The Educational PPP: Parents, Peers, Prices

Juan Pal (TSE) Joaquin Varvasino (UPF)

This version: June 20th, 2025

Abstract

This paper studies the roles of financial constraints and information frictions on enrollment and progression in higher education. We use Chilean administrative data, allowing us to link students to their parents and their high school peers. Our empirical strategy exploits the massive entry of private universities during the 1980s to instrument parental educational achievement, panel data methods to estimate peer influence, and the staggered rollout of Free College from 2016 that generated exogenous variation to out-of-pocket fees. Results show that subsidies increase university access, peers enhance enrollment and match quality, and parental exposure to university causally affects children's university enrollment. We use these findings to inform a dynamic structural model that quantifies these mechanisms and evaluates equity-oriented education policies.

Keywords: Chile, higher education, older peer, social background, informational environment

1 Introduction

Educational attainment is a key driver of economic growth (Krueger and Lindahl, 2001; Benos and Zotou, 2014) and social mobility (Zimmerman, 2019; Mountjoy, 2022). Nevertheless, individuals from disadvantaged socioeconomic backgrounds remain significantly less likely to enroll in university, even when they perform as well academically as their more advantaged peers Chetty et al. (2014). Instead, they disproportionately sort into Short-Cycle Programs (SCPs)[1] or forgo higher education altogether.

These three post-secondary pathways (university, SCPs, and non-enrollment) differ substantially in duration, cost, expected returns, and long-term opportunities. Understanding why students sort into programs based on their socioeconomic status requires disentangling the relative influence of multiple mechanisms. The first one is financial constraint: out-of-pocket costs for university can be prohibitively high relative to short-cycle alternatives. The second is the information environment: students may rely heavily on signals and advice from parents and peers, who themselves may lack accurate or complete information about educational options and returns. The third one is match quality: individual preferences and perceived or actual abilities likely play a central role in shaping the choice of educational track.

This paper aims to decompose the mechanisms driving post-secondary educational choices. First, we identify the main determinants behind the decision to enroll in university, short-cycle programs, or to forgo higher education entirely. Disentangling the relative importance of financial constraints, information frictions, and student-program match quality is essential for designing effective policy responses—ranging from tuition subsidies and student loans to informational interventions and reforms targeting school segregation. Second, we seek to examine how these mechanisms shape students' dynamic behavior over time. For instance, prior beliefs —often shaped by peers and parental background— may influence how students update their expectations following academic signals such as grades, potentially resulting in more volatile educational trajectories.

The structural model created for this paper analyzes students' educational decisions as a two-stage dynamic process involving both enrollment and academic progression. Initially, students choose among available college programs by maximizing expected utility based on program attributes (such as tuition costs, quality, location, parents and peer information, among others) and student-specific characteristics. This choice is governed by a discrete choice framework where the utility incorporates both observed and unobserved heterogeneity.

[1] SCPs typically span two to four years and emphasize occupation-specific skills, offering a faster and more affordable route into the labor market. e.g: nursery, electrician, etc.

Once enrolled, students receive signals about their unobserved academic ability through their grades, which allows them to update their beliefs using Bayesian learning. These updated beliefs affect their continuation decision which is whether to remain enrolled, switch, or drop out. A key feature of this model is allowing the prior belief about ability to vary by student type [2].

The setting of this paper focuses on the Chilean higher education system during the period from 2013 to 2019. This period includes the phased implementation of the "Gratuidad" policy, which progressively extended tuition-free college to students from lower-income households, significantly altering the relative costs of degree programs. To calibrate the model, we will leverage on detailed administrative data covering students' applications, enrollment decisions, academic records, and demographic characteristics.

First, we study the impact of out-of-pocket fees by leveraging the Gratuidad policy. The evidence suggests that both absolute and relative prices play a significant role in shaping enrollment decisions. On one hand, many disadvantaged students enter university only when it becomes financially accessible, revealing that affordability is a binding constraint. On the other hand, we find substitution effects: some students enroll in university simply because it becomes cheaper than SCPs, highlighting the role of relative price distortions in educational choices.

Second, we explore peer effects in the enrollment decision. Using a school-year fixed effects strategy, we find that students are more likely to enroll in higher education when older peers from the same school cohort have recently done so. This increase in enrollment is observed for both universities and SCPs, and importantly, it is not associated with negative academic outcomes. On the contrary, students influenced by peers are less likely to drop out and do not exhibit higher rates of switching programs, suggesting that these peer effects operate through mechanisms of information transmission or confidence-building rather than misguided imitation.

Finally, we examine the intergenerational effects of higher education expansion by exploiting an instrumental variable strategy based on the geographic distribution of new universities created in the 1980s. The findings reveal a causal impact of parental exposure to higher education opportunities on the educational choices of their children. Specifically, students whose parents had access to newly established universities are more likely to enroll in university themselves and less likely to choose SCPs. This suggests a persistent transmission of educational aspirations and expectations, shaped by the institutional environment available to the previous generation.

Motivated by our results, we build a structural model of higher education enrollment,

[2] Recent work that model the belief updating process of students assume a common prior (Larroucau and Rios, 2022)

progression and completion. By embedding these insights into a unified model, we aim to quantify the relative importance of each mechanism and simulate counterfactual policy scenarios.

We contribute to the literature on the determinants of higher education enrollment (Arcidiacono, 2004; Altonji et al., 2012; Wiswall and Zafar, 2015; Altonji et al., 2016; Delavande and Zafar, 2019). Prior research has examined the role of social interactions, focusing on the influence of peers and parents on students' educational choices (Barrios-Fernández, 2022; Barrios Fernández et al., 2024; Gazmuri and Prager, 2024; Estrada et al., 2025), while other studies have analyzed the impact of financial aid and scholarship programs on enrollment outcomes (Denning, 2017; Bucarey et al., 2020; Londoño-Vélez et al., 2020). This paper represents a first attempt to integrate multiple mechanisms into a unified structural framework. Upon estimating and calibrating the model, we could simulate a series of counterfactual policy interventions, thereby contributing to the literature on education policy. In particular, we engage with ongoing debates around voucher systems and school funding reforms (Dinerstein and Smith, 2021), affirmative action policies (Otero et al., 2021), subsidized student loans (Denning et al., 2019; Epple et al., 2006; Azmat and Simion, 2021), the role of standardized testing, and the effects of earnings disclosure (Hastings et al., 2015). Our central contribution lies in decomposing the role of students' information sets at both the extensive margin (e.g., enrollment decisions) and the intensive margin (e.g., program switching and dropout behavior).

The structure of the paper is as follows. Chapter 2 presents the institutional context of Chile and provides an overview of the higher education system. Chapter 3 describes the data sources and key variables used in the analysis. Chapter 4 examines the reduced-form evidence, focusing on the role of out-of-pocket costs, older peer effects, and parental influences. In Chapter 5, we introduce and outline the structural model that guides our counterfactual analysis. Finally, Chapter 6 concludes.

2 Institutional Setting: Chile Higher Education System

The college admissions process in Chile operates under a semicentralized structure. The most selective institutions participate in a centralized system, while the remaining universities conduct their admissions independently. This paper focuses on the centralized system, known as the Sistema Único de Admisión (SUA).

