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Different universities for different students: mapping the socioeconomic and academic segmentation of the Chilean university system

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ABSTRACT

In both Europe and the United States, the expansion of university education has led to a process of differentiation among universities based on their quality, prestige and student composition. The differences between the institutions tend to be associated with students' background, but it is unclear to what extent their segmentation reflects broader patterns of social stratification. This study analyzes the segmentation of the Chilean university system in terms of the socioeconomic and academic profile of first-year students. Using administrative data from over 90,000 first-year students across 45 universities in 2022, we apply Latent Class Analysis (LCA) to construct six student profiles. These profiles are then used to identify six clusters of universities according to the composition of their first-year enrollment. These clusters reflect the current structure of a consolidated system after decades of expansion. The findings suggest that the Chilean university system is structured around an elite-mass binarism. On one side, two small clusters of institutions enroll students from privileged backgrounds. One is made up of traditional universities with strong academic prestige, and the other comprises private institutions that serve as exclusive spaces for the country's socioeconomic elite. On the other side, a larger group of low-selectivity universities has absorbed most of the new enrollment resulting from the expansion process. These results show how institutional segmentation reflects underlying patterns of socioeconomic inequality within a massified and highly privatized higher education system.

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Introduction

In the past few decades, many countries have witnessed significant growth and expansion of their higher education systems. Concurrently, a process of institutional differentiation has occurred. This has led to the segmentation of the educational programs offered by different institutions, resulting in a tiered structure (Reimer and Jacob 2011; Trow 1984). A distinguishing aspect of this differentiation is the distinction between universities and institutions focused on technical or vocational education (Carpentier 2021). Furthermore, a stratification process has been observed within each type of institution. In particular, universities have undergone internal differentiation driven by

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various factors, including financial resources, institutional orientation, academic quality, and prestige (Davies and Zarifa 2012; Lepori, Huisman, and Seeber 2014). Several studies have indicated that the labor market outcomes of graduates vary significantly based on the institution from which they obtained their degree (Jung and Lee 2016; Wakeling and Savage 2015).

These processes have raised important questions about the relationship between the differentiation of mass higher education systems and the reproduction of social inequalities (Marginson 2016; Reimer and Jacob 2011). Researchers argue that this differentiation may reinforce hierarchies among different educational institutions, contributing to the reproduction of inequalities at the institutional level (Bathmaker 2015; Croxford and Raffe 2015). At the same time, it may perpetuate social inequalities at the social level by allocating students to different educational pathways based on their socioeconomic backgrounds (Bourdieu and Passeron 1970; Lucas 2001; Weininger and Lareau 2018). Specifically, studies conducted in North America (Davies and Zarifa 2012; Jerrim, Chmielewski, and Parker 2015), Europe (Munk and Thomsen 2018; Weiss and Schindler 2017), and Australia (Czarnecki 2018) have demonstrated that students from families with a high socioeconomic background tend to have greater access to the most prestigious universities and programs. Such universities and programs tend to confer higher status and better labor outcomes.

This phenomenon has received significantly less attention in contexts outside the Global North. This is an important gap, as expansion processes have unfolded differently across high-income and middle-income countries (Reinders, Dekker, and Falisse 2021). In Latin America, certain conditions such as the deregulation of higher education supply, the privatization of institutions, and institutional competition for resources and prestige have contributed to the emergence of deeply segmented systems (Marginson 2016, 2018). Chile represents a paradigmatic example of massification driven by the private sector in Latin America (Chiroleu and Marquina 2017). The reforms implemented by the military dictatorship (1973–1989) transformed the structure of the system, allowing for the deregulated establishment of new private institutions (Fleet and Guzmán-Concha 2017). These changes resulted in sustained enrollment growth starting in the 1990s. Indeed, between 1990 and 2024 there was a fivefold increase in enrollment (Consejo Nacional de Educación [CNED] 2024), which facilitated the expansion of coverage for all social sectors (Ministerio de Desarrollo Social 2018). However, in recent years, more than four decades after the implementation of these neoliberal reforms, the expansion of the Chilean higher education system has slowed down, both in terms of enrollment and the number of institutions.

A consequence of the expansion of higher education in Chile has been the increasing diversification of institutions within the system, both among different types of tertiary institutions and within the university subsystem itself (Barroilhet 2019). This phenomenon has prompted interest in understanding its implications for inequality in access to higher education. Such concerns are particularly important given Chile's historically high and persistent levels of social inequality, which are marked by a significant concentration of privilege at the top of the social structure (United Nations Development Programme [UNDP], 2017; Cortes-Orihuela et al. 2024). Some studies indicate that this institutional differentiation is reflected in the student profiles of each institution. Students whose parents have attended tertiary education or have a higher family income are more likely to attend the most prestigious universities (Cabrera 2016; Villalobos, Quaresma, and Franetovic 2020). This relationship is partly mediated by performance on university entrance exams (Espinoza et al. 2022).

A recent study on student-level segregation found that, in general, students are relatively evenly distributed across institutions based on their socioeconomic background. The main exception is observed among students from the highest socioeconomic sectors, who exhibit the most pronounced levels of segregation from the rest of the student population (Kuzmanic et al. 2021). While these studies highlight inequalities in access and their consequences for the system's structure, they have primarily focused on individual student characteristics. As a result, they do not examine how these inequalities are mirrored within the institutional framework of the tertiary education system. Specifically, there is an absence of empirical evidence regarding the differentiation of

universities based on the socioeconomic and academic profiles of their student bodies. The present study analyzes the segmentation of Chilean universities according to the socioeconomic and academic profile of their first-year students. It poses the following research question:

> How is the socioeconomic and academic stratification of first-year students reflected in the institutional segmentation of the Chilean university system?

