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Value of Special Education in Chile
Case Study for "Escuelas de Lenguaje"

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Comisión

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1 Introduction

There is a growing debate from recent years over the effects of inclusive education on students with and without Special Educational Needs (SEN). Interest has risen over the last years and various studies aim to analyze consequences of integration in health, educational attainments, future job prospects and overall well being. Nevertheless, the main barrier to quantitative analysis is identifying exogenous variation and a valid control group for comparison since decisions regarding Special Education are endogenous.

The debate is centered around defining the First Best Equilibrium, although empirical evidence on the effects of integration is scarce. Those in favor of integration argue that students with SEN are able to develop their full potential in inclusive classrooms and students without SEN learn important life skills such as tolerance and patience. On the other hand, those against inclusive education argue that students with SEN would not be provided with exclusive specialized services and students without SEN would be adversely affected since they would receive less attention from educators.

The majority of studies related to this literature focuses on integration of all educational needs, not distinguishing the possible differences in inclusive education of less severe disabilities such as speech impairments or attention deficit versus more severe and permanent educational needs such as deafness or blindness. Results from research on the effects of integration on integrated students and non integrated students is mixed and scarce, with null, positive and even negative impact on academic performance.

Despite growing interest on the effects of inclusive education, hardly any research has studied the impact of public policies in the supply of special schools versus regular schools. This matter is relevant in the discussion since in some cases, they can be substitutes in the decision when applying to schools. It is well known that various governments offer a higher subsidy for special education (see Table 10) as the costs associated are higher than students without special educational needs. In students with severe learning disabilities, this subsidy should have no effects on diagnosis as it is meant only for students who present these conditions. However, for students with less severe educational needs, this could generate a perverse incentive similar to a moral hazard model with asymmetric information, where parents are tempted to diagnose children without SEN. Considering how the government (principal) can't observe the parents' (agent) action regarding the real condition of their children then this induces to offer a higher level of Special Schools and over diagnose the number of students who present special educational needs.

Exploiting the fact that close to 95% of Special Schools in Chile are privately owned[1] and a public policy in 2015 that prohibited profits for voucher schools, this study aims to study the strategic positioning of a particular type of Special Schools (called *Escuelas de Lenguaje* (Speech Schools)) who provide services for pre-primary students with speech impairment. Furthermore, it provides a valid strategy to study individual level outcomes from students attending these Speech Schools. It contributes to the literature in two ways, in regards to strategic positioning, it focuses on Speech Schools as profit maximizing firms who decide where to locate depending on expected benefits, where the main hypothesis is that Speech Schools position themselves in districts where coverage by other establishments is limited in order to exploit the "residual" students not being attended by the regular educational system. Moreover, it adds to previous research on the effects of exclusive education on individual outcomes and overall application to the regular educational system through an instrumental variable approach that uses exposure to Speech Schools as an instrument for probability of attending a Speech School.

This study also sheds light on possible perverse incentives from subsidies that alter the diagnosis and enrollment of students without SEN in Special Schools. The social dilemma of over diagnosis and excess supply of Special Schools is twofold, students are being educated in exclusive education and are therefore, not being pushed to their maximum capacity in comparison to their peers in regular classrooms, while also directing attention away from students who present real speech impairment. Furthermore, governments are spending additional resources on students without learning disabilities in Special Schools rather than directing those funds to improve integration in the regular educational system. Specifically in Chile, the existence of these schools can delay the application to the regular educational system which reduces the supply of high quality and free schools available and can alter educational outcomes through the schools enrolled.

Our results indicate that regular coverage is significant in deciding whether to create a Speech School. In particular, moving from districts with low coverage to districts with high coverage reduces de probability of creation in 6.15%. The introduction of the public policy in 2015 decreases this effect, consistent with our theory that suppliers of Special Education behave as profit maximizers and when this behavior is banned, the decision to create a Speech School is less strategic. Additionally, students enrolled in a Speech School are 10 percentage points less likely to apply early to the regular educational system, have lower academic outcomes and less likely to apply to a Free and High-Medium quality school as first preference in the centralized admission system.

[1] See Section 3.3

This study is structured as follows: Section 2 provides a Literature Review on past research related to this topic, Section 3 includes a description of the Chilean educational context, Section 4 describes the data available in this research, Section 5 characterizes a model for optimal positioning by Speech School suppliers, Section 6 describes the empirical strategy to test for strategic positioning of Speech and Schools and an instrumental approach to identify causal impacts on individual outcomes of attending these schools, Section 7 provides results on both aspects, Section 8 introduces mechanisms to explain our results and Section 9 concludes.

2 Literature Review

There are various manners in which to study the effects of inclusive education and define a First Best Equilibrium. The literature with respect to academic outcomes of SEN students is mixed. The National Center for Educational Restructuring and Inclusion found results in a national study in 1995 that placement in inclusive education led to gains in academic achievements for students with disabilities. Waldron and McLeskey (1998) found different results with no significant difference in math scores for students in inclusive versus special schools[2]. Manset and Semmel (1997) review different studies on academic achievements for SEN students and conclude that the evidence suggests that inclusive education for students with mild disabilities provides gains in academic achievements.

In regards to the effect on peers, Contreras et al. (2020) find that the additional resources from the School Integration Program in Chile lead to neutral and even positive effects from integration for non-SEN students. Similarly, other studies suggest that SEN students don't have significant effects on academic results of peers (Rujis, 2017; Friesen et al, 2010; Rujis et. al, 2010; Hanushek et. al., 2002). On the other hand, Balestra et al (2020) find that a high concentration of students with SEN in a classroom can have negative effects over their peers, but they argue that a better distribution of these students is preferable over special schools. Rangvid (2019) finds that incoming SEN students have negative effects on peers, specially in schools with no prior experience in adjusting inclusion programs. Lastly, Fletcher (2009) finds that integration of students with severe emotional problems affect negatively non SEN peers.

From classic strategic models (Hotelling 1929; Salop 1979), we know that firms who are profit maximizers will decide to position themselves in locations where the expected profit is larger. There are two potential models at play, the first suggests that Speech School operate as a single firm that decides whether to enter the

[2] Yet, they found academic gains in reading

market for “residual” students not being attended by the regular educational system, while the second consists of a firm with multiple locations that considers market-power and expected profits in deciding whether to open a new “store”. Table 9 demonstrates that the former alternative is more likely, where suppliers compete in a vertical differentiation model with exogenous price (subsidy).

The literature on the strategic placement due to monetary incentives is scarce with regards to education. Yet, results from research on Medicaid and ADHD diagnosis indicate that a transition in reimbursement increased diagnosis due to the incentives created by the new system (Chorniy et al 2020). Within this same framework, classical and neo-classical theory suggests that a firm’s location is guided by cost factors and infrastructure of the region (Christensen & Drejer 2005). In this context, we assume infrastructure as the current coverage of regular education and cost factors is the expected profit from the subsidy minus the associated costs.

3 Context

3.1 Special Educational Needs

Chile has made significant progress in Special Education in recent years. Since the 90s, the country has been committed to modernizing the educational system to achieve a better integration of students who require more assistance in learning. Specifically, it has developed an entire area focused on those students who have Special Educational Needs (SEN) and who therefore, require greater support to overcome the additional learning barriers.

Special Education in Chile is developed through different educational levels in both regular and special education schools. In this way, it manages to deliver the necessary resources and services to ensure the development and learning of students with SEN. Currently, there are more than 500,000 [3] students who have access to the resources and services of Special Education.

This type of education in Chile is carried out through a series of alternatives. In inclusive education, schools can count with a School Integration Program (PIE)[4] and differential groups, while outside the regular education system, there are Hospital Classrooms (for hospitalized students) and Special Schools. Within the regular educational system, PIE stands out as the most important tool in inclusive education. The PIE program begins in Pre-K; it is voluntary for a school to be part of this program and must comply with an

[3] Ayuda Mineduc Atención Ciudadana
[4] Decreto Nº 490 and Decreto Nº 170

education program and evaluations to attend students with SEN. There is maximum of 7 students with SEN in each classroom and schools must have teachers specialized in special education. Hernandéz (2021) finds evidence consistent with schools presenting economies of scale in the adoption of PIE in primary education in Chile.