The centralized admissions process is administered by the Consejo de Rectores de las Universidades Chilenas (CRUCH) and implemented by the Departamento de Evaluación, Medición y Registro Educacional (DEMRE). To apply to any of the nearly 1,500 academic programs offered by the 41 universities that are part of this system, students must take a series of standardized exams, known as the Prueba de Selección Universitaria (PSU). These tests include sections in Mathematics, Language, and a choice between Science or History, with students receiving separate scores for each.

In addition to the PSU results, applicants receive two further scores based on their performance in high school: the NEM score, which is the average of their high school grades, and the Ranking score, which captures the student's relative standing within their graduating cohort. A key feature of this admissions process is that admission to programs is determined solely based on these scores and criteria.

Once the test scores are released, students can submit a ranked list of up to ten program choices, known as Rank Order Lists (ROLs). These lists must be ordered strictly according to the student's preferences. Importantly, applicants apply directly to specific university-major pairs, which we refer to as "programs" throughout this paper. There is no fee associated with submitting an application.

On the supply side, each academic program publicly announces the number of seats available, the weights applied to each admission criterion, and any additional eligibility requirements. For example, some programs may set minimum thresholds for application scores or require specific minimum scores on individual PSU components. Programs create preference rankings by first eliminating any applicants who fail to meet these basic requirements. They then rank the remaining applicants based on a weighted average of the scores, using the weights previously defined.

Given the applicants' preferences and the programs' selection rules, DEMRE performs the matching process using a version of the Deferred Acceptance (DA) algorithm. Enrollment takes place in two rounds. In the first, only students who received an offer through the centralized match can enroll in the program they were assigned to. In the second round, programs that still have open spots may extend offers to students on their waitlists. In addition, at any point, students retain the option to apply to and enroll in programs outside the centralized SUA system or to enter the labor market directly.

Finally, students can participate in the admissions process multiple times, and are allowed to reuse their PSU scores from the previous year when reapplying.

Nevertheless, Short Cycle Programs in Chile, offered by Centros de Formación Técnica and Institutos Profesionales, are not part of the centralized admission system used for university degree programs. Unlike traditional undergraduate programs, SCPs do not require applicants to submit scores from standardized university admission tests such as the PSU or its successors. Instead, access to SCPs is managed through decentralized, institution-specific processes, with each educational institution setting its own entry requirements. These may include completion of secondary education, internal assessments, or interviews, thereby providing more flexible and diverse pathways into higher education.

3 Data

The data used in this study correspond to Chile for the period 2013 to 2019 and consist of the following sources:

3.1 Administrative Records (DEMRE)

The DEMRE administrative dataset contains comprehensive individual-level records from the Chilean centralized university admission system. For each applicant between 2013 and 2019, it includes results from the Prueba de Selección Universitaria (PSU) or Prueba de Acceso a la Educación Superior (PAES), detailed ranked lists of up to ten program preferences, program-level admission scores and cutoffs, and final enrollment outcomes. Additionally, the dataset records institutional and program identifiers, modality (e.g., day or evening), and type of financing used (e.g., tuition-free, loan, scholarship). Each student record is uniquely identified and linked across application cycles, allowing for the construction of academic histories and reapplication patterns.

3.2 SIMCE (Sistema de Medición de la Calidad de la Educación)

SIMCE is a nationwide standardized assessment system administered by the Chilean Ministry of Education throughout primary and secondary education. It comprises multiple test cycles applied at various educational stages (e.g., 4th, 6th, 8th, and 10th grades), covering core subjects such as language, mathematics, natural sciences, and social sciences. In addition to academic test scores, SIMCE includes contextual questionnaires for students, parents, teachers, and school principals, capturing information on household background, educational expectations, and school resources. The system is designed to evaluate the performance and equity of the Chilean educational system over time.

3.3 Higher Education Census (Censo de Educación Superior)

The Higher Education Census is an official statistical operation conducted annually by the Chilean Ministry of Education. The census compiles exhaustive information from all higher education institutions—universities, professional institutes, and technical training centers—that are recognized by the state. It includes detailed records on student enrollment (by program, level, gender, and modality), number of academic programs offered, graduates, teaching staff, tuition fees, and infrastructure. It also provides institutional identifiers, regional and municipal location data, and information on institutional characteristics such as ownership (public/private) and accreditation status. The data span several decades and enable consistent tracking of the structural evolution of the Chilean higher education system.

4 Reduced Form Evidence

4.1 Out-of-pocket fee and opportunity cost

To understand the impact of out-of-pocket fees on enrollment decisions, we rely on a policy that altered both the absolute and relative prices of higher education. Gratuidad is a Chilean higher education policy introduced in 2016, aimed at providing free tuition for students from households in the bottom 50% of the income distribution. Initially, the policy applied only to Bachelor's programs at around 30 universities that voluntarily joined the initiative (all the public universities and many private ones). In this first stage, eligible students faced zero tuition costs for Bachelor's programs, while SCPs were not yet covered, creating a relative price shift where Bachelor's programs became cheaper than SCPs for the targeted group. In 2017, the policy was expanded to include SCPs, equalizing the price of both types of programs to zero for eligible students. Throughout its implementation, Gratuidad coexisted with other financing mechanisms such as subsidized loans and merit- or income-based scholarships.

On the supply side, there is no significant expansion in the number of vacancies. Enrollment capacity remained relatively stable in the years following the implementation of gratuity, suggesting limited institutional adjustment in terms of supply.

To estimate the impact of higher education prices on enrollment decisions, I exploit the staggered implementation of the Gratuidad policy using a difference-in-differences approach. The identification strategy relies on comparing enrollment outcomes before and after the policy's introduction, separately for treated (Gratuidad-eligible) and non-treated students.

$$
\begin{aligned}
\text{Enroll}_{it} = \alpha + \sum_{\tau \neq 2015} \delta_\tau \cdot I[\text{Year}_t = \tau] + \beta \cdot \text{Treated}_i \\
+ \sum_{\tau \neq 2015} \gamma_\tau \cdot (I[\text{Year}_t = \tau] \times \text{Treated}_i) + X_i'\theta + \varepsilon_{it}
\end{aligned}
$$

where Enroll_{it} is a binary indicator equal to 1 if student i is enrolled in any post-secondary program in year t. I estimate this equation separately for overall enrollment, university enrollment, and enrollment in SCPs. The variable Treated_i equals 1 if the student belongs to a household in income deciles 1 to 5, making them eligible for Gratuidad. The set of controls X_i includes gender and social background, measured by parental education.

We estimate the regression specified above and find that Gratuidad increases the probability of university enrollment while reducing the probability of SCP enrollment by a similar magnitude. This pattern suggests that the policy's effect operates mainly through substitution rather than by expanding total enrollment. In 2016, when only university programs were covered by Gratuidad, the treatment effect reflects a composite impact: tuition costs for university students fell to zero, and the relative price of university decreased compared to SCPs. This means part of the effect is driven by students who had a latent demand for university but were previously constrained by prohibitive costs, while another portion arises from individuals who shifted simply because university became cheaper.