In most research on institutional differentiation and inequality of access, scholars have focused on how students from different backgrounds are distributed across various types of universities. Typically, these studies define institutional categories *a priori*, based on formal characteristics such as prestige, selectivity or historical trajectory (Czarnecki 2018; Jerrim, Chmielewski, and Parker 2015; Luo, Guo, and Shi 2018; Munk and Thomsen 2018). This research takes the opposite approach. Instead of categorizing universities based on pre-existing attributes, this study employs cluster analysis based on first-year student profiles. These profiles are used to inductively construct institutional categories based on the academic and socioeconomic composition of their first-year enrollments. The inductive construction of university categories based on student profiles allows us to identify a type of institutional differentiation that may not be apparent when universities are classified solely by characteristics that do not consider the types of students they enroll.

Addressing the research question allows us to evaluate how social inequality in Chilean society is reflected in the segmentation of its universities. This study specifically aims to identify the differences among universities based on the academic and socioeconomic profiles of their students. Furthermore, it seeks to determine the extent to which this segmentation creates institutional spaces that are exclusive to certain social groups, particularly the socioeconomic elite. The aim is not only to contribute to the discussion on institutional differentiation in Chile, but also to provide valuable insights for other similar contexts, such as countries in Latin America and Eastern Europe. In these regions, rapid massification processes, combined with high levels of privatization and deregulation, have raised comparable concerns about the socioeconomic segmentation of higher education.

Literature review

Institutional differentiation and access inequality in massified higher education

One of the anticipated consequences of the expansion of higher education was a reduction in social inequality. However, some theoretical perspectives question the capacity of education systems to address this challenge (Reay 2017). Despite increased access to higher education, structural inequalities have persisted, often taking new forms. In particular, growing attention has been paid to how institutional differentiation within massified higher education systems can serve as a mechanism through which inequality is reproduced (Jeffrey and Gibbs 2024; Lucas 2001; Marginson 2016; Reimer and Jacob 2011).

Two of the most influential theories that have sought to explain the persistence of inequalities amid educational expansion are Maximally Maintained Inequality (MMI) (Raftery and Hout 1993) and Effectively Maintained Inequality (EMI) (Lucas 2001). MMI theory posits that inequality does not necessarily decrease with the expansion of education. Instead, higher socioeconomic groups will retain their advantages in accessing different educational levels until a saturation point is reached; only then will access for less advantaged groups begin to increase (Raftery and Hout 1993). In contrast, EMI theory argues that after the massification of higher education, privileged groups will strive to preserve their advantages by obtaining higher-quality forms of education. This means they will seek to distinguish themselves through factors such as the prestige of their educational pathways (Lucas 2001).

Building upon a broader sociological framework, Pierre Bourdieu (1979; Bourdieu and Passeron 1964, 1970) argued that education systems play a crucial role in the reproduction of social inequalities. Education plays a pivotal role in the indirect transmission of economic, cultural, and social

privileges from one generation to the next. By presenting these advantages as merit, education serves to legitimize the existence of structural inequalities (Reay 2022). At the institutional level, higher education can be conceptualized as a field, a social space defined by competition and hierarchical relationships among institutions (Croxford and Raffe 2015; Marginson 2008; Naidoo 2004). In the context of mass higher education, the positions universities occupy are influenced not only by their economic and symbolic capital but also by the students they attract (Davies and Zarifa 2012). Consequently, institutions that concentrate students with stronger academic performance and higher levels of economic and cultural capital tend to exhibit higher rankings and provide better labor market outcomes (Bühlmann et al. 2022; Wakeling and Savage 2015). This dynamic has implications at two interconnected levels. First, at the institutional level, it reinforces hierarchies among universities (Brankovic 2018). Second, at the social level, it contributes to the perpetuation of social stratification within the education system (Boliver 2015; Czarnecki 2018).

In practice, these approaches are exemplified by the segmentation that mass systems have undergone in response to expansion processes. These institutions have differentiated based on the resources they possess, their level of research activity, and their institutional missions (Carpentier 2021). However, this differentiation is not neutral; it leads to a hierarchical ordering of institutions (Mendoza-Lozano, Cruz-Pulido, and García-Rodríguez 2021; Wakeling and Savage 2015). Empirical evidence shows a correlation between this differentiation and the profile of students who increasingly enroll in each type of institution (Lucas 2001). In countries such as China (Luo, Guo, and Shi 2018), Australia (Czarnecki 2018), the United Kingdom (Reay 2022) and Germany (Weiss and Schindler 2017), research has shown that, as higher education opportunities expand, students from families with greater economic and cultural capital tend to enroll in the most prestigious institutions. Conversely, students from lower socioeconomic backgrounds are more likely to attend universities with lower prestige and quality.

Despite this growing body of research, most studies focused on institutional differentiation rely on *a priori* classifications of universities based on formal attributes such as prestige, legal status, or selectivity (Czarnecki 2018; Jerrim, Chmielewski, and Parker 2015; Luo, Guo, and Shi 2018; Munk and Thomsen 2018). As a result, they may overlook how patterns of student composition shape and reflect institutional hierarchies.

The Chilean context

In comparison to other Latin American countries, Chile's higher education system stands out for its rapid expansion and high level of privatization (Chiroleu and Marquina 2017). The system underwent significant transformations with the implementation of neoliberal reforms initiated in 1981 by the military dictatorship (1973–1989). Two key reforms established the foundation for the current system. First, the reforms allowed for the deregulated establishment of private institutions. This led to a rapid increase in the number of private universities – referred to as new private universities – alongside the existing traditional private universities and public universities.