In exclusive education, the existence of Special Schools called "Escuelas de Lenguaje" (from now on Speech Schools) stands out, since, as shown in Table 5, the enrollment in Speech Schools during 2004 is 90.64% of the total enrollment in Early Childhood Special Education and in 2018, this figure rose to 94.00%. Similarly, from Figure 11 we can observe how important these schools are in middle level day care, making up almost 40% of total enrollment.

The current subsidy system for students with SEN in Chile grants resources to schools depending on the educational level and type of SEN[5]. It is the second most important subsidy program in education and is governed by the Decreto Nº 2 from 1998, which defines the amount according to level and modality of each class. In 2019, special education received $161.562,31 CLP per student while the regular subsidy in pre-primary level was $66.384,85 CLP per student, suggesting that Speech Schools received approximately 2.4 times the regular amount.

When comparing with other countries, we observe that Chile has the highest proportion of students with SEN of Early Childhood enrollment (Figure 13) and highest proportion of students with SEN in special pre-primary schools (Figure 14). Similarly, current speech impairment in Chile borders 27% while international standards range from 7% to 15% [6], suggesting possible manipulation in diagnosis or alternative channels by which the subsidy is affecting.

3.2 Pre-Primary Supply

Public supply of pre-primary education in Chile consists of different providers. Figure 8 shows in detail the classification of pre-primary institutions in Chile. The two main institutions who provide this service in the regular school system (with different types of funding and administration) are Junta Nacional de Jardines Infantiles (JUNJI) and Fundación Integra. These schools receive state funds each year defined in the public sector budget law which are distributed afterwards discretionally between their own day cares. The main problem in state funds in pre-primary education is the disparity between the funds allocated to each type of

[5]Subsidy differs according to permanent and transitory SEN, school level, attendance, school day length
[6]European Agency Statistics on Inclusive Education, 2018

institution. In 2017, day cares under direct administration by JUNJI received a monthly subsidy of $278.778 CLP per student, while Integra received $218.013 CLP per student and Day Cares VTF received $126.683 CLP per student[7].

3.3 Speech Schools

An alternative to regular pre-primary institutions are Speech Schools. During 2002, policy N° 1300 was passed and it approved plans for students who presented speech impairments. This law established that the student must be evaluated each trimester in special Speech Schools to assure that the student maintained the Special Educational Need. These schools, exclusive for students with speech impairment[8], provide a free alternative and are specific to children between 3 and 5 years of age. Classrooms must have a maximum of 15 students and each study program consists of 22 hours. In order to be eligible for a Speech Schools, a student must go through an evaluation with a speech therapist, a psychoeducational evaluation and a health exam. Additional services that these schools provide are morning and afternoon classes, personalized attention, bus services and subsidized food programs.

Chile's current educational system is governed by three main funding policies: (i) Public Schools; (ii) Voucher Schools; and (iii) Private Schools. Public and Voucher Schools are financed mainly by governments' subsidies, plus municipality contributions in the first case and co-pay in the second. Schools suppliers also differ between these types of schools, where private and voucher schools have a private provider while public schools have a municipal provider. These providers can be for profit or non-profit organizations, where the main difference consists in for-profit suppliers aim to gain profits. Within this context, Speech Schools are distributed predominantly between public and voucher schools, where the co-pay is zero for the latter. Table 12 shows a striking change in composition in Speech School suppliers following the reform in 2015.

It is important to note that the diagnosis of students with speech impairment is relatively subjective in comparison to other special education needs. It could be that a family has a speech therapist that diagnoses a child with speech impairment while another speech therapist does not. This is particularly relevant when considering how Speech Schools only attend students between 3 and 5 years old, where children in vulnerable sectors could have low exposure to elevated levels of language and motor skills. This is fundamental when considering our model since we assume that parents can decide whether to be treated in a Speech School or in PIE program in regular schools. Further, we can extend this analysis to consider students that opt to

[7] Libertad y Desarrollo (2019)

[8] considered a Transitory Special Need in the subsidy program

attend a Speech School without presenting an objective SEN.

Furthermore, it is relevant to study how the number of Speech Schools has risen considerably in the previous years (see Figure 12). From 2004 to 2019 the total number of schools dedicated to speech impairment has risen almost 300%, stabilizing in 2015 [9]. Godoy et al(2004) argue that this immense increase in number of Speech School is due to the increase in subsidy.

The highest level of competition for Speech Schools is against public day cares JUNJI and Integra for children age 3. These two public day cares receive subsidies from each municipality and offer a free alternative for parents who would like to enroll their children in day care. For children ages 4 and 5, Speech Schools face competition in Pre-K and Kindergarten in regular schools who have applied to the PIE program. These schools receive the same subsidy as Speech Schools for each student with SEN yet they have less flexibility in how these resources are spent. Following Kindergarten, all students enrolled in Speech Schools must enter the regular education system.

3.4 Policy Nº 20.845

Policy Nº 20.845 of School Inclusion was published May 29th of 2015 during the second government of Michelle Bachelet. This policy is focused on inclusion/transparency in the admission process, eliminated copay for voucher schools and prohibited profits from enrollment.

For regular voucher schools, this law guarantees that schools which receive state resources must gradually become free. This means that as the resources received from the state increase, the copay will decrease. Furthermore, schools must eliminate any form of arbitrary discrimination which impede the learning process and participation from students. This concerns the admission process where past and potential academic achievement won't be considered in the admission process. Documentation on socioeconomic status, parent's education and wedding status won't be a requisite for the admission process. The last main objective from this policy regulates that schools which receive state funds shall not be for profit and must use these funds solely for education purposes.

This policy addresses three eligibility requirements to access public funding; selective admission, for-profit ownership and co-payments. The objective is to reduce socio-economic segregation, which is considered one of the main reasons behind the inequality in education in Chile (OCDE, 2017). It also responds to the belief

[9] In 2015, the government passed a law forbidding schools to make profits from enrollment

that education should be a non-commercial part of the public realm as well as the concern that for-profit providers might cut costs at the expense of educational quality.

This program affects directly Speech Schools because it reduces any monetary incentive to build this infraestructure since funds can't be allocated to the owners and must be reinvested for educational purposes. We can argue that the Policy Nº 20.845 is an exogenous variation since "firms" had no incentive to change their legislation position before this law came into effect, as such, owners of Speech Schools had no incentive to change their lucrative behavior before the policy. Since we're only looking at creation of Speech Schools, there is no lag from current Speech Schools. As can be seen in Figure 10, the creation of schools follows a pattern, before 2015, the difference is positive and significant between the creation versus destruction, where after 2015, the destruction versus the creation has an almost null difference.

4 Data

4.1 Location of Schools/Parents

The positioning and characteristics of Speech Schools, JUNJI, Integra and PIE schools by district level comes from the school directory and student enrollment from the Ministry of Education's databases (MINEDUC). For student positioning, we use the applications from the centralized admission process (which began in 2016) which reports geographic coordinates for students applying to the regular educational system. Our main sample consists of all students in pre-primary education during 2017 [10]. The centralized admission process in Chile was implemented across regions gradually and since all students from Speech Schools must apply to the regular system in 1st grade, we are omitting from our sample only the students from regions not considered initially in the admission process. Figure 1 and Figure 2 show the distribution of schools in two regions of Chile, where we can observe that JUNJI and PIE schools are distributed evenly throughout the region while Speech Schools are concentrated in urban cities.