In 2017, with SCPs also included in Gratuidad, the estimated treatment effect diminishes, indicating that some of the initial increase in university enrollment in 2016 may have come from individuals who chose university merely due to its relative affordability compared to SCPs. We interpret these effects as stemming from the demand side, since prior work and our own data analysis confirm that there was no expansion in the aggregate supply of university or SCP seats over this period (Bucarey, 2018).

We then re-estimate the model, this time distinguishing between universities that accepted Gratuidad and those that did not. This allows us to assess whether the observed substitution patterns are concentrated within specific segments of the higher education market. The results show that the substitution effect is particularly pronounced among institutions that joined the Gratuidad policy, with a clear increase in enrollment into these universities. In contrast, enrollment in non-Gratuidad universities declined following the policy's implementation. This suggests that, rather than inducing students to choose between university and SCPs alone, the policy also triggered substitution across university types—students shifted away from non-subsidized institutions toward those offering free tuition under Gratuidad.

To further understand whether students enroll in university due to the elimination of tuition fees or because of changes in relative prices, we examine cohort-specific switching patterns between universities and SCPs. For the 2015 cohort, we observe a noticeable increase in the number of students who switch from SCP to university after their first year. This suggests that some individuals, initially enrolled in SCPs, became aware during their first year that university had become free under Gratuidad, prompting them to transfer. This pattern provides supporting evidence of financial constraints that previously pre-

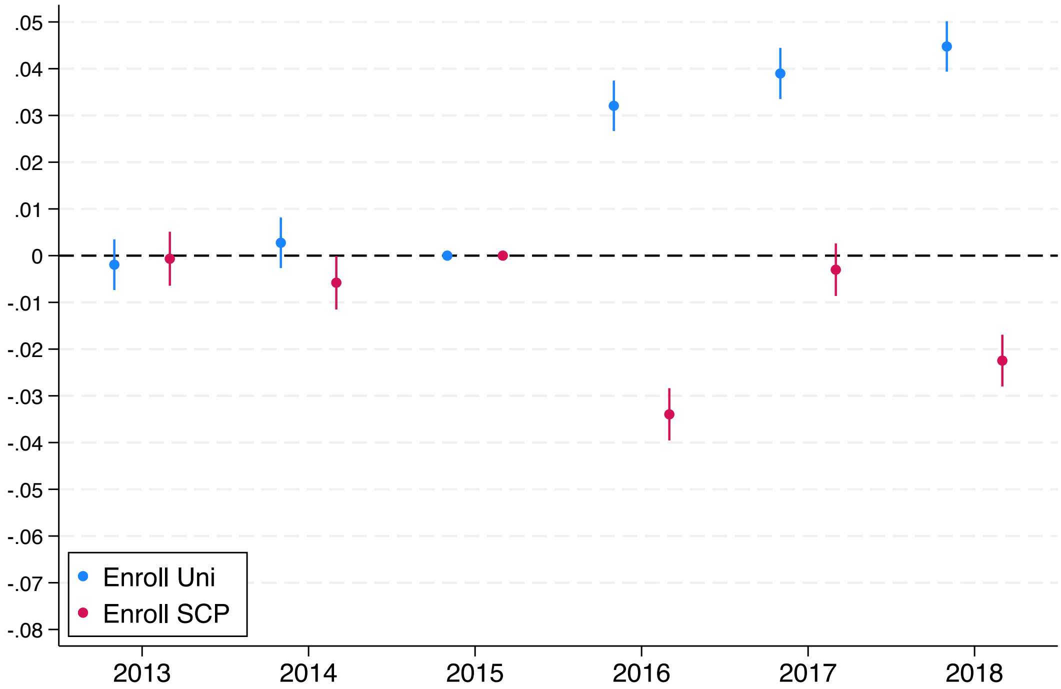

Figure 1: Effect on Enrollment of Gratuidad

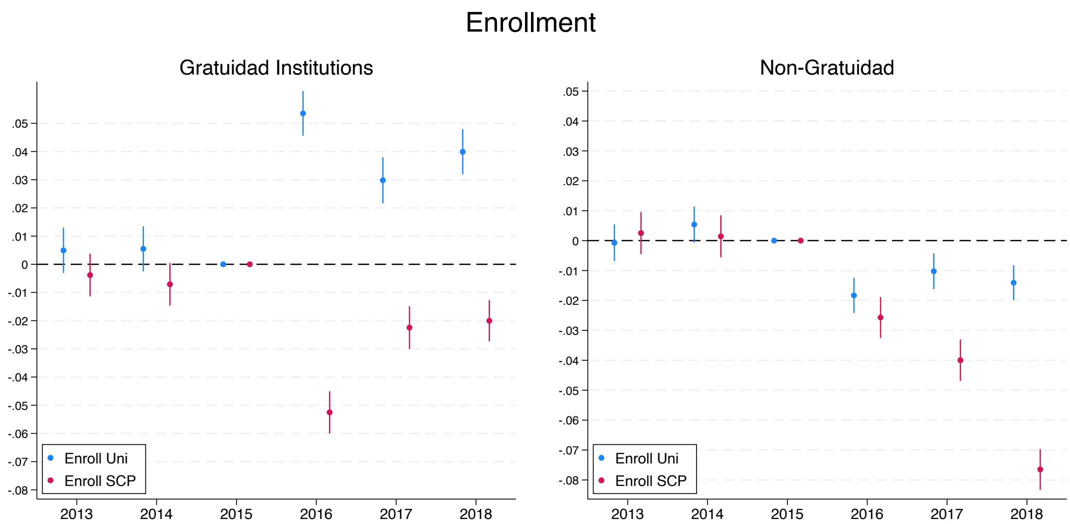

Figure 2: Effect on Enrollment of Gratuidad - In Platform and not In Platform

vented them from accessing university education (See Figure A. 1).

Conversely, in the 2016 cohort—prior to the extension of Gratuidad to SCPs—there is a significant increase in the probability of switching from university to SCP. These students, having begun university studies when SCPs were not yet free, appear to have responded to the newly introduced tuition-free SCPs by transferring out of university.

This behavior indicates that some individuals initially chose university not out of preference but because, under the 2016 policy configuration, it was relatively cheaper than SCPs (See Figure A. 2).

4.2 Informational Enviroment

4.2.1 Older Peer Effect

We investigate the role of older peers in shaping educational decisions, motivated by the idea that they serve as critical sources of information, guidance, and social influence at pivotal junctures. Older students, having already navigated the application process, selected educational tracks, and experienced higher education firsthand, are well-positioned to influence the expectations and decisions of their younger counterparts.

Descriptive evidence supports the importance of these peer dynamics: students who ultimately enroll in university are surrounded by significantly more peers who themselves pursued higher education. For instance, the average share of university-enrolled peers for university entrants is nearly 70%, compared to just over 50% for those who did not enroll. Moreover, enrollment outcomes vary strongly with the degree of exposure to enrolled peers. Among students in the highest peer exposure group (where 80–100% of older peers enrolled), over 54% enrolled in university, while only 20% did so in the lowest quintile group. There is plenty of variation in the average amount of older peers who enrolled to University or SCP, as we can see in Figure A. 3.

