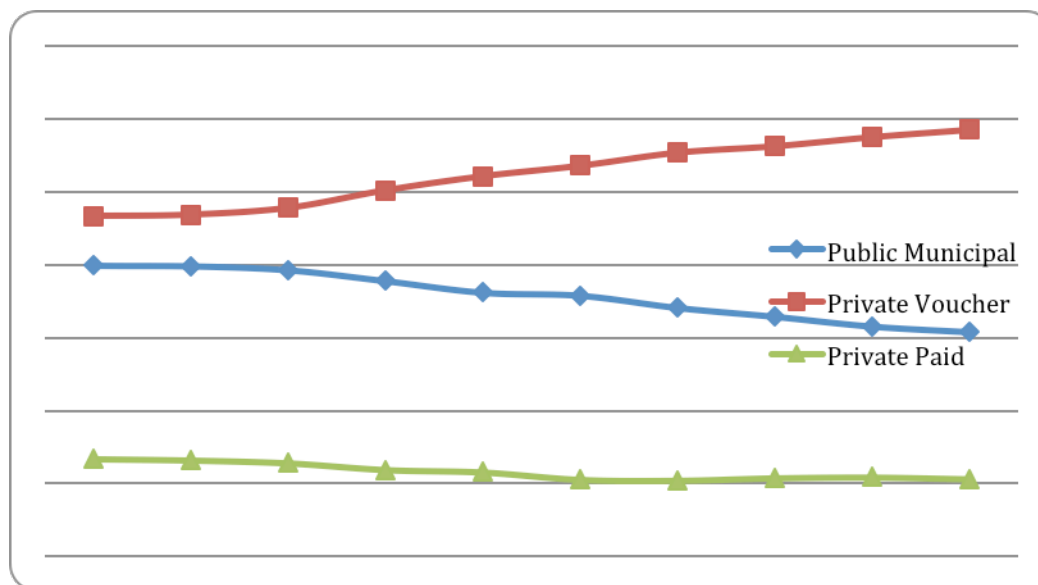


Figure 2. Santiago metropolitan area student enrollment by school type (2000- 2009)

Urban public school enrollment in the Santiago Metropolitan Area has trended down more sharply than the nation as a whole (see Figure 2). Between 2000 and 2009, the enrollment of public municipal schools has dramatically decreased in the Metro Area from 39.8% to 30.8%. In comparison, private voucher schools have expanded from 46.6% to 58.5%, and private-paid enrollment has decreased from 13.4% to 10.6%. In addition, municipalities have lost, on average, 25% of public school enrollment, while their private-voucher school enrollment has increase 37%, on average (see Appendix, Table2).

In addition, the statistical analyses performed in this study shows that Chilean municipalities have not lost public school students in the same manner, as some have lost more students than others due to heterogeneity between districts. On the one hand, a high private-voucher penetration within a locality, an insufficient voucher received from the central government for paying education personnel wages, fixed costs and low mean student achievement results for local public schools are associated with public school enrollment losses at the local/municipal level in Chile. On the other hand, a low private voucher penetration, sufficient voucher resources received from the central government and high mean student achievement results for local public schools are associated with public school enrollment gains or stability within a locality.

Concerning the effect of municipal local poverty levels over public school enrollment, findings are more complex. Despite the fact that low poverty areas are the localities that tend to retain more public school students on their campuses, high poverty areas are not the localities that tend to lose more public school students. Mid-high poverty areas and mid-low poverty areas, to a lesser degree, are the greater losers of public school enrollment. Why is this the case? First, the retention of students at low poverty and wealthier districts may relate to the

high status and historical prestige they possess, along with the implementation of some practices that keep their local status untouched: The selection of the best students from the pool of applicants, the management of the number of students with behavioral problems they have, the expulsion of most conflictive students when necessary, and the investment in school infrastructure and appearance, etc. These practices are similar to the ones that most private-voucher schools put in practice and differ from the measures other public school districts are able to implement (Author, 2014).

Second, high poverty districts are not the highest losers of public school enrollment under vouchers in Chile because their students appear unattractive to private providers or to municipalities in better-off areas. In addition, families of students in high-poverty districts do not have sufficient resources to pay for transportation costs or for the additional fees private-voucher schools usually charge. As a result, the students tend to remain studying in their public neighborhood schools and become “ghettoized” from the system (see Gewirtz, Ball and Bowe [1995] for similar findings under open school choice in England).