[10] This considers all students in Speech and Regular Schools in levels *Middle Level Nursery, Pre-K, Kindergarten*

Figure 1: Coquimbo Region - JUNJI/Integra

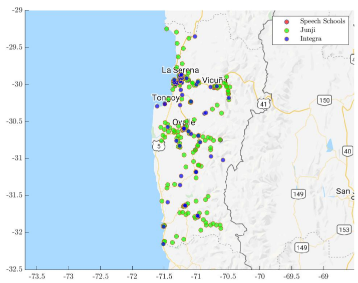


Figure 2: O'Higgins Region - JUNJI/Integra

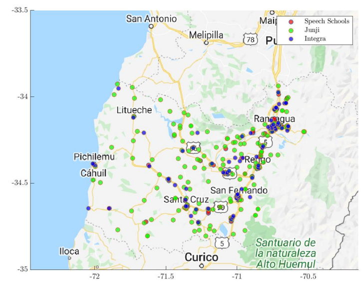


Figure 3: Coquimbo Region - PIE

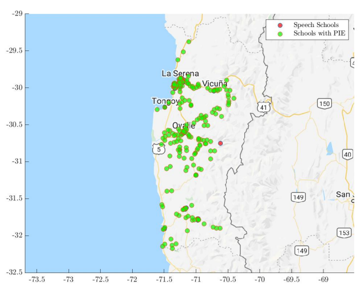
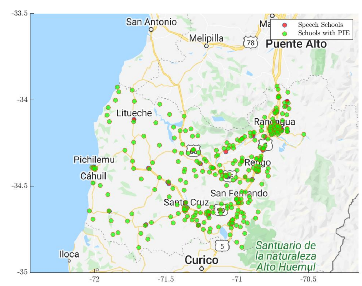


Figure 4: O'Higgins Region - PIE



4.2 Regular Coverage and observable characteristics

We use the enrollment data and the Survey CASEN 2017 to create a regular educational system coverage index by counting the number of students attended by day care (JUNJI and Integra) and dividing by total population in that cohort[11]. This index measures the level of competition in each district and we test whether Speech Schools position themselves where there is low coverage by the regular educational system. This would provide evidence that Speech Schools are profit maximizing firms and low coverage indicates a higher demand for their services. Additionally, characteristics at district level comes from data from national surveys to account for factors such as poverty, number of households eligible for SEP subsidy, healthcare etc.

4.3 Exposure Index

As mentioned before, the main barrier for studying how Speech Schools alter individual outcomes such as attendance or passing grade is the endogeneity behind the choice to attend a Special School. Students who enroll in Speech Schools can differ in unobservables with students who enroll in the regular system, making the latter an inadequate counterfactual. In order to reduce this bias, we implement an instrumental variable

[11] Population projections Survey CASEN 2017

approach with exposure to Speech Schools as an instrument for the probability of attending these schools. This index is created by generating the number of Speech Schools within a 2 km radius of the subsample of students in pre-primary education in 2017. In this manner, we can distinguish students within the same cohort that applied and enrolled in the regular educational system with and without exposure to at least 1 Speech School within a 2km radius, from students who applied but enrolled in a Speech School with and without exposure to a Speech School within a 2 km radius. This allows us to run a first stage with exposure as an instrument for attending a Speech School and reduce the problem of endogeneity.

5 Conceptual Framework: Strategic Positioning

Formally, we can model the decision of For-Profit and Non-Profit suppliers in the following way: The demand function can be considered the amount of students that each supplier serves with a regulated price (fixed subsidy amount per student).

$$D = f(Q, \theta) \tag{1}$$

Where Q is considered the quality offered by each Speech School, considering the overall care and additional services that each supplier provides, θ is a parameter that measures the competition level in the market. A higher coverage of JUNJI-Integra increases θ and affects the number of students that Speech Schools can receive. In this manner:

1. $\frac{\partial f}{\partial Q} \geq 0$ A higher quality level is associated with a higher demand (attract more students per Speech School)

2. $\frac{\partial f}{\partial \theta} \leq 0$ A higher level of competition is associated with less demand (attract less students per Speech School)

3. $\frac{\partial^2 f}{\partial Q \partial \theta} \geq 0$ If there is a higher level of competition, suppliers must compete with more quality in order to attract more students.

For Profit suppliers will maximize:

$$\max_{Q} f(Q, \theta)(p - c) - F_p - k(Q) \qquad\qquad F_p \sim \mathcal{N}(\mu_p, \sigma^2) \tag{2}$$

where p is the subsidy received per student by each Speech School, c is the cost associated with serving a student with SEN, including additional resources and time invested. F_p are fixed cost associated with investing in a Speech School and *k(Q)* are the costs of providing quality. If we consider F_p to be a random variable which includes finance and opportunity costs of each supplier then we can assume that this variable distributes with mean μ and variance σ^2 [12]. These suppliers invest Q^* in order to maximize profits, therefore invest in quality until $F_p \leq f(Q^*, \theta)(p-c)k(Q)$

Non Profit suppliers will maximize:

$$\max_Q Q \qquad \text{sa} \qquad f(Q,\theta)(p-c) - F_{np} - k(Q) \geq 0 \qquad\qquad F_{np} \sim \mathcal{N}(\mu_{np}, \sigma^2) \tag{3}$$

The main difference between these two types of suppliers is that non-profit suppliers aren't profit maximizers, therefore they will invest in quality Q^{**} as long as total revenue is positive. Also, an important assumption in this model is that $\mu_p > \mu_{np}$, which is consistent with the idea that for profit suppliers have a higher opportunity cost than non profit suppliers[13].

The fundamental aspect of this model is that an increase in θ reduces the demand in both types of suppliers. Yet, as the condition of investment is more demanding in for-profit suppliers, the decrease in investment is higher for for-profit suppliers, which suggests that they have a greater elastic response to changes in competition.

For simplification, let's assume our demand function and the cost of investing Q is the following:

$$f(Q,\theta) = a - \theta(1-Q) \qquad\qquad k(Q) = \frac{\lambda Q^2}{2} \qquad\qquad Q \in (0,1)$$

Which complies with our initial proposition,

1. $\frac{\partial f}{\partial Q} = \theta \geq 0$

2. $\frac{\partial f}{\partial \theta} = -1 + Q \leq 0$

3. $\frac{\partial^2 f}{\partial Q \partial \theta} = 1 \geq 0$

[12] We consider each supplier to face with different probability the different finance and opportunity costs

[13] For profit can invest in alternative businesses while non profit are more limited in what they invest their funds

Maximization for for-profit suppliers will result in Q^* equal to

$$Q^* = \frac{\theta(p-c)}{\lambda}$$

For-profit suppliers will invest if

$$F_p \leq (a-\theta)(p-c) + \frac{\theta^2(p-c)^2}{2\lambda}$$

Maximization for non-profit suppliers will result in Q^{**} equal to

$$Q^{**} = \frac{2\theta(p-c) + \sqrt{4\theta^2(p-c)^2 - 8\lambda(F_{np} + \theta(p-c) - a(p-c))}}{2\lambda}$$

Where the condition to invest is

$$F_{np} = (a-\theta)(p-c) + \frac{\theta^2(p-c)^2}{2\lambda} = F_p = F^*$$

Changes in θ decreases the residual demand each supplier faces, which is compensated with higher levels of investment in Q. This higher investment is costly for suppliers in $k(Q)$. Formally,

$$\frac{\partial\pi}{\partial\theta} = -(1 - \frac{\theta(p-c)}{\lambda})(p-c) < 0$$

As seen in Figure 3, suppliers will enter if costs are less than F^*. In Figure 4 we observe that a higher level of competition (θ) reduces de condition for both non profit and for profit suppliers, reducing the suppliers that will invest in Speech Schools. This decrease is bigger for for-profit suppliers rather than non-profit suppliers, consistent with the theory that for profit suppliers respond more to changes in competition than non profit suppliers since they are interested in maximizing profits and not only having non-negative profits.

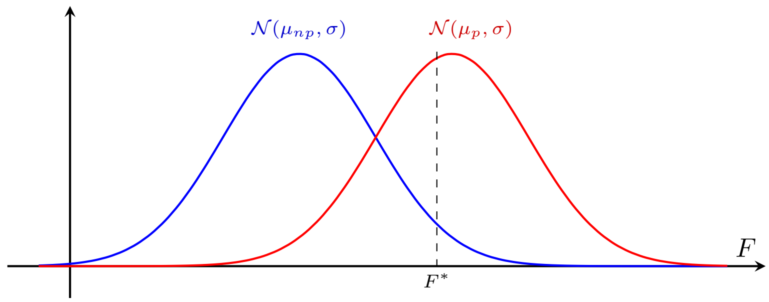


Figure 5: Distribution with F^*

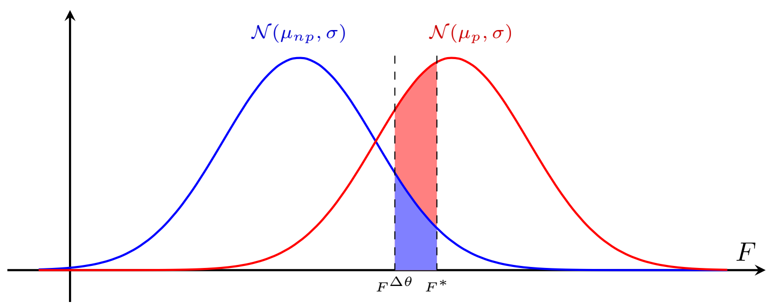


Figure 6: Distribution with $\Delta\theta$

6 Identification

6.1 Empirical Strategy for Strategic Positioning of Speech Schools

The first part of this study relates to possible perverse incentives manipulating the creation of Speech Schools. The main hypothesis is that private suppliers of Special Education in Chile (considered voucher schools) behave as profit maximizers while public suppliers (or private corporations/foundations) provide the necessary resources to students as an "altruistic" act. The higher relative subsidy (Figure 9) and less regulation associated with Special Education (in comparison to highly regulated PIE program in the regular system) grants providers of education an opportunity to arbitrage in the Special Education Market. Over 95% of suppliers of Speech Schools in Chile are private suppliers [14] and Figure 12 illustrates how the number of Speech Schools has risen by type of provider, where municipal schools have maintained a relatively constant growth over the years while voucher schools have grown rather exponentially since 2004. This provides suggestive evidence that supports the model mentioned before where private suppliers take advantage of the higher subsidy and create Speech Schools accordingly.