Estimating a simple OLS model with time and region fixed effects would be insufficient to capture the causal impact of peers. A central identification concern in estimating peer effects arises from endogenous selection: families may choose schools or neighborhoods based on peer characteristics, making it difficult to distinguish the causal effect of peers from that of shared unobserved traits (Barrios-Fernández, 2022; Agostinelli et al., 2020). To address this, some of the literature often employs fixed effects at the school, neighborhood, or cohort level, thereby controlling for time-invariant unobserved heterogeneity. While such approaches mitigate some sources of bias, they rely on the assumption that within-group variation in peer composition is exogenous, a condition that may not universally hold. The variation we are exploiting is within school shift variation: In the Chilean education system, schools commonly operate on a double-shift basis, with separate morning and afternoon sessions; notably, only 27% of schools function on a single-shift schedule.

Our empirical strategy is based on the following specification:

$$EducationOutcome_{it} = \alpha + \beta \cdot PeersEnrolled_{i,t-1} + \gamma X_{it} + \varepsilon_{it}$$

In this model, $EducationOutcome_{it}$ denotes a range of educational outcomes for student i in year t, including enrollment (any program, university and SCP), standardized exam scores, dropout probability and switching probability between university and SCP (and viceversa). The key independent variable, $PeersEnrolled_{i,t-1}$, captures the average proportion of students in the preceding cohort from the same school who enrolled in any post-secondary program. The specification includes fixed effects for school, year, and region, and controls for a rich set of covariates: student gender, parental education and employment status, and subjective household income. The variable $PeersEnrolled_{i,t-1}$ is being normalized for interpretability.

Table 1: Effect of Peer Enrollment on Educational Outcomes

	Enrolled	Score Exam	Prob. of Enrolling Uni	Prob. of Enrolling SCP	Dropout	Switch SCP to UNI	Switch UNI to SCP
Mean Peers Enrolled t-1	0.017***	0.003***	0.008***	0.009***	-0.004***	-0.000**	0.000
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Observations	1,229,691	1,229,691	1,229,691	1,229,691	739,356	739,356	739,356
R-squared	0.097	0.477	0.198	0.099	0.050	0.008	0.012
Environment Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 1 presents the estimated effect of peer enrollment in the previous cohort:

Most notably, a one standard deviation increase in the average peer enrollment rate in the previous cohort is associated with a 1.7 percentage point increase in the likelihood that a student enrolls in any post-secondary program. Disaggregating by type of program, we find that the peer effect leads to increases in both university and SCP enrollment: 0.8 percentage points and 0.9 percentage points, respectively.

The data also shows that an increase in peer enrollment is associated with a 0.4 percentage point reduction in the probability of dropping out, and no significant increase in switching between university and SCP tracks. This suggest that peer-induced choices tend to be stable and well-matched.

Taken together, these findings indicate that the influence of older peers leads to increased participation in higher education without compromising match quality, as evidenced by the lower dropout rates and minimal switching behavior.

We then focus exclusively on peers who enrolled in university, as shown in Table 2. The overall patterns remain consistent with previous results: peer exposure increases total enrollment, standardized exam scores, and university enrollment probability, while reducing dropout and switching rates. However, we observe a key difference in the effect on SCP enrollment—the coefficient is now negative and significant, indicating that exposure specifically to university-enrolled peers discourages SCP enrollment.

Table 2: Effect of University-Enrolled Peers on Educational Outcomes

	Enrolled	Score Exam	Prob. of Enrolling Uni	Prob. of Enrolling SCP	Dropout	Switch SCP to UNI	Switch UNI to SCP
Mean Peers Enrolled Uni t-1	0.011***	0.007***	0.013***	-0.003***	-0.004***	-0.001***	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Observations	1,194,924	1,194,924	1,194,924	1,194,924	719,969	719,969	719,969
R-squared	0.096	0.479	0.198	0.100	0.050	0.008	0.012
Environment Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

However, even under the fixed effects specification, concerns about potential endogeneity remain. To address this, we develop a more stringent identification strategy by leveraging the exogenous variation generated by the rollout of the Gratuidad policy. Since this policy substantially increased university and SCP enrollment among low-income students, we use it as an instrument to isolate exogenous changes in the peer environment. Specifically, we focus on the cohorts from 2017 to 2019 (years after the full expansion of Gratuidad) and restrict the sample to students who were not eligible for the policy (i.e., those in household income deciles 6 to 10). For these individuals, we instrument the average number of older peers in their school who enrolled in university or SCP with the share of Gratuidad-eligible students (deciles 1 to 5) in the preceding cohort. While the results are somewhat less precise, we still find a statistically significant positive effect on the probability of enrolling in university. Moreover, the evidence suggests improved matching: the probability of switching, consistent with the interpretation that policy-induced peer exposure leads to more informed and stable educational choices.

Table 3: Effect of Enrolled Peers on Educational Outcomes - IV specification

	Enrolled	Score Exam	Prob. of Enrolling Uni	Prob. of Enrolling SCP	Dropout	Switch SCP to UNI	Switch UNI to SCP
Mean Peers Enrolled Uni t-1	0.065	-0.005	0.185**	-0.086	-0.053	-0.058**	-0.064*
	(0.064)	(0.029)	(0.089)	(0.077)	(0.082)	(0.027)	(0.039)
Observations	80,256	80,256	80,256	80,256	65,155	65,155	65,155
R-squared	0.070	0.052	0.033	0.009	0.058	-0.045	-0.016
Baseline Mean	0.59	6.17	0.32	0.24	0.67	0.01	0.03
Environment Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

4.2.2 Parent Effect

Parents play a crucial role in shaping students' educational choices through multiple channels, including access to resources, the provision of information, and the transmission of expectations and aspirations.

In our setting, students from the lowest decile exhibit a university enrollment rate of 12.7%, compared to 63.8% among those from the highest decile. In contrast, enrollment in Short-Cycle Programs is highest among low-income students—reaching 41.8% in the bottom decile—and declines monotonically with income until 6% in the highest decile.

We are interested in estimating the causal effect of parent's education on their childrens' education decisions. A naive regression of children's education on parents' education would give us a biased estimate of the causal effect of parent's education on children's outcomes. This is because parents' education is likely to be correlated with unobserved characteristics that also affect children's education. Therefore, we need to come up with an instrument that generates exogenous variation in parents' education. We exploit the expansion of universities during the 1980s to obtain exogenous variation in access to higher education.

Following the military coup of 1973, the Augusto Pinochet regime viewed universities not only as educational institutions but also as political threats. Universities were accused of being hubs of Marxist indoctrination, prompting the junta to impose military control over all institutions, expel politically active students and faculty, and censor academic content. Despite these purges, all eight existing universities remained formally open. However, enrollment declined sharply, dropping by 38% between 1973 and 1981, driven primarily by a reduction in new admissions. The share of education spending devoted to tertiary education fell from nearly 50% under Allende to just 30% by 1980 (Bautista et al., 2023; González et al., 2024; Bautista et al., 2025).