The second transformation involved establishing tuition fees as the primary mechanism for funding universities. This shift placed the financial burden on students and their families, which was justified by the principles of neoliberal economics and the idea of a 'free' market. Following the restoration of democracy in 1990 the state supported institutional massification and diversification through various financial aid mechanisms (scholarships and bank loans), which helped to extend access to previously marginalized groups (Palma-Amestoy 2013). In addition to the existing scholarships and loans, a free tuition policy (in Spanish, *gratuidad*) was implemented in 2016. This policy currently covers tuition fees for students from the lowest six income deciles who enroll in participating universities. As of 2025, 38 universities are included in this policy, which encompasses all traditional universities and some of the new private universities.

Since 1989, the number of students enrolled in Chilean universities has increased significantly, from 131,702 in 2010 (SIES 2010) to 693,663 in 2023 (CNED 2024). This expansion has led to

greater institutional differentiation among universities, characterized by factors such as selectivity, prestige, institutional orientation, and the labor market outcomes of graduates (Barroilhet 2019; Quaresma and Villalobos 2022). Similar to trends observed internationally, this differentiation relates to students' characteristics. Students whose parents have attended higher education are more likely to apply to and be accepted by 'traditional' universities (Cabrera 2016). Recent research shows that students are admitted to different institutions based on their social class and socioeconomic background (Espinoza et al. 2023a, 2023b).

A crucial aspect to comprehend the segmentation of the Chilean university system, is the role played by the admission mechanisms. The University Admission Access System (SAAU), to which the majority of Chilean universities belong, employs a centralized admission process that considers applicants' performance on standardized admission tests. The admission tests have a minimal pass score, but universities (and programs) vary widely in selectivity. Research indicates that performance on standardized tests in Chile is strongly influenced by students' socioeconomic background and the characteristics of their secondary education (Rodríguez et al. 2022). Consequently, students from lower socioeconomic backgrounds or those who completed their secondary education in public and vocational-technical schools are frequently excluded by the SAAU, as they fail to meet the minimum scores required to apply to selective universities (Canales 2016; Espinoza et al. 2022).While prior research in Chile has documented inequalities in access to higher education, there is still limited understanding of how these inequalities are reflected in the institutional composition of the university system.

Methodology

The data for this study were obtained from the Department of Evaluation, Measurement, and Educational Registry, responsible for the centralized admission process to the higher education system in Chile (SAAU). The 45 universities (out of a total of 55) included in this study select their students based on their performance on the national admission test and their academic performance during their secondary school years. The data utilized was collected for the 2022 admission process, and include the sociodemographic characteristics, academic record at the secondary level, and performance in the admission tests of all students who participated. A total of 93,986 students enrolled in one of the SAAU universities, of which 21,602 (22.9%) had missing data. Therefore, the analyses were conducted on the 72,384 students who had complete information.[1]

Variables

For the construction of student typologies, three sets of variables were employed: prior academic performance, educational background at the secondary level, and socioeconomic characteristics. A detailed description of the variables associated with each set is presented in Table 1. On average, almost all students performed well at the secondary level. Scores on the university admission test paint a different picture. Two-thirds of admitted students scored in the medium or low range on the admission tests. Additionally, a clear predominance of subsidized and academic-track schools is observed. Finally, the socioeconomic characteristics of the students indicate that the largest proportion (32%) comes from very low-income families, followed by those from very high-income families (20%). Approximately half of the students have a parent who attended tertiary education, while the other half is the first generation in their family to attend higher education (see Table 1).

Analysis

The analysis was conducted in two steps. The first step involved the construction of student typologies. For this purpose, Latent Class Analysis (LCA) was employed (Lazarsfeld and Henry 1968). This type of analysis enables the identification of qualitatively different groups based on their specific

Table 1. Description of variables used in the study.

Set	Variable	Description	Categories	Distribution (%)
Academic performance prior to university entrance[4]	GPA	Score associated with the school GPA	Low: < 500 pts.	7
			Medium: 500–600 pts.	21
			High: 600–700 pts.	34
			Very High: > 700 pts.	39
	Admission Test Score	Average score obtained on the math's and language admission test	Low: < 500 pts.	21
			Medium: 500–610 pts.	52
			High: 610–720 pts.	24
			Very High: > 720 pts.	3
Educational background at the secondary level	School Type	Secondary School Type	Private	17
			Subsidized[5]	56
			Public	28
	School Track[6]	Secondary School Track	Academic	86
			Vocational	14
Socioeconomic background	Family Income Level	In U.S. dollars 2024	Very Low: $0-$284	32
			Low: $284-$495	19
			Medium: $495-$760	13
			High: $760–1.284	16
			Very High: >$1.284	20
	Parental education	Indicates whether either parent has attended higher education	Continuing: at least one parent attended tertiary education	50
			First-Generation (FG): Neither parent attended tertiary education	50
N				72,384

Source**:** Authors' elaboration.

observable characteristics (Weller, Bowen, and Faubert 2020). In this case, the variables presented in Table 1 were employed to construct students' profiles. LCA constructs latent classes according to the probability that each individual has of belonging to a given group. These probabilities are determined based on their response patterns, assuming that these patterns are distinct between different classes (Goodman 1974).

The second step consisted in segmenting the universities based on the profile of their students. Cluster analysis was employed because it enables the classification of objects into groups based on a set of characteristics (Kassambara 2017). The rationale behind the formation of these groups is that the elements within each set should exhibit the greatest possible similarity to one another (low intra-cluster variance) while exhibiting the least possible similarity to the elements of the other groups (high inter-cluster variance). In this case, the universities are grouped in the same cluster when they receive a similar proportion of each student profile built in the previous stage.