As shown in Figure 11, the main market for Speech Schools is *Medio Mayor* (Middle Level Nursery) where

[14] In 2004 it was 96.59% and in 2019, this figure rose to 98.77%

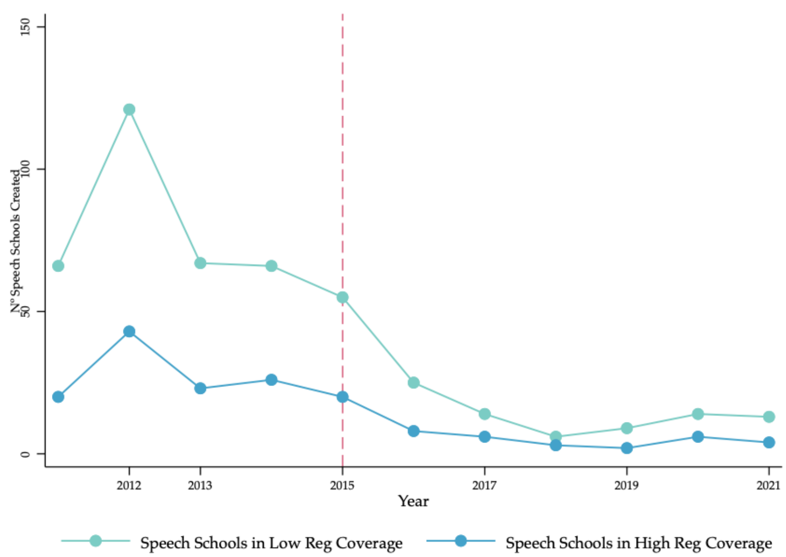
it consists of approximately 40% of total enrollment. In comparison with Pre-Kindergarten and Kindergarten where it falls to approximately 15% - 20% of total enrollment. It is worth mentioning that the competition changes in Middle Level and Pre-Kindergarten. In the former, school providers compete with other public nursery schools (JUNJI and Integra) which receive funds from the government and private sources, in the latter, suppliers of Speech Schools compete with the regular system which receives the base education subsidy plus an additional amount if the student is part of the PIE program. Focusing on Middle Level Nursery, and following classic spatial economic models, we would expect private suppliers of Speech Schools to position themselves in districts where the competition is lower and therefore, there is a higher market to explode. Additionally, we can think of a speech impairment diagnosis to be correlated with lower socioeconomic status. In this manner, Speech Schools providers would also consider poverty at district level as a relevant factor when deciding to create a new school in the area.

As shown previously in Figure 1, urbanization is also a relevant factor for suppliers when deciding whether to create a new school or not. We would expect rural areas to have less supply of Speech Schools as the number of students available could be served by a very few number of schools.

In an effort to test whether this hypothesis holds up, we use the Policy Nº 20,485 implemented in 2015 where schools that received funds from the government were restricted from generating profits from enrollment. (See Section 3.4). We argue the relevance of this policy change as it occurred in a context of increased political pressures regarding school profits in the public realm and no other legislation pertinent to school subsidies was passed during this period. Figure 10 shows the tendencies in creation and destruction of Speech Schools since 2004, where the creation of schools posterior to 2015 falls below the schools destroyed. We divide our sample of schools according to the coverage of regular education, where districts with high (low) coverage are considered those above (below) the median of the distribution. Figure 7 provides evidence of parallel trends in districts before and after 2015, where districts with a higher (lower) regular system coverage (high (low) proportion of children were served by JUNJI and Integra) had lower (higher) number of Speech Schools created, and this difference is significantly different from zero. In particular, the average creation of schools for high coverage districts before 2015 was 28, while for low coverage districts the average was 80 schools created per year (difference of 52 Speech Schools created per year). This is consistent with the proposition stated previously where districts with low regular coverage provide a higher incentive for the creation of Speech Schools given that these districts have a higher proportion of residual students to serve as "customers". Posterior to 2015, the difference in creation of Speech Schools between high and low coverage districts gets reduced - with an average creation of 4.8 schools per year for high coverage district and 13.5 schools for low coverage districts (difference of 8.7 Speech Schools created per year). These results provide evidence that suppliers of Special Education engaged in strategic behavior to maximize profits before 2015; yet, after the policy came into effect, incentives to create schools were minimized.

Furthermore, Table 12 provides further evidence that 2015 altered the strategic behavior of private Speech Schools suppliers. In the Chilean context, these agents can be separated into non-profit organization (Corporations and NGOs) or for-profit organizations (Societies, LTDA, EIRL, SA). Those considered for profit have the objective of generating wealth in order to distribute profits to their members, while non-profit organizations have tax credits but can only use the earnings to re-invest in the organization. Before the policy came into effect, the greater part of Speech Schools suppliers were for-profit entities; after the policy, the amount of non-profit organizations grew and became the dominant structure. The change in legislative administration is indicative that suppliers before 2015 preferred a structure where they could distribute profits between its members, while after 2015, preferred to take advantage of the tax breaks of non-profit organizations.

Figure 7: Trends in the Creation of Speech Schools



Formalizing this framework in order to test for effects on creation of Speech Schools, we consider the following regression model:

$$Creation_{i,t} = \beta_0 + \beta_1 RegularCoverage_{i,t} + \beta_2 PostLaw + \beta_3 RegularCoverage_{i,t} * PostLaw \\ + \beta_3 BeneficiarySEP_{i,t} + \beta_4 Rural_{i,t} + \delta + \varepsilon_{i,t} \tag{4}$$

Where $Creation_{i,t}$ is a binary variable equal to 1 if district i in year t had a new Speech School built. $RegularCoverage_{i,t}$ is an index created from the sum of enrollment in regular day care (JUNJI and Integra) divided by the total population of 3 years old in district i in year t. $PostLaw$ is a binary variable equal to 1 if the observation corresponds to years following 2015. $BeneficiarySEP_{i,t}$ measures the amount of beneficiaries of the SEP subsidy and δ are year fixed effects[15]. The coefficient β_3 considers an interaction term that exploits the change in public policy, in order to study how regular coverage estimates change.

6.2 Individual Outcomes

The other main focus of this research aims to study outcomes at the individual level of having attended Speech Schools. In this manner, we are able to center the argument for public policy implications and define whether over-diagnosis and excess supply of Speech Schools is beneficial for students on a range of academic outcomes. If the evidence suggests that enrolling in a Speech School yields positive results then implications for policy makers consist of balancing the monetary cost with the academic benefits in order to reach an equilibrium - yet, the excess supply of Speech Schools (in comparison with international standards) is not a first order concern as no harm is being placed on students. However, if results yield negative effects of attending Speech Schools then, policy makers should address the excess supply and high enrollment rates of Speech Schools given that it is damaging to students' academic careers.

Following Urzua (2013), we consider the following model to estimate the impact of attending a Speech School on individual outcomes:

$$Y_i = \alpha_i + \delta SP_i + \beta X_i + \gamma + \varepsilon_i \tag{5}$$

Where Y_i corresponds to individual outcomes such as final grade, school attendance, failure to pass grade, if individual i changed schools; SP_i corresponds to a binary variable which indicates if the student i

[15] We included a measure of poverty at district level for each year, yet initial results suggested this component was not significant so for simplicity, we omit this variable from our analysis

attended a Speech School; X_i is a vector with individual characteristics such as SCE status, gender, rural, high academic achievement, γ are district fixed effects and ε_i is the error term. Within this context, δ is the coefficient of interest for our analysis.