Nevertheless, in 1981, the Chilean military regime implemented a set of legal reforms that fundamentally restructured the higher education system. Central to this transformation was the Decreto con Fuerza de Ley (DFL) Nº 1, which established the legal framework for academic freedom and, crucially, authorized private actors to create and operate educational institutions. This decree dismantled the public university network by decentralizing existing institutions—such as dividing the University of Chile into regional campuses—and legally permitted the creation of private universities. Simultaneously, DFL Nº 4 redefined the financial model by reducing direct state funding to traditional universities and introducing a competitive subsidy system based on student test scores, thereby incentivizing both student performance and institutional competition. The system shifted from universal state funding to targeted support, favoring institutions that attracted high-scoring applicants. Finally, DFL Nº 30 granted new institutions legitimacy by allowing degree equivalence with traditional universities, provided academic programs were similar. Together, these decrees not only facilitated a dramatic increase in the number of private universities—from 8 in 1980 to over 60 by the 1990s—but also laid the foundation for a market-driven, stratified higher education system that prioritized expansion over equity.

We will exploit this policy-driven expansion of higher education—specifically, the rapid creation of universities and the sharp increase in available vacancies across regions—as a source of exogenous variation to instrument for parental education. By leveraging this variation, we aim to identify causal effects of parental educational attainment on outcomes of the next generation, while mitigating concerns of endogeneity arising from unobserved family or regional characteristics.

From Figure A. 4, based on Bernasconi (2004), and Figure A. 5, created with data from Braun Llona et al. (2000), we observe that 52 out of the 60 universities currently operating were established during that decade, alongside the creation of the entire system of Short-Cycle Programs. Moreover, higher education coverage—measured as the proportion of individuals eligible for tertiary education who actually enrolled—increased sharply following the implementation of the 1981 decrees. Using our data on education on parents, obtained by SIMCE, we also can observe this increase the amount of people with superior education after 1981 (see Figure A. 6)

In terms of data requirements for implementing the instrumental variable strategy, we rely on information regarding the educational attainment of the parent and the parent's age at 21—i.e., the age at which individuals typically made the decision to pursue higher education during the 1980s (Bautista et al., 2025). This information is available in the SIMCE dataset. Specifically, SIMCE provides data on the educational level of both the father and the mother, as well as the age of the legal guardian. In approximately 80% of cases, the legal guardian corresponds to the mother, and in about 95% of cases, it is either the mother or the father. We exclude observations where the legal guardian is another relative, such as a grandparent or older sibling.

Furthermore, in order to determine whether the parent was exposed to an increase in higher education vacancies, we require information on the region in which the parent resided at age 21. While we do not observe this directly, we use the region of the student's school as a proxy, under the assumption that the parent resided in the same region at that decisive age. For this assumption to be valid, we must believe in the absence of significant intraregional migration. According to Chilean Census data, internal migration is a relatively minor phenomenon, affecting approximately 3% to 5% of the population depending on the year of the Census consulted, thereby lending plausibility to our identifying assumption.

A first approach will be to instrument parents' education with the number of vacancies in the region, therefore taking the form:

$$ParentHigherEducation_{irt} = \pi_0 + \pi_1 Vacancies_{rt} + \delta' X_{irt} + \nu_{irt}$$

And as a second stage we estimate the following equation:

$$EducationOutcome_{irt} = \alpha + \beta ParentHigherEducation_{irt} + \gamma' X_i + \varepsilon_{irt}$$

The results are presented in Table 4 and Table 5. In the first, the dependent variable equals one if the parent has any form of tertiary education (including both university and non-university postsecondary studies), while in the second it equals one only if the parent holds a university degree. Across both specifications, we observe that having a parent with higher education is associated with a significant increase in standardized test scores, a higher probability of university enrollment, and a correspondingly lower probability—of even greater magnitude—of enrolling in a Short-Cycle Program.

These findings highlight the strong intergenerational transmission of educational attainment, suggesting that parental education plays a crucial role in shaping students' academic performance and postsecondary educational choices.

Table 4: Effect of Parent's Education on Educational Outcomes

	(1) Enrolled Any	**(2) Score Exam**	**(3) Prob. of Enrolling Uni**	**(4) Prob. of Enrolling SCP**
Parent = Tertiary or University Education	-0.054*	0.097***	0.111***	-0.200***
	(0.032)	(0.012)	(0.031)	(0.027)
Observations	356,903	356,903	356,903	356,903
Demographic Controls	Yes	Yes	Yes	Yes
FE Year & Region	Yes	Yes	Yes	Yes

Table 5: Effect of Completed University Education on Educational Outcomes

	(1) Enrolled Any	**(2) Score Exam**	**(3) Prob. of Enrolling Uni**	**(4) Prob. of Enrolling SCP**
Parent = Completed University Education	-0.060*	0.116***	0.135***	-0.236***
	(0.036)	(0.013)	(0.036)	(0.030)
Observations	356,903	356,903	356,903	356,903
Demographic Controls	Yes	Yes	Yes	Yes
FE Year & Region	Yes	Yes	Yes	Yes

5 Structural Model

5.1 Enrollment

Students are utility-maximizing agents who choose between enrolling in a university degree or a short-cycle program (SCP) based on the characteristics of each option and their own attributes[3]. Let $j \in U, SCP$ denote the two available program types. Student i's indirect utility from choosing option j is given by:

$$u_{ij} = u(z_i, x_j, w_{ij}, \eta_{ij}; \theta) \tag{1}$$

where z_i and x_j are vectors of student and programs characteristics, respectively. The vector w_{ij} denotes match characteristics, such as the distance from student i to the campus where option j is located. We further parameterize the utility function as linear in the students and programs' observable and unobservable characteristics, taking the form:

$$\begin{aligned} u_{ij} &= V_{ij} + \eta_{ij} \\ &= \delta_j + \alpha_p op_{ij} + \alpha_w w_{ij} + \alpha_z z_i + \alpha_q x_j z_i + \eta_{ij} \end{aligned} \tag{2}$$

The parameter δ_j captures the intrinsic value of attending option j (both observed and unobserved). The variable op_{ij} are the out-of-pocket fees faced by student i for option j, which will depend on the ongoing policy such that $op_{ij} = (1 - \lambda_{ij}) p_j$ with λ_{ij} being the personalized tuition discount, given student and program characteristics. If a student is elegible for free college, and the institution participates in the policy, then $\lambda_{ij} = 1$. The utility of the outside option (not enrolling) is normalized to zero. The idiosyncratic shock η_{ij} is assumed to follow a type-1 extreme value distribution. The choice set Ω_i includes every degree with a cutoff below the student's program-specific score, and the probability that student i chooses option j can be written as:

$$s_{ij} = \frac{\exp V_{ijt}}{\sum_{k \in \Omega_i} \exp V_{ikt}} \tag{3}$$

and the probability of not enrolling is:

$$s_{i0} = \frac{1}{1 + \sum_{k \in \{U, SCP\}} \exp(V_{ik})} \tag{4}$$

5.2 Progression

In the next period, students receive a flow utility from attending college, observe their grades, and update their beliefs about their unknown ability. Their flow utility is given by Equation 2. We divide the ability into an observed component A_i and an unobserved component A_i^u. The grade equation is given by:

[3]For ease of exposition, I omit the time subscript.

$$G_{ij} = v(u_{ij}, z_i^g, A_i, A_i^u) + \varepsilon_{ij} \tag{5}$$

and the signal is defined as:

$$a_{ij} = G_{ij} - v(u_{ij}, z_i^g, A_i) \tag{6}$$

Therefore, the signal is computed from the grades, preferences, observable characteristics and the observed component of ability. Students are rational and update their beliefs about their unobserved ability A_i^u using the signal a_{ij} and following the Bayes' rule. We assume that students' initial prior beliefs about their unobserved ability are normally distributed with mean zero and variance σ^2_{j,g_i}, where g_i denotes the type of student i based on observable characteristics such as social background. The variance parameter σ^2_{j,g_i} also depends on the program j, allowing for heterogeneous learning environments across university and short-cycle programs. Students then update the mean unobserved ability as follows:

$$\mu_{i,t+1} = \mathbb{E}_t \left(A_i^u \mid a_{it} \right) = \frac{\sigma^2_{j,g_i} \, a_{ij}}{\sigma^2_{it}} \tag{7}$$

After updating their beliefs about unobserved ability, students face a discrete set of alternatives: they may choose to continue in their current educational program, switch to a different alternative, or exit the education system and enter the labor market. Let $d_{it} \in \{C, D, O\}$ denote the choice of student i in period t, where C denotes continuation in the current program, D indicates a downgrade from a university degree to a short-cycle program (for students of a SCP is not possible to downgrade), and O represents dropping out.