K-means clustering was utilized, which enables the data to be partitioned into k distinct groups by minimizing total intra-cluster variance. The algorithm iteratively assigns each observation to the cluster with the closest centroid, defined as the average position of all points in the cluster. This process continues until further changes in cluster assignment no longer reduce intra-cluster variance. As the analysis is based on identifying elements that are similar to one another, it is crucial to define what is meant by 'close' or 'distant' points. In this scenario, the term 'distance' refers to the method used to calculate the distance between observations. To achieve this, the Euclidean distance was employed, as shown below. To test the sensitivity of the results to different algorithms, the same analysis was repeated using two alternative methods: Partitioning Around Medoids (PAM) and Hierarchical Clustering.

$$\textit{Euclidean distance}\ (x, y) = \sqrt{\sum_{i=1}^{n} (x_i - y_i)^2}$$

In both types of analysis, the number of classes and clusters was chosen according to statistical

criteria and the interpretability of the results (Masyn 2013). LCA and cluster analys were performed in R version 4.3.2 (R Core Team 2023). The LCA was estimated using the poLCA function from the poLCA package (Linzer and Lewis 2011), while the cluster analysis was conducted using the kmeans function from the stats package. Sensitivity analyses were conducted using the *pam* function from the cluster package (Maechler et al. 2023) and the *hclust* function from the stats package.

Results

Students' typologies

To construct the student typologies, seven latent class models with two to eight classes were fitted.[2] Two criteria were employed in selecting of the final model: statistical fit (Log-Likelihood Ratio Test – LLRT, AIC, and BIC) and interpretability of the results (class separation and class homogeneity). The latent class analysis (LCA) results are presented in Appendix 1. The three statistical criteria, LLRT, AIC, and BIC, improve as the number of classes increases. Consequently, from a statistical standpoint, the optimal model would be the one with eight latent classes. However, interpretating the results becomes increasingly challenging as the number of classes increases. We sought to determine whether the new models with more classes were able to differentiate the students in a meaningful way.

The analysis reveals that when transitioning from a five-class to a six-class model, four student profiles remain unchanged. In contrast, one group, initially composed of students from middle socioeconomic backgrounds with medium-high academic performance, splits into two distinct classes. The first new class is predominantly composed of first-generation students (71%), who come from very low (53%) or low-income families (25%). These students have medium (55%) or high (39%) performance on admission tests. The second new class consists of students from more advantaged socioeconomic backgrounds, primarily continuing-generation students (80%). This group has high (23%) or very high (27%) incomes, and scores medium (41%) or high (47%) on admission tests. In contrast, the models with seven- and eight-classes did not yield relevant new insights. The additional classes differed from existing ones only in terms of parental education while remaining similar in other variables, indicating low-class separation. Therefore, the six-class solution was determined to be the optimal model.

The probability profile plot for this model is presented in Figure 1. The latent classes were organized in ascending order based on socioeconomic status. The first class (21% of the total) comprises students from the vocational track and public schools who performed well academically during secondary education. However, this high performance does not translate into their results on the admission tests, since they have the lowest scores. Most of the students in this latent class come from low-income households, and nearly all of their parents did not attend tertiary education. Class 2 (16% of the total) primarily includes students from subsidized schools, with a smaller proportion from public schools. Most of these students come from the academic track and demonstrate satisfactory performance both in their secondary studies and on the admission tests. Two out of three students are the first in their family to pursue university education, and nearly half come from very low-income households.

Students in latent Class 3 (32% of the total) predominantly attended subsidized and academic-oriented schools. Almost half of them had parents who had attended tertiary education, yet their family incomes were low or very low. Students in this class obtained the lowest performance at the secondary level and had the second lowest scores in the admission tests. Class 4 (12% of the total) has a comparable educational background to Class 3. Nevertheless, students in this latent class demonstrate better academic performance at the secondary level and in the admission exams. Moreover, Class 4 ranks as the second highest in terms of previous academic performance. Regarding parental educational background, eight out of ten had pursued tertiary education, with family incomes ranging from low to very high.