As mentioned earlier, the challenge in the direct comparison of students who enrolled in a Special School with students who entered the regular education system are possible differences in unobservables that may affect outcomes through alternative channels. In this manner, the decision whether to attend a Speech School is not exogenous and may be correlated with the error term. It is reasonable to believe that students in Special Schools have difficulties that affect learning outcomes, not necessarily as a result of enrolling in a Speech School; yielding inconsistent estimators of equation 2 when using OLS. To control for this source of endogeneity and following research on information interventions by Allende et al (2021), we use the exposure to Speech Schools in a 2 km radius during 2017 as an instrument for the probability of attending a Speech School in 2017. The justification behind this instrument is that the exposure to Speech Schools in a 2km radius affects the probability of attending a Speech School, yet it does not affect individual outcomes such as school attendance or school grades.

An obstacle to our identification strategy is that we observe parents' location from the centralized school admission process, which offers location with an error term. We provide an estimator of exposure with alternate radius (1, 3 and 4km) to see if the probability of attending a Speech School is still significant. Additionally, we can consider that our sample consists of a subset of the population of students enrolled in regular or special education. We omit students who didn't apply in the admission process such as children who remained in Speech Schools in Kindergarten or students who applied to Pre-K or Kindergarten during 2016. We argue that since students in Speech Schools must apply to the regular system for 1st grade, we still obtain consistent estimators.

Table 1 presents the first stage estimates with the probability of attending a Speech School over the exposure to Speech Schools in 1, 2, 3 and 4 km radius. Coherent with our initial assumption, we observe that the probability of attending a Speech School increases with the radius, as more families are considered exposed when expanding the radius from 1km to 4 km. Despite worries about the error term in the location of students, the coefficients are still significant and positive for the probability of being enrolled in these schools, regardless of increasing the radius to twice the distance used in this study. Specifically, students exposed to Speech Schools in a 2km radius are 12 percentage points more likely to be enrolled in these schools than students not exposed. To test for weak instruments, we use the Stock-Yogo weak ID test with F statistic 256.10 and reject the null hypothesis that our equation is weakly identified.

Table 1: First Stage with Exposure Instrument

	(1) Enrollment SP	(2) Enrollment SP	(3) Enrollment SP	(4) Enrollment SP
Exposure 1km	0.0674*** (0.00542)			
Exposure 2km		0.120*** (0.00657)		
Exposure 3km			0.144*** (0.00673)	
Exposure 4km				0.143*** (0.00675)
Region FE	Yes	Yes	Yes	Yes
Observations	48,158	48,158	48,158	48,158

Roust standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.010

7 Results

7.1 Strategic Positioning

We begin by analyzing the effect of regular education system coverage on probability of creating a Speech School in district i in year t. Table 2 shows the results from two regression models without interaction and one with interaction. Column (1) estimates a normal regression, column (2) uses a Logit model and column (3) uses an interaction term to exploit the change in public policy. From columns (1) and (2) we can observe that all coefficient present corresponding sign and significance level. For the OLS model, going from a low coverage district (bottom 25th percentile) to a high coverage district (top 75th percentile) decreases the probability of creating a Speech School by 0.0161 (approximately 1.6%), while for the Logit model, going from low to high coverage district decreases the probability of creating a Speech School by 0.525 (approximately 52.5%)[16]. These results are consistent with the theory that Speech School suppliers are profit maximizers and therefore, choose location depending on expected revenue. Moreover, districts with more students considered as SEP beneficiaries are more likely to create Speech Schools, which we argue is due to the fact that SEP is a proxy for socio-economic status of a district. Similarly, district rural index is negatively correlated with the creation

[16] Calculated as the difference in coverage between top 75th and bottom 25th percentile times the regression coefficient

of Speech Schools, in line with Figures 1 where these schools choose urban locations. When analyzing the effect per year, we notice a change in significance level for years after 2015 - where years following the reform in public policy negatively affect the probability of creating a new school, significant at the 1% level. These coefficients suggest that by banning profits in the public education system, suppliers of Speech Schools have less incentives to create new schools. In particular, under OLS, the year 2016 decreased in 12.2 percentage point the probability of creating a Speech School. While for the Logit model, 2016 decreases the probability of creating a school by 1.6 percentage points approximately. This effect is larger than the coefficient for coverage, providing evidence suggestive that the change in policy regarding profits has a greater effect on the creation of Speech Schools.

Column (3) presents the results from estimating equation (1), with a difference-in-difference approach that uses the change in public policy as an exogenous variation in the decision to create new Speech Schools. Similar to previous results, the coefficient for regular coverage is negative and significant where going from a low coverage district (bottom 25th percentile) to a high coverage district (top 75th percentile) decreases the probability of creating a Speech School by 0.0615 (approximately 6.15%). In a similar manner, the estimator for the variable $PostLaw$ indicates that years after 2015 decreased the probability of creating a new school in 31.2 percentage points. However, the coefficient for the interaction between coverage and timing is positive, which suggests that after 2015, the probability of creating a Speech School increases. The total effect for regular coverage is $\beta_1 + \beta_3 = 0.00064$, which is very close to zero and provides evidence that the policy was successful in reducing incentives to create Speech Schools.

Table 2: Logit and OLS estimates

	(1) OLS	(2) Logit	(3) Interaction
Regular Coverage	-0.000414***	-0.0135***	-0.00158***
	(0.000126)	(0.00216)	(0.000170)
Beneficiary SEP	0.0000118***	0.000119***	0.0000153***
	(0.00000152)	(0.0000119)	(0.00000144)
Rural Index	-0.00121***	-0.0141***	-0.000833***
	(0.000239)	(0.00259)	(0.000185)
Post Law			-0.312***
			(0.0279)
Coverage x Post Law			0.00222***
			(0.000197)
2012	0.0937***	0.623***	
	(0.0268)	(0.196)	
2013	-0.00799	-0.149	
	(0.0269)	(0.212)	
2014	-0.00914	-0.161	
	(0.0265)	(0.214)	
2015	-0.0340	-0.371	
	(0.0259)	(0.227)	
2016	-0.122***	-1.595***	
	(0.0248)	(0.292)	
2017	-0.157***	-2.212***	
	(0.0235)	(0.345)	
2018	-0.191***	-3.393***	
	(0.0234)	(0.527)	
2019	-0.185***	-3.130***	
	(0.0251)	(0.510)	
2020	-0.167***	-2.492***	
	(0.0226)	(0.390)	
Year FE			Yes
Observations	3,199	3,199	3,199

Robust standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.010

7.2 *Individual Outcomes*

Next, we analyze the effects on individual outcomes of attending a Speech School. Table 3 shows the results on individual level outcomes from an instrumental variable approach. Column (5) presents the first stage regression, similar to the results on Table 1, using only *Exposure 2km* as instrument. Consistent with previous results, the exposure to Speech Schools increases the probability of attending a Speech School in 10.2 percentage points. When analyzing individual level outcomes, we use results for 2021 to assure that all students report an academic outcome. Column (1) shows that enrollment in a Speech School during 2017 represents a fall in grade point average in 0.5 points approximately, while student's low Socio-Economic Status (SES) decreases the grade point average in 0.2 points approximately. Column (2) uses attendance reported in 2021 as an outcome variable, where the enrollment in Speech School in 2017 results in a drop in attendance in 9.56 percentage points and low SES results in a drop of 1.6 percentage point. Column (3) uses a binary variable if the student failed to pass their grade in 2021, indicating that students from Speech Schools are more likely to fail their grade[17]. Column (4) shows the last individual outcome variable in our analysis, with a binary variable indicating whether the student changed schools since entering the regular school system. We can observe that attending a Speech School in 2017 increases the probability of changing schools in a 4 year span in 35 percentage points.

Additionally, it is worth noting that in each specification, the Cragg-Donald Wald F statistic for weak identification, which tests whether the instruments have explanatory power in defining the endogenous variable, is higher than the Stock-Yogo weak ID test critical values at the 10% level. This means that we are able to reject the null hypothesis that the equation is weakly identified.