Finally, mid-high poverty municipalities –and mid-low poverty areas to a lesser degree– appear to be losing public school students the most. This finding may be related to the “higher spectrum of opportunities” students living in these areas will have to choose from— a specific campus or a set of schools— as compared the limited choices of students living in high-poverty districts. These higher opportunities occur because families and students living in mixed income areas, who also have a relatively higher SES, are the ones that can access, pay for and/or get selected by either private-voucher schools or public schools in better-off areas. This is an important area for future research.

In sum, findings from this study show that educational and mobility opportunities for families and students participating in the Chilean voucher system are not homogeneously distributed. Some families and students will use and benefit from the system, while others will remain marginalized. Who will be able to benefit from the system and who are the losers? Based on quantitative results from this research, students of relatively higher SES living in mid-high –or mid-low- poverty districts receive the benefit from vouchers. These students may move from one public school to another, from a public school to private-voucher school in the same area, from one district to another, or from a public school in an area to a private-voucher school in another district. Meanwhile, low-income counterparts living in high-poverty areas are excluded from the system and tend to remain at their public neighborhood school (see also Author, 2014).

Policy Implications

Considering previous elaborations, what can be learned from this study? What main policy implications unfold about the design, implementation and/or effects of large scale, universal school voucher plans, like the Chilean one? How could public education thrive in the context of increased education privatization? The first policy implication from this study is that the consideration of district level characteristics is relevant when analyzing the effects of large scale, universal school voucher plans. The effects of vouchers not only vary depending on school or school sector –public or private- characteristics, but also on district attributes. For example, this study demonstrates that, within urban areas, the level of poverty of a municipality –or district- matters for retaining/attracting students to the locality in the context of open school choice. Similarly, the mean student performance of local public schools also affects a public district’s ability to retain/attract students. From a broader perspective, this implies that the analysis of the effects of market mechanisms on an educational system and on

public education needs to incorporate the district/municipal level along with other –more traditional- levels, such as the school and the school sector for an empirically, rather than ideologically, driven approach to vouchers.

A second policy implication from this research is that the claim of voucher supporters that school vouchers will prompt school competition –and district level competition- thereby increasing the overall effectiveness of the educational system is questionable. It appears to depend on how competition unfolds, if this outcome becomes more possible under vouchers than under a more traditional educational system. In the Chilean case, competition has certainly not increased such effectiveness. On one hand, previous research (Auguste & Valenzuela, 2004; Carnoy & McEwan, 2000; Gauri, 1998; Hsieh and Urquiola, 2004; Hsieh and Urquiola, 2006; Mizala & Romaguera, 2003) has demonstrated that increased overall student achievement has not been obtained as a result of the introduction of vouchers. On the other hand, this study shows that competition for students has not strengthened either the public or the private-voucher sector, but downgraded the public and benefited the private terms of enrollment. This outcome has been the result of how the Chilean voucher system functions.

The third, and perhaps most important, policy implication from this study is that the design and implementation of a large scale, universal school voucher plan may imply various unintended negative effects over equity of education opportunity and the social integration of students within an education system. Such inequities not only operate between schools and school sectors, but also between districts. Chile has recognized the inequity for low-SES students as a problem in their market-based approach and, in 2008, passed the Preferential Subvention Law (PSL), changing the apportionment of the voucher. Prior to the PSL, the voucher amount was the same for all students. The new law created a larger voucher for high-poverty students. The data in the study are prior to the passage of the PSL. Future research is necessary to understand if the newly allotted amounts are enough for suppliers (schools) in the market to be interested in consumers (low-SES students). Thus, another question for future research is whether these newly allotted amounts balance the market in favor of low-SES students, particularly for those living in mid- high and high poverty areas. Whether the PSL has changed the attraction and retention of low-SES students is still an open question.

This study demonstrates that, in a voucher market where the voucher is distributed equally, the final result is a complex scenario of education stratification where differences and segregation simultaneously occur across different lines. Not only between public school A and public school B, but also between public schools A and B, and private-voucher school C in the same neighborhood. Not also between public school A and B and private-voucher school C, but also between them and private-voucher school D located in a nearby area. Not only between public school district A and public school district B, but also between public school districts A and B, and private-voucher schools located in both districts, etc. In a market based educational system, all these possibilities introduce uncertainty to school enrollment. Prior research on vouchers in Chile, and the current study, demonstrate that specific family and student characteristics, as well as, the family/student's area of residence will jointly determine the spectrum of educational opportunities available in a universal voucher system.