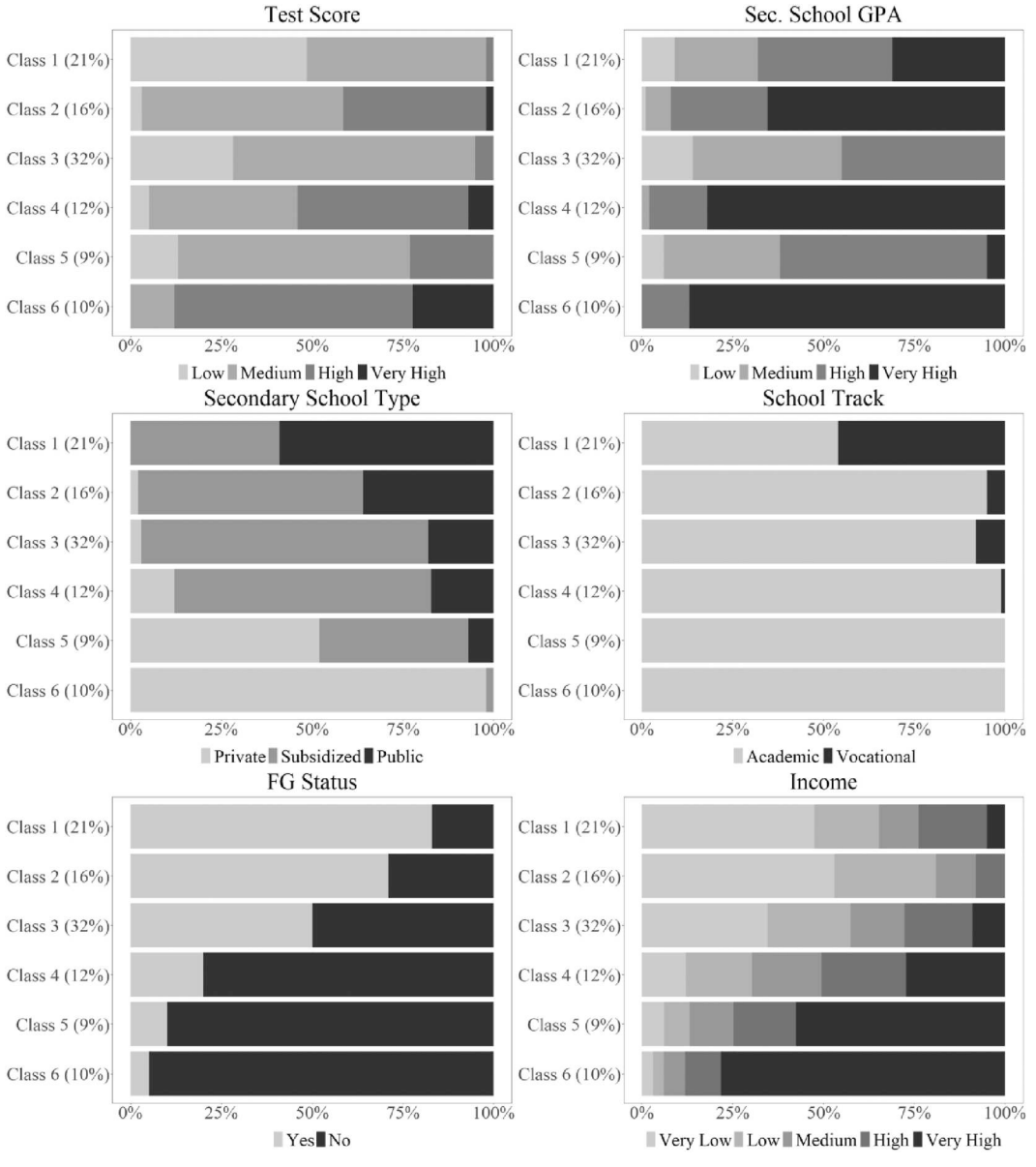

Figure 1. Latent probability profile plot: Students' typologies by their academic and socioeconomic characteristics.

Latent Class 5 (9% of the total) includes students from families with very high incomes and parents who have attended tertiary education. A significant proportion of these students attended private, academically oriented schools. They demonstrate satisfactory academic performance at the secondary level and average performance on selection tests. Lastly, Latent Class 6 (10%) represents the most advantaged group in terms of socioeconomic and academic background. A substantial proportion of these students were enrolled in private schools. Their parents had attended tertiary education, and their family income was considerably higher. Additionally, this class consistently exhibits the highest academic performance at the secondary level and in university selection tests.

University clusters

The cluster analysis employed an iterative approach to determine the optimal number of clusters. First, the total within-cluster sum of squares (WSS) was compared across models with different numbers of clusters. This comparison served to preliminarily identify the optimal number of university clusters, resulting in models with five to seven groups. Second, the interpretability of each model was assessed to select the final solution.

When comparing the clusters of universities between the models with five and six clusters, three clusters remained unchanged, while the other two were divided into three clusters. Analyzing the composition of their enrollment revealed that these new clusters differ from each other and their predecessors. The transition from five to six clusters allows for a better distinction among the most selective universities, categorizing them into elite, high-selectivity, and medium-high selectivity universities. In contrast, when examining the change between the model with six and seven clusters, no discernible change was observed in enrollment distributions. Therefore, the model comprising six university clusters was selected.

Figure 2 illustrates the distribution of enrollment across each cluster, while Table 2 lists the number of universities in each group, some of their institutional characteristics, and whether they were subject to the free-tuition policy. Appendix 2 (k-means clustering) lists the universities included in each cluster, and Appendix 3 provides the full names of these institutions. The clusters were organized in descending order based on the socioeconomic level of their students.

The clusters can be grouped into two main categories. The first category includes two clusters that represent the elite sector of the university system, as they enroll a high proportion of students from high socioeconomic backgrounds (Clusters 1 and 2). Both clusters comprise a small number of institutions, all located in Santiago, the capital of Chile. However, they differ in their participation in the free tuition policy, which results in one cluster exhibiting high academic selectivity while the other reflects high social selectivity.

The second group consists of four clusters is made up of institutions distributed across the country that enroll students from lower socioeconomic and academic backgrounds.[3]

Regarding the elite sector, Cluster 1 is composed of three new private universities. None of them participates in the tuition-free policy. This is reflected in practically no students from low socioeconomic backgrounds (Classes 1, 2, and 3) enrolling in these institutions. One out of two students belong to Class 6 and one out of four to Class 5. Although these universities primarily enroll students from privileged socioeconomic backgrounds, their academic performance before entering university is not the highest (Table 2).

The second cluster comprises the country's oldest and most prestigious universities. This group includes one public and one traditional private university, both participating in the free tuition policy (see Table 2). These universities admit students with high academic performance, regardless of their socioeconomic background. This distinguishes them from the universities in Cluster 1 and is reflected in the fact that 23% of their students belong to Class 2 (low socioeconomic and high academic level), compared to 16% in the general population. Another 24% of students come from Class 4, which corresponds to a middle-high socioeconomic background and high academic performance. However, despite this diversity, the majority of their first-year enrollment is still concentrated among students from the highest socioeconomic group. 37% of their students belong to Class 6, compared to only 10% of the overall first-year population (Figure 2).