[17]This coefficient is close to zero, consistent with government policy during pandemic where students were less likely to fail their grade

Table 3: IV Regression for Individual Outcomes

	(1) GPA 2021	(2) Attendance 2021	(3) Fail grade 2021	(4) Change Schools	(5) Enrollment SP
Enrollment SP	-0.472***	-9.563***	0.0465***	0.349***	
	(0.0596)	(1.303)	(0.0101)	(0.0438)	
Low SES	-0.242***	-1.614***	0.0137***	-0.0447***	0.0138***
	(0.00405)	(0.0885)	(0.000685)	(0.00297)	(0.00261)
Female	0.00858	-0.543***	-0.0000121	0.0568***	-0.0830***
	(0.00635)	(0.139)	(0.00107)	(0.00465)	(0.00259)
Exposure 2km					0.102***
					(0.00397)
Region FE	Yes	Yes	Yes	Yes	Yes
Observations	139,282	139,282	141,098	141,098	139,282
Underidentification	658.0	658.0	661.8	661.8	
Weak identification	661.1	661.1	664.8	664.8	

Standard errors in parentheses

* $p<0.10$, ** $p<0.05$, *** $p<0.010$

8 Mechanisms

In this section we aim to provide potential mechanisms that explain how attending a Speech School can have negative effects on individual outcomes. As mentioned previously, the higher relative subsidy for Special Education in Chile creates a perverse incentive to over diagnose the number of students with SEN. In particular, students who don't require a Special School yet enroll in a Speech School can be adversely affected if they aren't pushed to their full capacity in Speech Schools or if the focus of speech impairment distracts from student learning in other areas. If this is the case, then students entering the regular education system would be behind their peers in learning outcomes, consistent with our results. Similarly, following literature on the inclusion of students, those who have a speech impairment and attend a Special School may fall behind their peers if being excluded alters the learning outcomes and the potential for each student.

Besides the quality of the schools, we argue that a mechanism by which Speech Schools can induce negative effects on students is in the probability of applying late to the regular educational system. One concern with Speech Schools in the Chilean context is that students are more likely to remain in exclusive education, applying to the regular system in later years. Within the centralized admission system, the probability of being assigned to the top choice depends mainly on the amount of slots available in each school. In this particular setting, as an entry grade level, applying in Pre-K grants students the highest probability of being assigned to their top choice. Similarly, schools with high academic performance and low cost have a larger amount of slots available in entry grades, therefore, applying late to the regular system diminishes the amount of open positions in these schools. From Table 4 we can observe that being enrolled in a Speech School reduces in 10 percentage points the probability of applying in Pre-K and this coefficient is significant at the 1% level, consistent with the theory that attending a Speech School can alter academic achievements through the timing the student applies to the regular system. This mechanism is particularly relevant since the timing of application can have long term effects if, due to applying late, a student enrolls in a lower quality school than they would have gone to if applying in Pre-K. Further empirical investigation should focus on studying the long-term impacts of the timing of application. Following this idea, Table 14 shows that conditional on timing, students from Speech Schools are less likely to apply to *good* schools (considered as High or Medium academic performance and Free) as a first preference. This would indicate that individual outcomes at student level from enrolling in a Speech School is not solely due to incentives to apply later to the regular educational system, but also from the application in itself. Considering that almost all applicants (98%) in our sample apply to at least 2 schools, we extend our analysis to consider the average of the first two preferences. Similar to previous results, Table 15 shows that conditional on applying in Pre-K, being enrolled in a Speech School reduces the probability of having a Free and High-Med school in the top two preferences, yet this coefficient is not significantly different from zero. This would suggest that attending a Speech School has an effect on the first preference school in the application process, but this effect is reduced as parents apply to more schools, indicating that this mechanism is only relevant for the first choice in the admission process.

Table 4: IV Regression for Probability To Apply Pre-K

	(1)
	Applies in Pre-K
Enrollment SP	-0.100***
	(0.0293)
Low SES	-0.00517***
	(0.00196)
Female	0.0214***
	(0.00310)
Region FE	Yes
Observations	141,098
Underidentification	702.1
Weak identification	725.1

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.010

9 Conclusion

In this research we present a model and evidence supporting our theory that Speech School suppliers behave as profit maximizers, choosing locations where expected profits are highest - correspondent to districts with low regular education coverage. In this manner, higher competition between Speech Schools and regular education day cares (JUNJI and Integra) affects the investment decision of for-profit suppliers greater than non-profit suppliers. To test for this model, we use a reform in public policy introduced in 2015 which prohibited schools that received state funds to obtain profits from enrollment. We expect this law to shift the strategic behavior of suppliers, with creation of schools no longer strongly dependent on the competition level and a decrease in total number of schools built, since monetary incentives for for-profit suppliers were reduced. Our results are coherent with these beliefs, where preliminary regressions indicate that higher regular coverage reduced the likelihood of creating a new school, yet, the coefficient for years after the public policy are more indicative of the behavior of suppliers. Next, our regression model with the interaction between regular coverage and years following 2015 demonstrates that the total effect of regular education coverage gets reduced to approximately zero when the public policy came into effect.

Additionally, we use an instrumental variable approach to test individual academic outcomes from enrolling in a Speech School. This section is relevant for public policy makers as the decision to change legislations regarding Speech Schools differs depending on these results. If results are positive then reforms should be pursued for the purpose to increase the quality of these schools, and not necessarily respond to the high enrollment rates in Chile. Nonetheless, if results are negative, policy makers should respond accordingly and aim to reduce enrollment and number of Speech Schools available. We use the exposure of each student to Speech Schools in a 2km radius to control for the endogeneity in the decision to enroll in these schools, where first stage estimates show a significant and positive effect of exposure in probability of enrollment. Our results using an instrumental variable method suggests that enrolling in a Speech School lowered the Grade Point Average and attendance in 0.5 points and 9.56 percentage points respectively, while increased the probability of changing schools in 35 percentage points.

The mechanisms studied to explain the results on individual outcomes consists on the timing of application and the application itself. The coefficients from these regressions indicate that enrolling in a Speech School reduces the probability of applying early to the regular educational system and of applying to a High-Medium quality and Free school as first preference. This would suggest that students attending a Speech School can have long term effects due to the incentives in the application process.

These results are indicative of perverse incentives in the supply of Speech Schools and negative academic results from enrolling in these schools. Future research should focus on alternative identification strategies to study academic outcomes, providing separate methods to control for the endogeneity of enrolling in a Speech School.

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11 Appendix

Figure 8: Pre-Primary Classification

Funding	**Administration**	**Institutions that offer pre-primary education**
State	Public	Day care JUNJI: • Direct Administration • VTF municipal • VTF SLE • Alternative day care • Alternative programs
		Day care INTEGRA: • Agreement delegated administration municipal • Agreement delegated administration SLE • Alternative modalities
		Schools (continuity to primary education)
		Nursery schools
		Speech Schools
		Special education schools
	Private	Day care JUNJI • VTF private
		Day care INTEGRA • Direct Administration • Agreement delegated administration private
	Voucher Schools	Schools (continuity to primary education)
		Nursery schools
		Speech Schools
		Special education schools
Private	Private	Private Day Cares
		Schools (continuity to primary education)
		Nursery schools

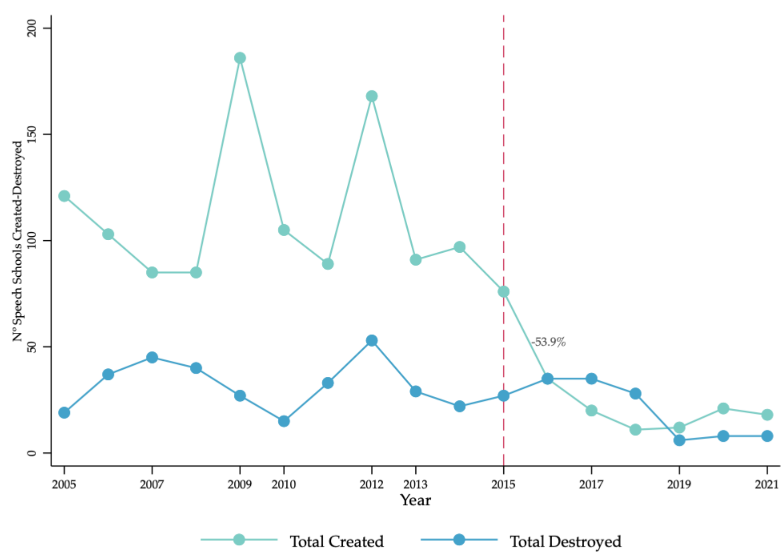
Source: Own elaboration from administrative data MINEDUC