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**APPENDIX:
QUANTITATIVE DATA & RESULTS**

Table 1
Descriptive Statistics of Dependent and Continuous Independent Variables of the Study: Municipalities at the National level

NATIONAL LEVEL	N	Minimum	Maximum	Mean	Standard Deviation
Public-municipal enrollment change 2000- 2009 (DV)	345	-73.84	58.78	-22.0072	15.07414
Private-voucher enrollment change 2000- 2009	346	-87.50	1160.42	38.5804	100.16432
Municipality Total Population Change 2001- 2009 (IV)	341	-67.01	239.53	9.8579	34.15191
Total Student Population Change 2000- 2009 (IV)	344	-70.25	125.05	-9.1486	19.19986
Urbanicity Level: Percent of Urban Population 2009 (IV)	345	.00	100	62.0827	30.02525
Percent Change of Private-voucher Schools 2000- 2009 (IV)	346	-50.00	350.00	31.6833	55.72258
Municipality Contributions to Education from Total Municipal Revenue 2009 (IV)	339	.00	26.13	7.0969	5.43513
Total Municipal Expenditures on Education Personnel Expenses over Total Voucher received 2009 (IV)	335	57.71	294.89	120.4220	31.00560
Poverty Index CASEN Survey 2009 (IV)	335	1.4	50.9	16.033	8.5408
SIMCE Language Math Public-municipal 2006- 2008 (IV)	339	195.00	302.09	234.8338	14.47745

Table 2
Descriptive Statistics of Dependent and Continuous Independent Variables of the Study: Municipalities within the Santiago Metropolitan Area

SANTIAGO METROPOLITAN AREA	N	Minimum	Maximum	Mean	Standard Deviation
Public-municipal enrollment change 2000- 2009 (DV)	52	-51.90	11.24	-25.0328	14.55049
Private-voucher enrollment change 2000- 2009	52	-46.33	348.76	37.3990	81.36792
Municipality Total Population Change 2001- 2009 (IV)	52	-25.08	236.97	13.7236	43.67924
Total Student Population Change 2000- 2009 (IV)	52	-34.66	125.05	-2.2851	27.85642
Urbanicity Level: Percent of Urban Population 2009 (IV)	51	.00	100	87.7898	22.02608
Percent Change of Private-voucher Schools 2000- 2009 (IV)	52	-50.00	350.00	53.9615	82.55241
Municipality Contributions to Education from Total Municipal Revenue 2009 (IV)	52	2.67	21.89	8.6390	4.79363
Total Municipal Expenditures on Education Personnel Expenses over Total Voucher received 2009 (IV)	51	94.31	213.74	139.4827	28.27875
Poverty Index CASEN Survey 2009 (IV)	52	2.3	21.4	10.750	4.8271
SIMCE Language Math Public-municipal 2006- 2008 (IV)	52	208.24	302.09	231.1780	18.67360

Table 3
Chilean Nationwide School Enrollment Losses: Public-municipal versus Private voucher

LOSSES: Percent Change	Public-municipal Sector	Private-voucher Sector
More than -40% (N)	29	8
Between -20% and -40% (N)	175	17
Between -0.1% and -20% (N)	123	40
Subtotal	327	65
Total	345	256

Table 4
Chilean Nationwide School Enrollment Gains: Public-municipal versus Private-voucher

GAINS: Percent Change	Public-municipal Sector	Private-voucher Sector
More than +40% (N)	2	91
Between +20% and +40% (N)	2	50
Between +0.1% and +20% (N)	14	50
Subtotal	18	191
Total	345	256

Table 5
Correlation of Dependent and Continuous Independent Variables of the Study