On the other hand, the second group consists of clusters of universities whose student enrollment reflects greater socioeconomic and academic diversity. This group includes the majority of Chilean universities, many of which participate in the tuition-free policy. The first of these clusters (Cluster 3) comprise nine traditional universities, eight located in cities other than Santiago. All of them are subject to the free-tuition policy. In general, the student body of these universities is similar to that of Cluster 2, but with lower socioeconomic and academic levels. Almost 70% belong to

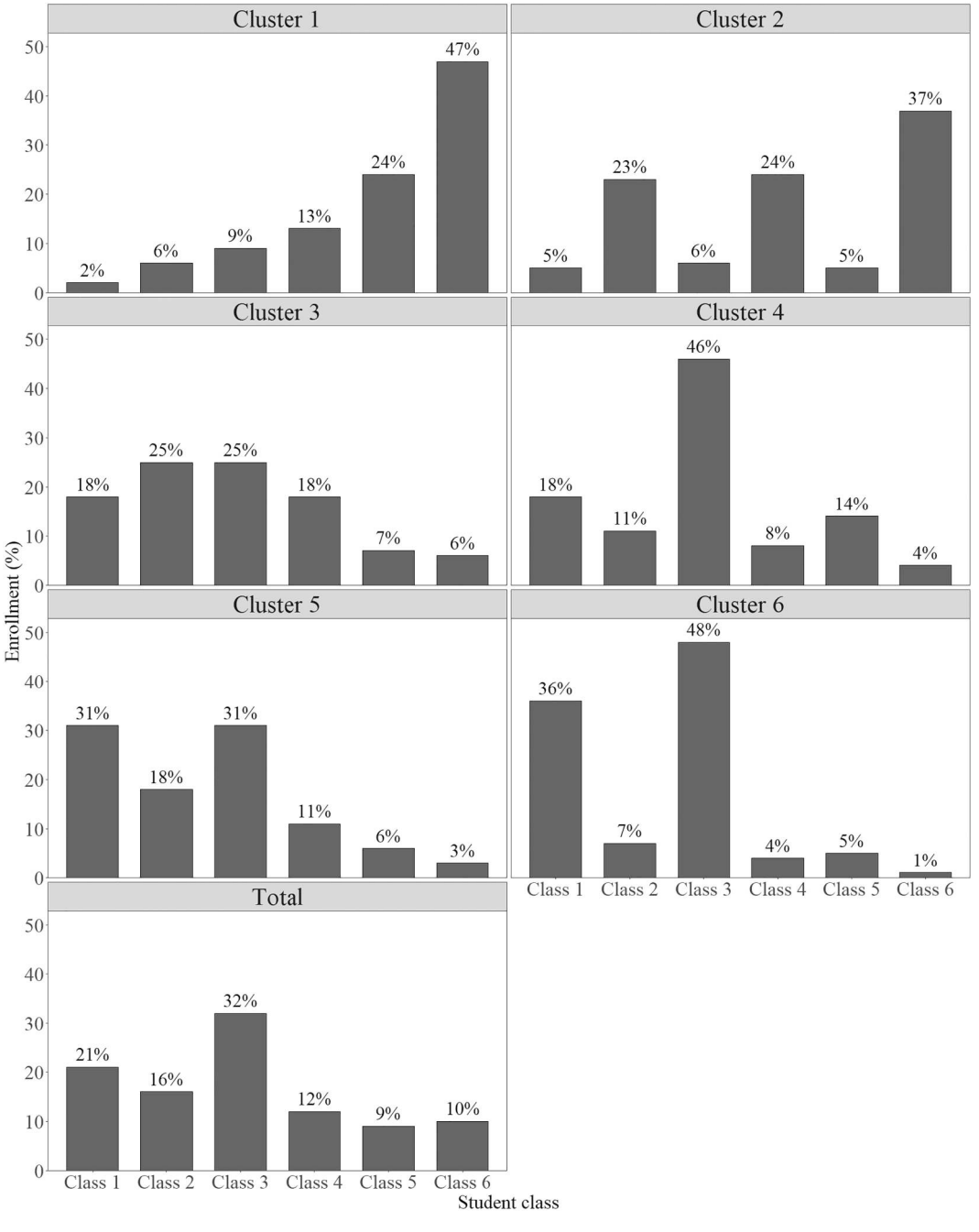

Figure 2. Enrollment distribution by university cluster.

Latent Classes 1, 2 and 3. However, these universities admit students with good previous performance: 25% of their students are from Class 2, while 18% belong to Class 4.

Cluster 4 comprises eight universities and has the second-largest number of students enrolled. The institutions are almost all new private institutions located in Santiago, and half are ascribed to tuition-free policy (Table 2). Figure 2 shows that these universities have heterogeneous enrollment. Although half of their students belong to latent class 3 (medium socioeconomic and academic

Table 2. Description of university clusters.

		University Type			Geographic Area				
Cluster	N	Public	Traditional Private	New Private	Santiago	Other regions	Free tuition policy	Enrollment	Avg. Test Score
1	3	–	–	3	3	–	–	3,573	618
2	2	1	1	–	2	–	2	8,260	653
3	9	4	5	–	1	8	9	19,306	581
4	8	1	–	7	8	–	4	16,692	552
5	8	6	2	–	–	8	8	8,341	543
6	15	6	1	8	9	6	13	16,212	514

Source: Authors' elaboration.

level), at the same time they receive 18% of students from class 1 (low socioeconomic level and admission test results) and 14% from latent class 5 (high socioeconomic level and medium-high academic level).