The value associated with continuing in the same program is given by:

$$V_{it}^C = u_{ij,t} + \beta \mathbb{E}_t \left[V_{i,j,t+1} \mid \mu_{i,t+1} \right], \tag{8}$$

where $u_{ij,t}$ is the flow utility in period t, and the expectation is taken over the future continuation value, conditional on the updated belief $\mu_{i,t+1}$ about the student's unobserved ability.

If the student is enrolled in a university program, they may choose to switch to an SCP (and viceversa). The value of changing alternative from j to k is given by:

$$V_{it}^D = u_{i,j,t} + \beta \mathbb{E}_t \left[V_{i,k,t+1} \mid \mu_{i,t+1} \right] \tag{9}$$

Finally, the value of exiting to the labor market is:

$$V_{it}^{O} = u_{ij,t} + \varepsilon_{it}^{O}, \tag{10}$$

5.3 Completion

Students who decide to remain current program in period t subsequently face a stochastic completion outcome based on their academic performance. While the decision to continue depends on expected utilities and updated beliefs, graduation itself is determined solely by realized performance, which in turn depends on the student's underlying abilities.

Let $\widetilde{G}_{ij,t+1}$ denote the academic performance in period $t+1$, which is drawn from the same grade-generating process as described in Equation 5. For simplicity, we assume that successful program completion requires surpassing a fixed academic threshold $\bar{G}_j$ that is specific to each program type $j \in \{U, SCP\}$. Formally, student i graduates from program j if:

$$\text{Graduate}_{ij,t+1} = I\left\{\widetilde{G}_{ij,t+1} \geq \bar{G}_j\right\}, \tag{11}$$

and fails to complete the program otherwise.

Let's call $X_{ij} = (z_i, x_j, w_{ij}, A_i, A_i^u)$. The probability of graduation is thus:

$$\Pr(\text{Graduate}_{ij,t+1} = 1 | X_{ij}) = \Pr\left(v(u_{ij}, z_i^g, A_i, A_i^u) + \varepsilon_{ij} \geq \bar{G}_j\right) = \frac{exp(X_{it}\Phi)}{1 + exp(X_{it}\Phi)} \tag{12}$$

where the randomness arises from the shock ε_{ij} in the grade equation. Individuals are assumed to know the parameters Φ and form expectations on graduating using that formula.

Conditional on continuation, students either transition into the labor market as graduates, enjoying the associated wage returns, or they dropout and enter the labor market without a postsecondary credential.

6 Conclusion

This paper studies the mechanisms that shape post-secondary educational choices in Chile, with a focus on the persistent inequality in university enrollment across socioeconomic groups. To address this, we combine a rich set of administrative data with quasi-experimental variation from major policy reforms and a dynamic structural model of college choice. Our empirical strategy isolates three key channels: financial constraints, information frictions, and match quality. The evidence reveals that tuition subsidies significantly influence both absolute and relative enrollment decisions; peer exposure improves enrollment and match quality; and parental access to higher education—instrumented by regional university expansions in the 1980s—has lasting intergenerational effects. Together, these findings motivate the design of a structural framework that integrates these mechanisms to simulate the effects of alternative education policies aimed at reducing inequality.

The next steps of our analysis involve calibrating the structural model to simulate relevant counterfactual policy scenarios, and refining the reduced-form evidence by (i) expanding the sample through the inclusion of additional SIMCE cohorts, and (ii) improving the measurement of supply shocks by reallocating university vacancies from the regional to the municipal (comuna) level, thereby enhancing the plausibility of our instrumental variable strategy based on parental exposure.