	Public School Enrollment Change 2000- 2009 (DV)	Poverty Index CASEN Survey 2009 (IV)	Municipality Contributions to Education from Total Municipal Revenue 2009 (IV)	Total Municipal Expenditures on Education Personnel Expenses over Total Voucher received 2009 (IV)	SIMCE Language Math Public-municipal 2006- 2008 (IV)	Percent Change of Private-voucher Schools 2000- 2009 (IV)	Municipality Total Population Change 2001- 2009 (IV)	Total Student Population Change 2000- 2009 (IV)	Urbanicity Level: Percent of Urban Population 2009 (IV)
Public School Enrollment Change 2000- 2009 (DV)	1	-.080 Sig .144	-.074 Sig .176	-.167** Sig .002	.264** Sig .000	-.089 Sig .100	.170** Sig .002	.518** Sig .000	-.056 Sig .296
Poverty Index CASEN Survey 2009 (IV)	-.080 Sig .144	1	-.017 Sig .763	-.257** Sig .000	-.174** Sig .001	-.108* Sig .048	-.218** Sig .000	-.127* Sig .021	-.103 Sig .060
Municipality Contributions to Education from Total Municipal Revenue 2009 (IV)	-.074 Sig .176	-.017 Sig .763	1	.331** Sig .000	.017 Sig .752	-.047 Sig .385	.126* Sig .021	-.143** Sig .008	-.231** Sig .000
Total Municipal Expenditures on Education Personnel Expenses over Total Voucher received 2009 (IV)	-.167** Sig .000	-.257** Sig .000	.331** Sig .000	1	-.041 Sig .463	.031 Sig .571	.273** Sig .000	-.037 Sig .495	.127* Sig .020
SIMCE Language Math Public-municipal 2006- 2008 (IV)	.264** Sig .000	-.174** Sig .001	.017 Sig .752	-.041 Sig .463	1	-.079 Sig .145	-.051 Sig .352	-.040 Sig .469	-.139 Sig .011
Percent Change of Private-voucher Schools 2000- 2009 (IV)	-.089 Sig .100	-.108* Sig .048	-.047 Sig .385	.031 Sig .571	-.079 Sig .145	1	.262** Sig .000	.431** Sig .000	.204** Sig .000

Table 5 (cont.'d)

Correlation of Dependent and Continuous Independent Variables of the Study

Municipality Total Population Change 2001- 2009 (IV)	.170** Sig .002	-.218** Sig .000	.126 Sig .021	.273** Sig .000	-.051 Sig .352	.262** Sig .000	1	.444** Sig .000	.026 Sig .632
Total Student Population Change 2000- 2009 (IV)	.518** Sig .000	-.127* Sig .021	-.143** Sig .008	-.037 Sig .495	-.040 Sig .469	.431** Sig .000	.444** Sig .000	1	.269** Sig .000
Urbanicity Level: Percent of Urban Population 2009 (IV)	-.056 Sig .296	-.103 Sig .060	-.231** Sig .000	.127* Sig .020	-.139* Sig .011	.204** Sig .000	.026 Sig .632	.269** Sig .000	1
** Significant at .01 Significance Level									
* Significant at .05 Significance Level									

Table 6
Description of Regression Models Performed

Models	Independent Variables	Dependent Variable
1	MODEL 1 INCLUDES THREE VARIABLES (a, b and c) IN THE REGRESSION EQUATION: a) The percent change on the total municipal population (2000- 2009). b) The percent change on the total student population of a municipality – including all types of schools- (2000- 2009). c) The percent of urban territory of a municipality in 2009 (as measured by SINIM).	a) Percent change on public school enrollment at the municipal level (2000-2009)
2	MODEL 2 ADDS A NEW VARIABLE (d) TO THE REGRESSION EQUATION: d) The percent change on the number of private-voucher schools within a municipality between 2000 and 2009.	Idem
3	MODEL 3 ADDS A NEW VARIABLE (e) TO THE REGRESSION EQUATION: e) The percentage of municipal contributions to education compared to the total municipal revenue received in 2009 (as measured by SINIM).	Idem
4	MODEL 4 REPLACES VARIABLE e) WITH A NEW VARIABLE f): f) Total Municipal Expenditures on Education Personnel Expenses over Total Voucher received 2009 (as measured by SINIM).	Idem
5	MODEL 5 ADDS A NEW VARIABLE (g) TO THE REGRESSION EQUATION: g) The municipality poverty level for 2009 (as measured by the CASEN survey).	Idem
6	MODEL 6 ADDS A NEW VARIABLE TO THE REGRESSION EQUATION (h), AND DELETES VARIABLE g): h) The mean student achievement results of public-municipal schools in an area between 2006 and 2008 (as measured by SIMCE).	Idem
7	MODEL 7 CONTAINS ALL PREVIOUS VARIABLES (except variable e), AND INCLUDES BOTH VARIABLES g) AND h).	Idem
8	MODEL 7 REPLACES VARIABLE g) FOR DUMMY VARIABLES ON POVERTY LEVELS, AND DELETES VARIABLE h): i) Dummy variables for the municipality poverty level for 2009 (High, Mid-High, Mid-Low Poverty Levels, and Low Poverty Level as reference category)	Idem
9	MODEL 8 CONTAINS SAME VARIABLES AS MODEL 7 AND ADDS VARIABLE h) TO THE REGRESSION EQUATION.	Idem