The fifth cluster includes eight traditional universities. All of them are located outside Santiago and offer free tuition. Most students in these institutions come from low socioeconomic backgrounds, with one out of every two belonging to classes 1 and 2. Academically, the cluster exhibits some heterogeneity. While over 60% of students come from low-performing classes (1 and 3), 29% come from Class 2 and 4, two high-performing latent classes. The last cluster is the largest in the number of institutions, although it ranks third in terms of the number of students enrolled. Most universities in this group are newly established private institutions and nine are in Santiago. Only two of these universities are not affiliated with the free tuition policy. The student body predominantly comprises students from low socioeconomic backgrounds and with low test scores (approximately 85% of the students belong to classes 1 and 3).

Finally, the differentiation of the clusters was analyzed based on the disciplinary orientation of the universities. Appendix 4 presents the distribution of first-year enrollment within each cluster by field of study. Some relevant differences can be observed. For example, Cluster 1 stands out for its high proportion of students enrolled in Business and Management programs (20%), nearly twice the overall average. In turn, Cluster 3, composed of traditional universities with medium to high selectivity, shows a particularly strong presence of students in STEM fields, accounting for 40% of its enrollment. At the other end of the spectrum, Cluster 6 has a higher concentration of students in the fields of social sciences and health.

To assess whether the composition of the clusters reflects the disciplinary orientation of the universities, the cluster analysis was replicated using a subset of institutions that offered programs in at least four out of the eight fields of study. The results were consistent with the original analysis.

Discussion

The growing differentiation within mass higher education systems has led to new forms of inequality in access. Evidence from hierarchical institutional contexts indicates that students enroll in different types of institutions depending on their academic and socioeconomic backgrounds (Czarnecki 2018; Luo, Guo, and Shi 2018). In Chile, the findings of this research allow us to identify six distinct entrance profiles. While most students entering the university system performed well at the secondary level, our findings show that success on admission tests is closely aligned to their socioeconomic background. This pattern is consistent with previous research, which suggests that educational systems often reward students who possess greater economic, cultural, and social capital (Lareau 2015; Reay 2022).

This results in a non-random distribution of students across institutions, which mirrors the broader patterns of social stratification in the country. In Chile, a small elite holds a disproportionate share of resources, while most of the population is situated in less advantageous social positions (Cortes-Orihuela et al. 2024). The higher education system perpetuates this divide through a

binary segmentation into an elite sector and a non-elite sector. This form of segmentation can be interpreted as the outcome of competition among institutions for the appropriation and accumulation of different forms of capital, economic, cultural, and symbolic, that define their relative positions within the higher education field (Naidoo 2004). The findings of this study suggest that institutional hierarchies reflect power dynamics within a structured field, where institutions compete for legitimacy, prestige, and selectivity by attracting students with particular characteristics (Boliver 2015; Croxford and Raffe 2015; Quaresma and Villalobos 2022).

One important institutional characteristic that influences the diversity of student profiles between clusters is the disciplinary orientation of universities. Previous research has shown that the choice of field of study is not socially neutral, as students from different socioeconomic backgrounds tend to choose different fields of study (Lessky, Nairz, and Wurzer 2022; Yu and Hsieh 2022). In Chile, the results of this study reveal differences in academic disciplines across university clusters, with elite clusters having a higher concentration of students in Business and Management and STEM programs. This observation aligns with previous national studies, which have shown that certain prestigious programs – such as Business (Bussines and Management) and Civil Engineering (STEM) – have become privileged spaces for the formation of the country's economic and political elites (Kuzmanic et al. 2021; Villalobos, Quaresma, and Franetovic 2020).

At the institutional level, the segmentation patterns observed in this study are consistent with findings from other systems, such as the French (Winkler and Sackmann 2020) or British (Boliver 2015), revealing two small groups of universities that attract the most privileged students in terms of social and academic background. On the one hand, two of the oldest and most prestigious universities in Chile enroll students who demonstrate outstanding academic performance in secondary school and university admission tests (Villalobos, Quaresma, and Franetovic 2020; Zimmerman 2019). Although many come from the country's socioeconomic elite, these universities admit high-achieving students from low- and middle-income backgrounds. This reflects their emphasis on 'academic merit' and a relatively greater degree of social openness (Quaresma and Villalobos 2022; Valenzuela et al. 2023).

On the other hand, three new private universities have emerged as the preferred option for upper-class students, despite having lower institutional prestige (Villalobos, Quaresma, and Franetovic 2020). The emergence of these institutions as a second elite cluster represents a significant transformation in the segmentation of the Chilean university system after its massification (Valenzuela et al. 2023). At least two factors can explain this configuration. First, the non-adherence of these universities to the free-tuition policy, coupled with their elevated tuition fees, acts as a barrier for students with lower economic capital (Marginson 2016). Second, upper-class students are likely to perceive a close alignment between their habitus and the institutional habitus of these universities (Espinoza et al. 2023b; Palma-Amestoy 2022). As a result, these institutions serve as exclusive socialization spaces for the elite, reproducing exclusionary mechanisms as legitimate institutional differentiation (van Zanten 2009).

In contrast, a larger group of universities admit students from lower socioeconomic backgrounds with medium or medium-low academic performance on the admission tests. Private universities with the lowest selectivity and some public institutions (Cluster 5 and 6) tend to enroll students from the most disadvantaged backgrounds and with the weakest academic preparation. This highlights the role the private sector has assumed in the expansion of higher education, in Chile and in other middle-income countries (Marginson 2016). In massified systems, private universities have emerged as key providers of higher education, absorbing a substantial share of the new demand for university enrollment (Arantes 2021; Quaresma, Villalobos, and Torres-Cortes 2021).