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A Tables and Figures

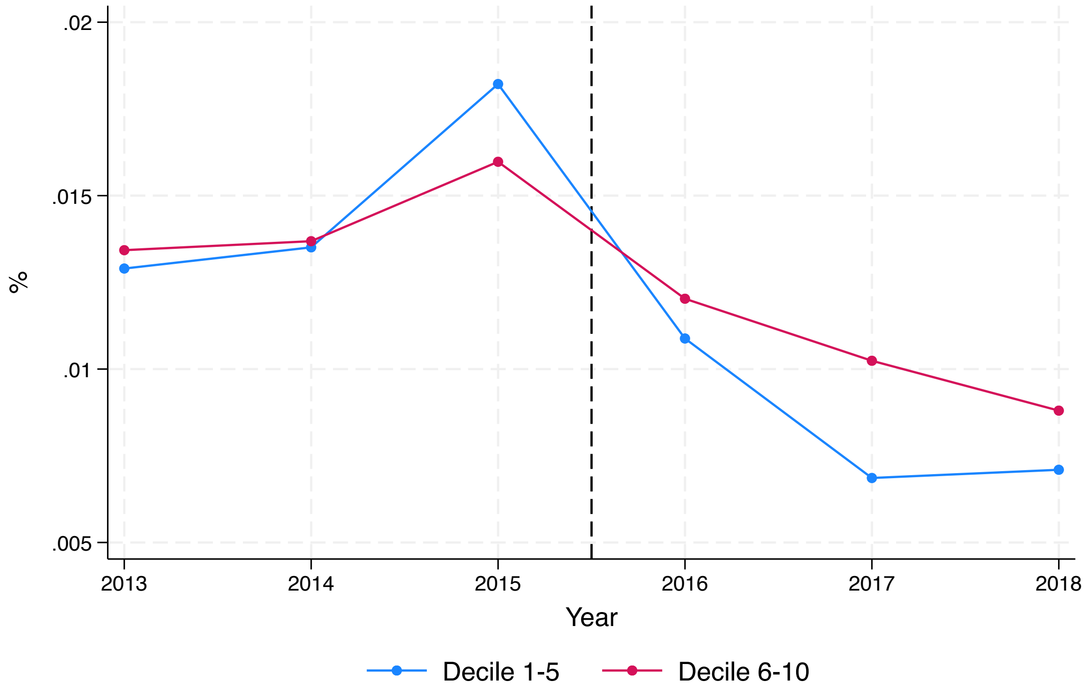

Figure A. 1: Probability of switching from SCP to University

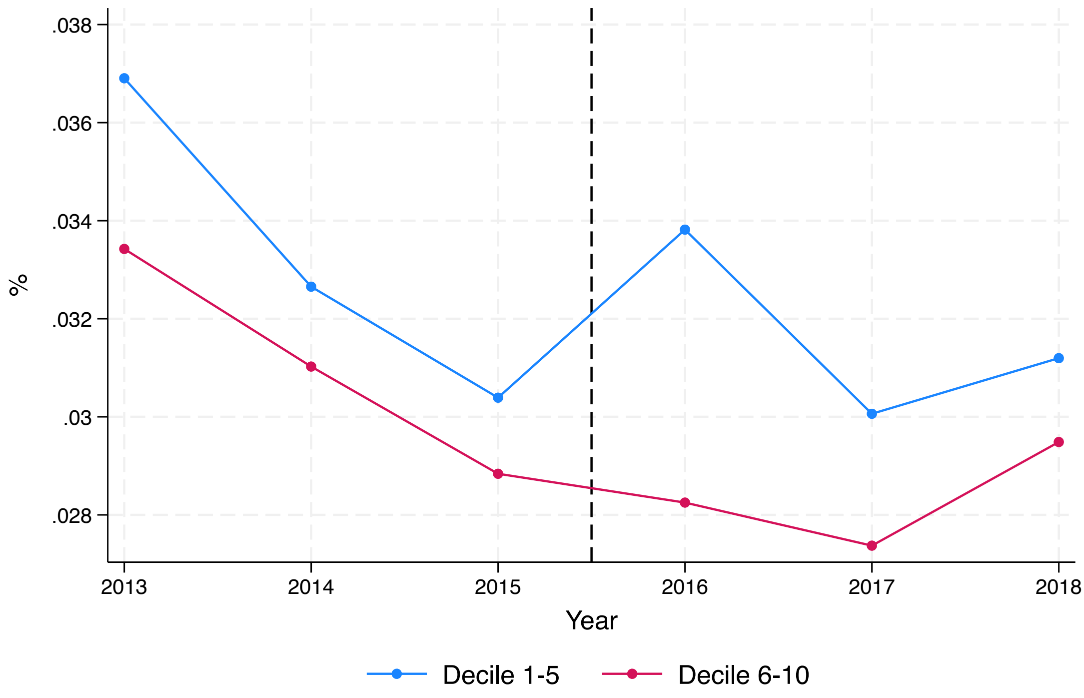

Figure A. 2: Probability of switching from University to SCP

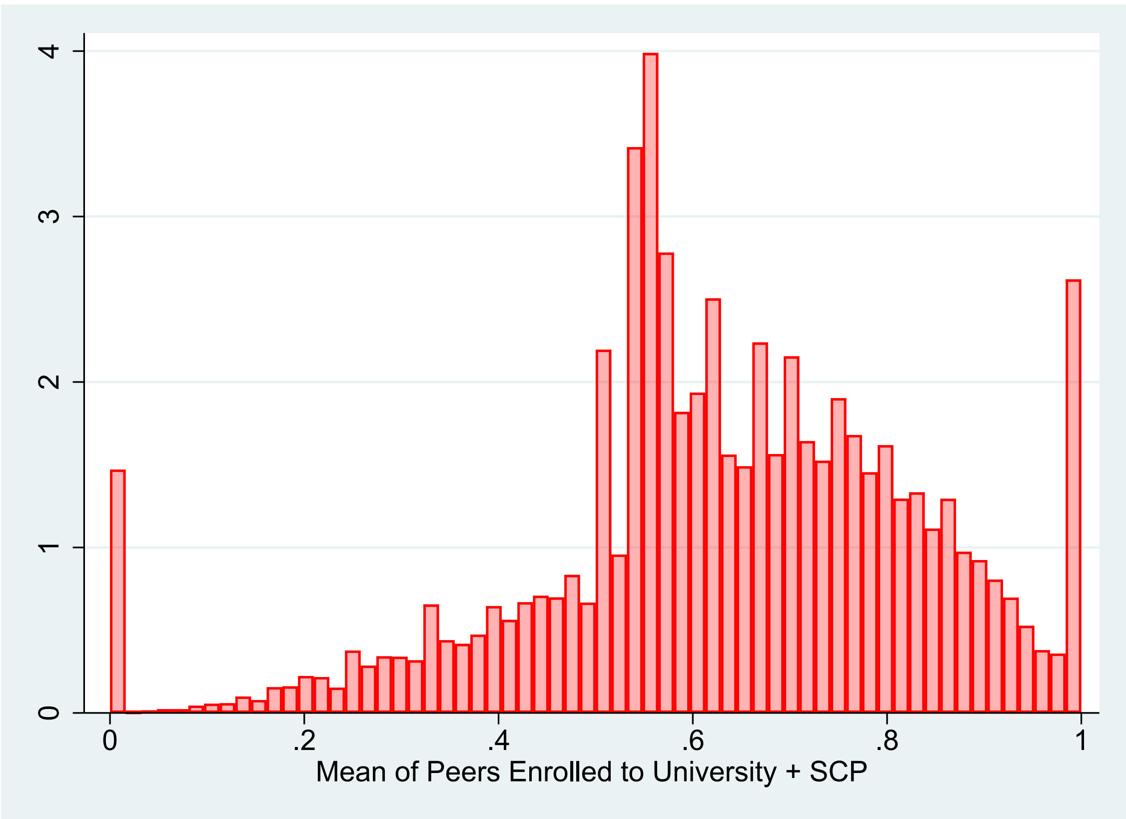

Figure A. 3: Histogram of Mean of Peer Enrollment in t-1

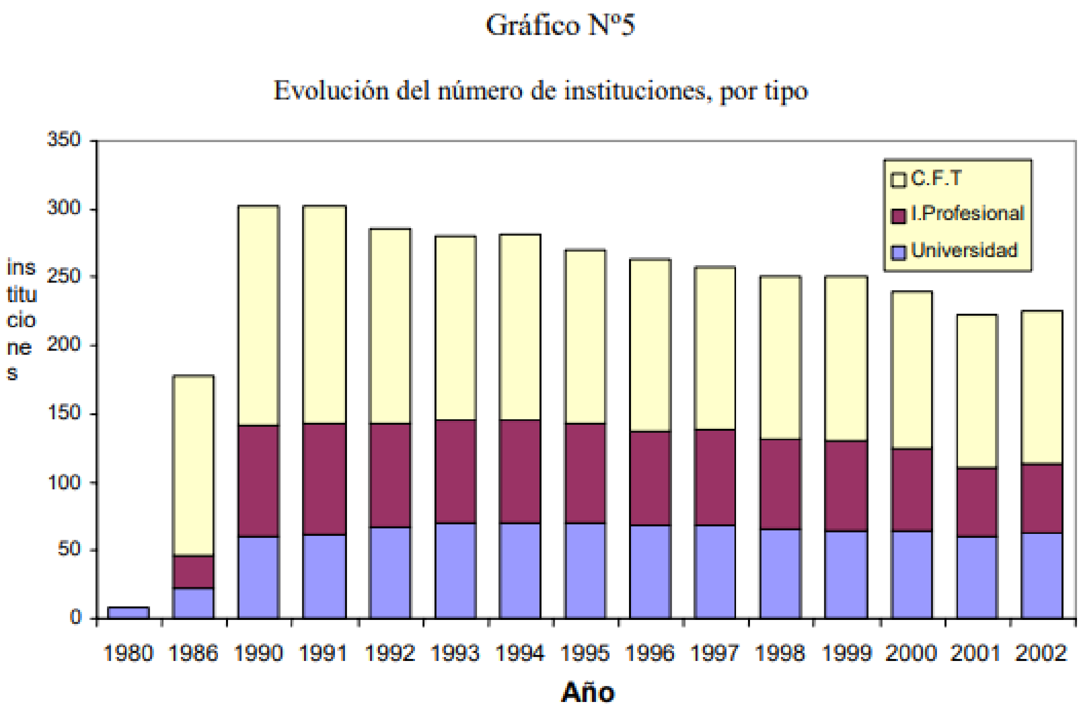

Figure A. 4: Amount of Universities and SCP by year. Source: Bernasconi (2004)