Figure 9: Relative Subsidy

Level and type of education	With no full-day schooling	With full-day schooling
Pre-primary education (1st and 2nd transition levels)	1.131	1.369
Basic education		
Year 1 to Year 6	1	1.369
Year 7 and Year 8	1.085	1.373
Special education		
Permanent needs	3.196	4.028
Transitory needs	2.800	3.523
Upper secondary education		
Scientific-humanistic programmes	1.211	1.634
Technical-professional programmes		
Agriculture and maritime strands	1.794	2.213
Industrial strand	1.399	1.731
Commercial and technical strands	1.255	1.636

Source: OCDE Reviews of School Resources: Chile 2017

Figure 10: Creation-Destruction of Speech Schools



Source: Own elaboration from administrative data MINEDUC

Table 5: Enrollment Pre-Primary Special Education Speech Schools

Year	**Pre-Primary Special Education Total**	**Speech School Enrollment**	**Percentage**
2004	52.660	51.354	90,64%
2005	61.077	55.889	91,51%
2006	69.225	63.895	92,30%
2007	75.007	69.434	92,57%
2008	85.394	78.711	92,17%
2009	97.538	90.970	93,27%
2010	104.383	97.376	93,29%
2011	104.026	97.037	93,28%
2012	118.663	111.596	94,00%
2013	127.678	120.279	94,20%
2014	137.141	129.484	94,42%
2015	142.307	134.693	94,65%
2016	143,840	136.371	94,81%
2017	143.546	136.422	95,04%
2018	145.432	136.711	94,00%

Source: Own elaboration from administrative data MINEDUC

Table 6: Enrollment Special Education

Diagnosis	**1990**	**2001**	**2010**	**2018**	**Distribution of Enrollment 2018**
Hearing	1.146	1.100	734	109	0.07%
Mental	26.740	29.650	39.277	5.839	4.01%
Visual	333	494	389	142	0.097%
Speech	3.186	27.038	97.376	138.554	95.27%
Motor	341	486	596	135	0.093%
Autism	*	524	1.882	0	0.0%
Communication and Relation Alteration	*	*	*	552	0.38%
PIE	*	*	*	104	0.07%
Total	31.746	59.292	140.254	145.432	100.0%

Source: Own elaboration from administrative data MINEDUC

Table 7: Maule

District	Number Speech Schools	District	Number Speech Schools
Cauquenes	3	Pelarco	1
Chanco	1	Pencahue	1
Colbún	1	Rauco	1
Constitución	2	Retiro	3
Curepto	1	Romeral	1
Curicó	16	Sagrada Familia	3
Hualañé	1	San Clemente	5
Licantén	1	San Javier	5
Linares	7	San Rafael	1
Longaví	2	Talca	33
Maule	6	Teno	1
Molina	4	Villa Alegre	1
Parral	6		

Source: Own elaboration from administrative data MINEDUC

Table 8: Biobío

District	Number Speech Schools	District	Number Speech Schools
Arauco	5	Mulchén	5
Cabrero	4	Nacimiento	3
Cañete	2	Negrete	1
Chiguayante	7	Penco	5
Concepción	19	Quilaco	1
Coronel	21	Quilleco	1
Curanilahue	3	San Pedro de la Paz	18
Florida	2	San Rosendo	1
Hualpén	7	Santa Bárbara	1
Hualqui	4	Santa Juana	2
Laja	3	Talcahuano	11
Lebu	1	Tirúa	1
Los Álamos	1	Tomé	4
Los Ángeles	21	Tucapel	3
Lota	3	Yumbel	2

Source: Own elaboration from administrative data MINEDUC

Table 9: Owner Analysis

Owner	Owner of 1	Owner of 2	Owner of 3	Owner of 4	Owner of 5	Owner of 6+
2013	891 (78.57%)	183 (16.14%)	44 (3.88%)	6 (0.53%)	0 (0.00%)	10 (0.88%)
2014	947 (78.39%)	195 (16.14%)	44 (3.64%)	11 (0.91%)	0 (0.00%)	11 (0.91%)
2015	991 (78.46%)	191 (15.12%)	53 (4.20%)	15 (1.19%)	1 (0.08%)	12 (0.95%)
2016	987 (78.09%)	198 (15.66%)	46 (3.64%)	16 (1.27%)	4 (0.32%)	13 (1.03%)
2017	998 (79.59%)	184 (14.67%)	39 (3.11%)	15 (1.20%)	4 (0.32%)	14 (1.12%)
2018	1,033 (83.17%)	143 (11.51%)	40 (3.22%)	8 (0.64%)	4 (0.32%)	14 (1.13%)
2019	1,046 (83.68%)	139 (11.12%)	40 (3.20%)	3 (0.24%)	1 (0.08%)	21 (1.68%)
2020	1,058 (83.70%)	141 (11.16%)	40 (3.16%)	0 (0.00%)	5 (0.40%)	20 (1.58%)
2021	1,067 (83.82%)	141 (11.08%)	40 (3.14%)	0 (0.00%)	5 (0.39%)	20 (1.57%)

Source: Own elaboration from administrative data MINEDUC

Table 10: Special Education versus Regular Annual Subsidy 2015

Country/State	Special Education ($USD)	Primary Regular Education ($USD)
Chile	$11,258.80	$4,021
Austria	$42,953.69	$9,563
Portugal	$22,218.87	$7,258
Spain	$13,130.7	$6,956
Colombia	$2,488.80	$2,074

Source: OCDE Reviews of School Resources

Table 11: School Characteristics when transferring to Regular Education (2016)

	Transfer Pre-K	Transfer K	Transfer 1º grade
Average Attendance (%)	92.42	92.17	91.93
Average Attendance Passing Students (%)	92.71	92.49	92.33
Free (%)	55.98	56.59	61.87
Med-High (%)	72.66	68.62	58.04
SIMCE reading	266.58	263.99	258.67
SIMCE math	262.64	259.81	252.98
Students with Insufficient reading (%)	30.53	32.70	36.60
Students with Insufficient math (%)	33.76	36.13	41.59

Source: Own elaboration from administrative data MINEDUC

Table 12: For Profit and Non-For Profit

	Non For Profit	**For Profit**
2013	14	1120
2014	15	1193
2015	16	1247
2016	35	1229
2017	130	1124
2018	847	395
2019	1059	191
2020	1073	191
2021	1081	192

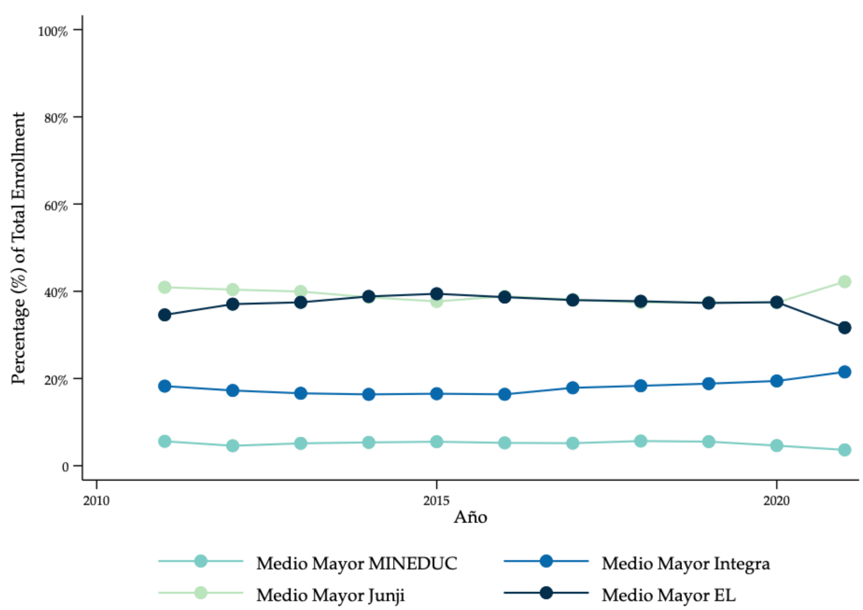
Source: Own elaboration from administrative data MINEDUC