Table 9
Results of Regression Models with Dummy Variables on Municipal Poverty Levels (Models 8 and 9)

Model		Constant	Percent change on the total municipal population (2000-2009)	Percent change on the total student population of a municipality (2000-2009).	Percent of urban territory of a municipality in 2009	Percent change on the number of private-voucher schools within a municipality between 2000 and 2009	Total Municipal Expenditures on Education Personnel Expenses over Total Voucher received 2009	Mid-Low Municipal Poverty Level-Dummy Variable	Mid-High Municipal Poverty Level-Dummy Variable	High Municipal Poverty Level-Dummy Variable	Mean student achievement results of public-municipal schools in an area between 2006 and 2008
8	Coefficient b	1.260	-.021	.516	-.079	-.083	-.059	-3.461	-7.374	-3.429	-
	Coefficient Beta		-.050	.664	-.162	-.317	-.127	-.104	-.220	-.101	-
	Significance Level	.691	.333	.000**	.000**	.000**	.007**	.050*	.000**	.065	-
9	Coefficient b	-60.948	-.010	.498	-.070	-.080	-.051	-2.341	-5.297	-2.307	.252
	Coefficient Beta		-.021	.636	-.139	-.309	-.106	-.071	-.158	-.068	.247
	Significance Level	.000**	.686	.000**	.002**	.000**	.019*	.173	.003**	.200	.000**
** Significant at .01 Significance Level * Significant at .05 Significance Level											

Table 10

Diagnostics for Multicollinearity (Models 1 to 7)

Model	Variables/ Results	Percent change on the total municipal population (2000- 2009)	Percent change on the total student population of a municipality (2000- 2009)	Percent of urban territory of a municipality in 2009	Percent change on the number of private-voucher schools within a municipality between 2000 and 2009	Municipal contributions to education compared to the total municipal revenue received in 2009	Total Municipal Expenditures on Education Personnel Expenses over Total Voucher received 2009	Municipality poverty level for 2009	Mean student achievement results of public-municipal schools in an area between 2006 and 2008
1	Tolerance	.793	.733	.913	-	-	-	-	-
	VIF	1.261	1.363	1.095	-	-	-	-	-
2	Tolerance	.785	.654	.905	.799	-	-	-	-
	VIF	1.273	1.530	1.105	1.251	-	-	-	-
3	Tolerance	.758	.640	.873	.793	.899	-	-	-
	VIF	1.318	1.562	1.145	1.261	1.113	-	-	-
4	Tolerance	.697	.627	.882	.788	-	.863	-	-
	VIF	1.463	1.596	1.134	1.269	-	1.158	-	-
5	Tolerance	.624	.550	.882	.775	-	.857	.897	-
	VIF	1.603	1.818	1.134	1.290	-	1.167	1.115	-
6	Tolerance	.650	.591	.890	.788	-	.899	-	.977
	VIF	1.538	1.692	1.123	1.269	-	1.113	-	1.024
7	Tolerance	.614	.554	.879	.775	-	.837	.867	.948
	VIF	1.627	1.807	1.138	1.291	-	1.195	1.154	1.055

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Table 11

Diagnostics for Multicollinearity (Models 8 and 9)

Model		Percent change on the total municipal population (2000-2009).	Percent change on the total student population of a municipality (2000-2009).	Percent of urban territory of a municipality in 2009.	Percent change on the number of private-voucher schools within a municipality between 2000 and 2009.	Municipal contributions to education compared to the total municipal revenue received in 2009	Mid-Low Municipal Poverty Level-Dummy Variable	Mid-High Municipal Poverty Level-Dummy Variable	High Municipal Poverty Level-Dummy Variable	Mean student achievement results of public-municipal schools in an area between 2006 and 2008
8	Tolerance	.687	.618	.871	.780	.826	.662	.656	.625	-
	VIF	1.456	1.618	1.148	1.281	1.211	1.512	1.526	1.599	-
9	Tolerance	.641	.581	.881	.782	.857	.644	.628	.612	.936
	VIF	1.559	1.721	1.136	1.280	1.167	1.554	1.592	1.633	1.068

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