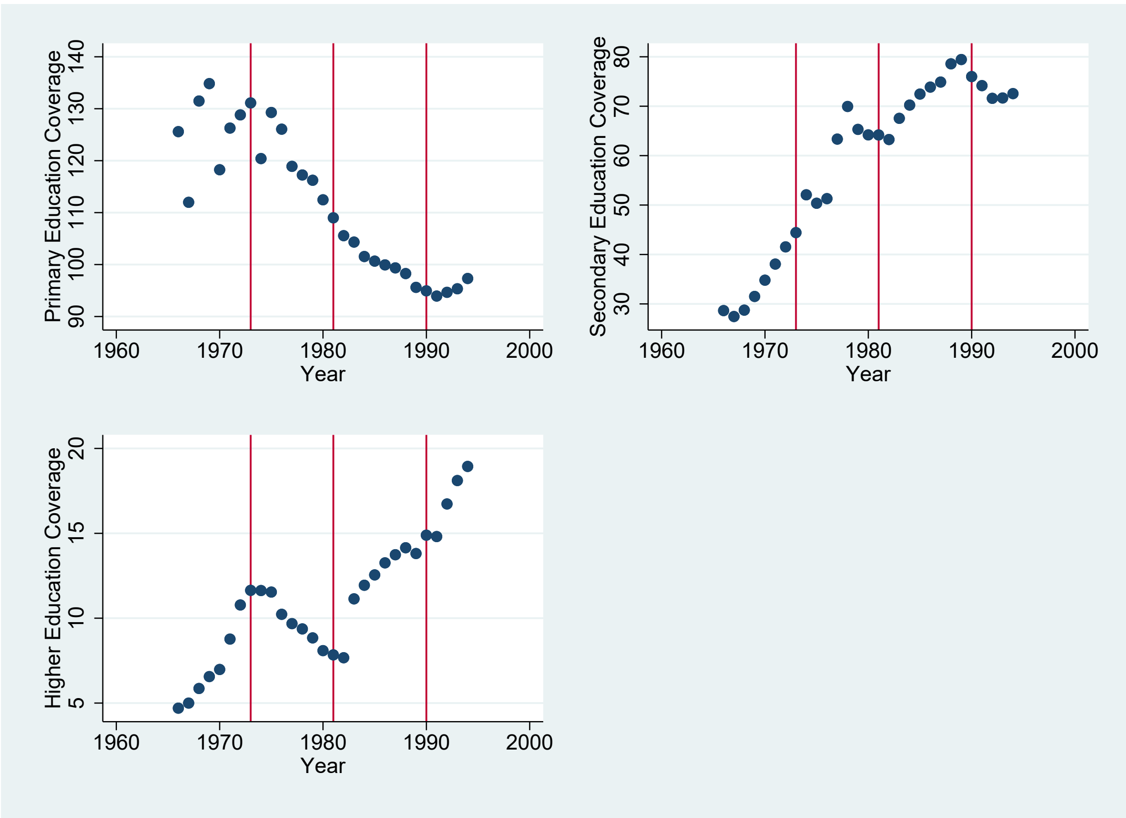

Figure A. 5: Education coverage by year, Chile 1965 - 1995. Source: Braun Llona et al. (2000)

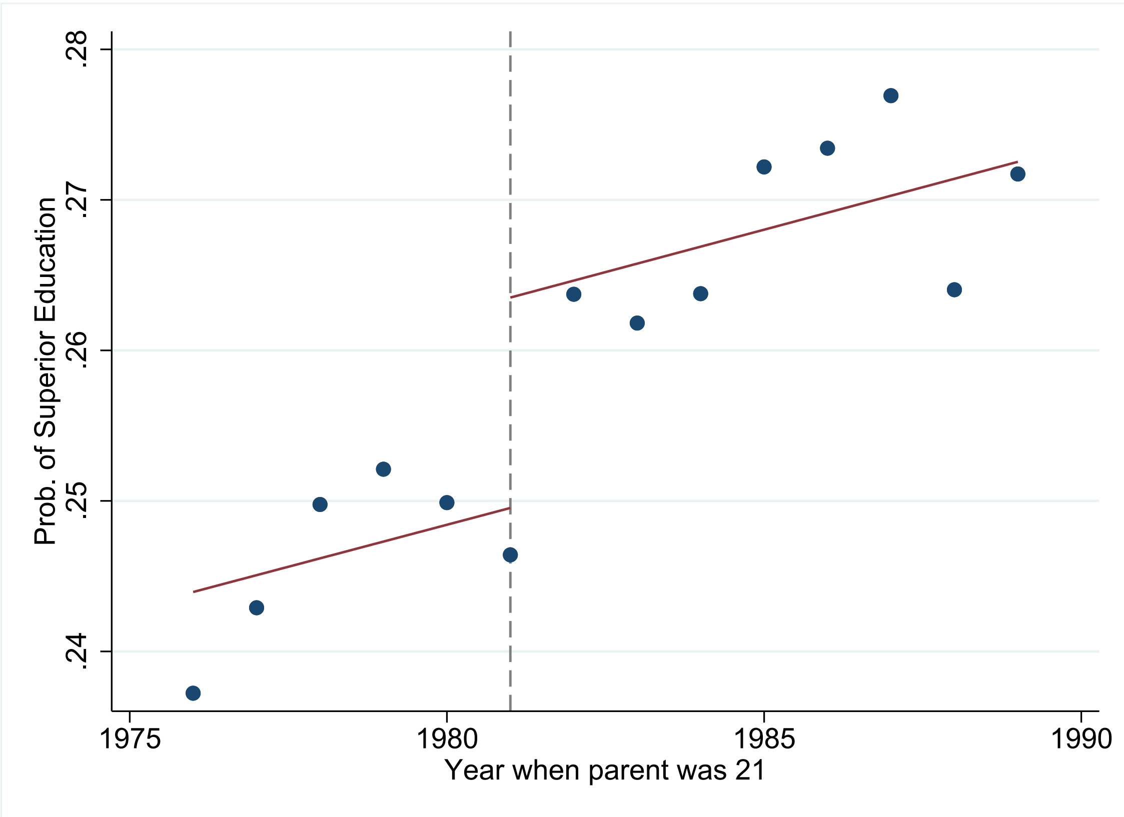

Figure A. 6: Superior Education by parent cohort