Table 13: Distribution in Exposure Dataset 2017 Application

Exposure	**Final Enrollment**	**Total**
Has Exposure to Speech Schools	Speech School (Applied)	53,008
	Regular System	69,709
No Exposure to Speech Schools	Speech School (Applied)	5,888
	Regular System	12,493

Source: Own elaboration from administrative data MINEDUC

Figure 11: Percentage in middle level nursery by type of school



Source: Own elaboration from administrative data MINEDUC

Table 14: Application Outcomes for First Preference

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Monthly Cost	Academic Performance	Free & High-Med	Average Spanish Test Score (SIMCE)	Average Math Test Score (SIMCE)	Students Insufficient Spanish SIMCE (%)	Students Insufficient Math SIMCE (%)	Average Attendance (%)
Enrollment SP	3.186***	0.898***	-0.324**	47.06***	33.96***	-33.34***	-42.73***	-3.965***
	(0.460)	(0.210)	(0.158)	(7.315)	(7.847)	(5.386)	(7.008)	(0.913)
Low SES	-0.463***	-0.0442***	0.0932***	-3.437***	-4.100***	2.226***	2.936***	-0.338***
	(0.0298)	(0.0126)	(0.00898)	(0.440)	(0.444)	(0.323)	(0.419)	(0.0546)
Female	0.0145	0.0118	0.00765	0.758**	0.189	-0.746***	-0.452	-0.0737*
	(0.0237)	(0.00953)	(0.00667)	(0.336)	(0.330)	(0.245)	(0.318)	(0.0421)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	24,784	24,297	24,830	24,777	24,776	24,192	24,182	24,830
Underidentification	149.0	146.8	151.3	150.4	150.4	143.7	143.2	151.3
Weak identification	158.6	156.3	161.2	160.2	160.2	153.1	152.5	161.2

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.010

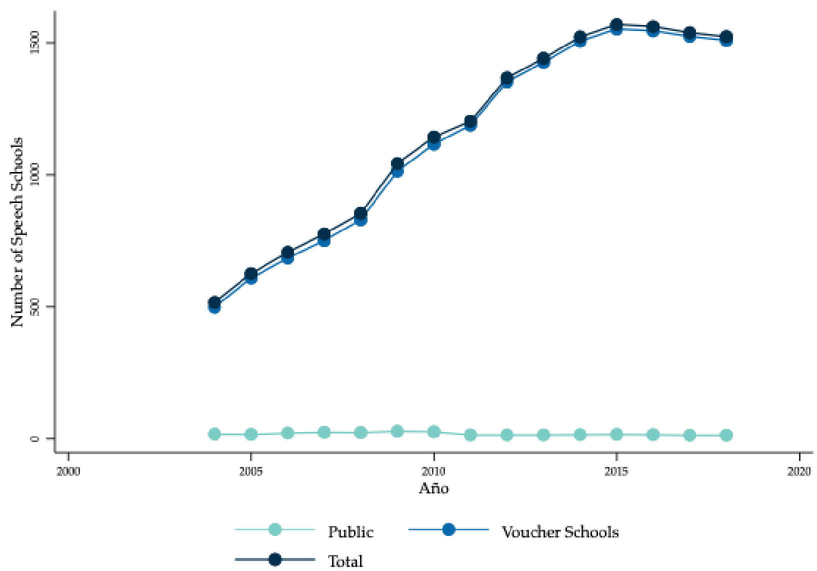
Table 15: Application Outcomes for Average Top 2 App

	(1) Monthly Cost	(2) Academic Performance	(3) Free & High-Med	(4) Average Spanish Test Score (SIMCE)	(5) Average Math Test Score (SIMCE)	(6) Students Insufficient Spanish SIMCE (%)	(7) Students Insufficient Math SIMCE (%)	(8) Average Attendance (%)
Enrollment SP	3.582***	1.334***	-0.145	38.26***	26.76***	-28.50***	-41.60***	-3.926***
	(0.491)	(0.228)	(0.147)	(6.809)	(7.012)	(5.081)	(6.511)	(0.860)
Low SES	-0.437***	-0.0171	0.0916***	-3.373***	-3.742***	2.185***	2.501***	-0.293***
	(0.0301)	(0.0132)	(0.00801)	(0.377)	(0.371)	(0.279)	(0.372)	(0.0489)
Female	0.0232	0.0183*	0.00541	0.653**	0.105	-0.702***	-0.494*	-0.0722**
	(0.0235)	(0.0100)	(0.00591)	(0.278)	(0.267)	(0.206)	(0.280)	(0.0367)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25,390	25,212	25,401	25,383	25,384	25,064	25,062	25,401
Underidentification	125.5	125.3	125.6	125.0	124.9	122.2	122.3	125.6
Weak identification	132.5	132.3	132.6	132.0	131.9	129.1	129.1	132.6

Standard errors in parentheses

* $p<0.10$, ** $p<0.05$, *** $p<0.010$

Figure 12: Number of Schools by Dependency



Source: Own elaboration from administrative data MINEDUC

Figure 13: Students diagnosed with SEN of total Pre-primary enrollment

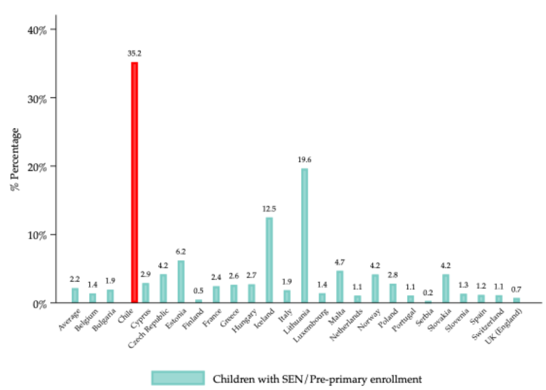
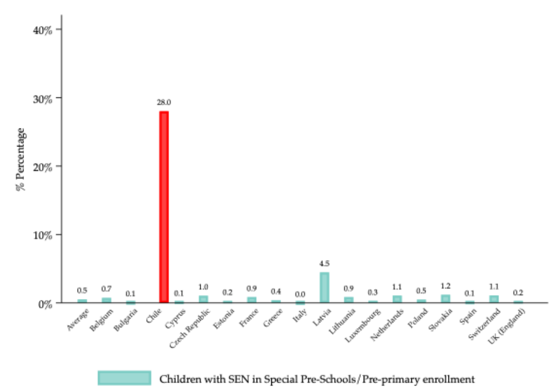


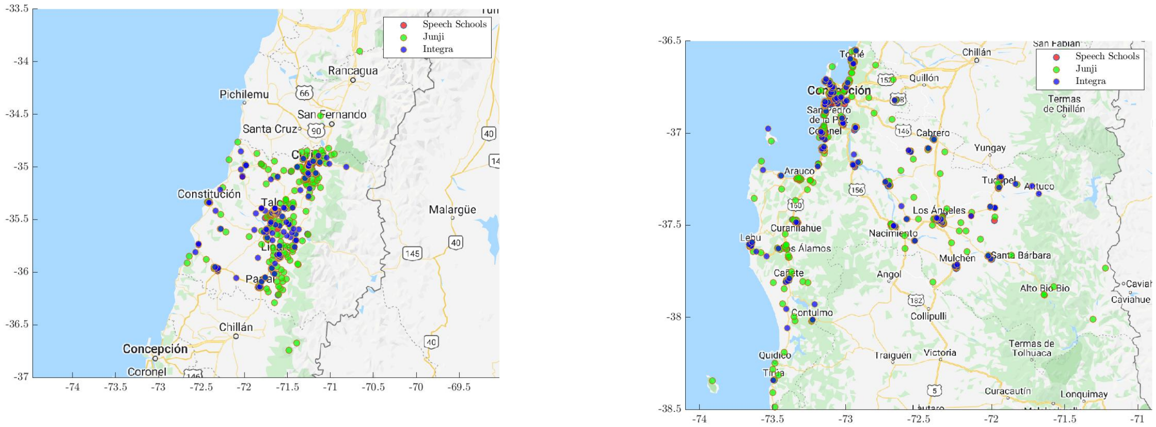
Figure 14: SEN students in Special Schools of total Pre-primary enrollment



Source:

European Agency Statistics on Inclusive Education (EASIE)

Figure 15: Demographic variation region del Maule and region Biobío



Source: Own elaboration from administrative data MINEDUC