Finally, it is important to acknowledge some limitations of the analysis. While the methodology employed allowed us to map the structural segmentation of the Chilean system, it does not shed light on the motivations behind students' decisions nor does it address how universities' admission policies or institutional cultures might shape the observed patterns. Furthermore, the data used in this study come from administrative records, which limits the depth of available socioeconomic

variables and rely on self-reported information by students. One aspect not captured in this study is the geographical origin of students, which may be relevant in the Chilean context given the country's regional socioeconomic disparities. The concentration of middle and upper-class populations in Santiago may help explain why universities in the capital city, regardless of their prestige, might be more likely to attract students from higher socioeconomic backgrounds.

Conclusion

In light of the expansion and massification of higher education, new and increasingly complex forms of differentiation have emerged. The present study aimed to analyze the segmentation of the Chilean university system based on the socioeconomic and academic characteristics of the students it enrolls. In a context where massification has reached a point of stagnation, the study examined how students are distributed across institutions. The aim was to describe the form that inequality in access to higher education takes, even after its expansion.

First, the results allowed for the identification of six student profiles within the Chilean university system. Latent class analysis showed a strong alignment between students' socioeconomic origin and their previous academic performance, particularly on university admission tests. Second, the findings revealed a general pattern of binarism in the structure of the system. On one side, two small groups of universities concentrate students with the highest levels of academic achievement and socioeconomic background, respectively. On the other, four larger groups of institutions enroll most students from lower socioeconomic backgrounds and those with medium to low performance on admission tests.

These findings illustrate some of the consequences of the massification of higher education under the deepening of market-oriented logics, as exemplified by the Chilean experience over the past forty years. The alignment between students' socioeconomic origin and their performance on university admission tests provides evidence of the role that these tests play in perpetuating inequalities, by exposing the cumulative inequalities embedded in students' prior educational trajectories. Additionally, the expansion of higher education, largely driven by the deregulation of the private sector, has led private universities to assume two distinct roles within the Chilean system. In this context, the private sector has contributed to the reproduction within the university system of the broader patterns of social stratification found in Chilean society, enabling the socioeconomic elite to create and sustain exclusive institutional spaces.

By constructing university groups inductively based on the socioeconomic and academic profile of their student bodies, it was possible to identify patterns of differentiation that remain obscured when institutions are grouped solely by formal characteristics. This approach allowed us to observe how social inequality is reproduced within the university structure, reflected in institutional segmentation. This analytical perspective contributes not only to understanding inequality in access but also to theorizing how higher education systems operate as stratifying fields that reflect and reproduce broader social hierarchies.

Although the Chilean case has specific features, the implications of this study may inform policy in other systems that have undergone rapid massification, limited state regulation, and high levels of privatization. Within this context, the findings underscore that massification alone does not guarantee a more equitable distribution of educational opportunities. On the contrary, without redistributive policies, expansion may even reinforce existing social inequalities. It is, therefore, essential to advance policies such as the strengthening of affirmative action programs to promote access for diverse social groups, the assurance of quality in universities that enroll the most socioeconomically disadvantaged students, and the development of financial support mechanisms that foster successful educational trajectories within the system.

Nonetheless, further research is needed to deepen our understanding of institutional segmentation and access inequality. Future studies could incorporate qualitative approaches or implement student surveys to examine students' perceptions, aspirations, and decision-making mechanisms.

In addition, it would be valuable to explore the extent to which institutional differentiation based on student profiles aligns with other characteristics of universities, such as their academic orientation, prestige, and graduates' labor market outcomes. Furthermore, future research should complement this analysis by examining the total university enrollment rather than focusing exclusively on first-year students. Finally, it is important to examine the employment outcomes of graduates from different university clusters more closely. To what extent does the observed segmentation in university access shape graduates' trajectories in the labor market? Answering these questions is essential for evaluating the degree to which Chilean higher education contributes to the reproduction, or reduction, of social inequality.

Notes

1. A total of 19,287 records correspond to students who did not declare their family income level. The remaining 2,315 correspond to cases missing one or more variables. After an examination of the students without family income information, it was confirmed that they are randomly distributed with respect to the other variables used in the analysis. Consequently, the number of missing values does not represent a limitation for the purposes of the analyses conducted.
2. The term 'class' as used here refers to the results of the latent class statistical procedure. It does not refer to the concept of social class used in sociological studies.
3. When the clustering algorithm was changed (PAM and hierarchical clustering), the results did not vary significantly, and the two-group structure of clusters remained consistent. One group corresponds to elite institutions, while the other consists of clusters made up of universities that enroll students from lower socioeconomic backgrounds. The comparative results are presented in Appendix 2.
4. Both the university admission test scores and the school GPA-based score range from 150 to 850 points. However, only the admission test scores are standardized to follow a normal distribution with a mean of 500 and a standard deviation of 110. Therefore, we categorized university admission test score to reflect this distribution. In contrast, school GPA score is not standardized, so its categorization was based on uniform intervals of 100 points.
5. In the Chilean educational system, *subsidized schools* are privately managed institutions that receive public funding from the government. These schools operate under a mixed-financing model, combining state subsidies with private contributions, and represent a middle ground between fully public and fully private schools.
6. The academic track is a form of secondary education that prepares students for university-level studies. The vocational track is designed to provide students with the skills and knowledge required for employment.

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Appendices

Appendix 1

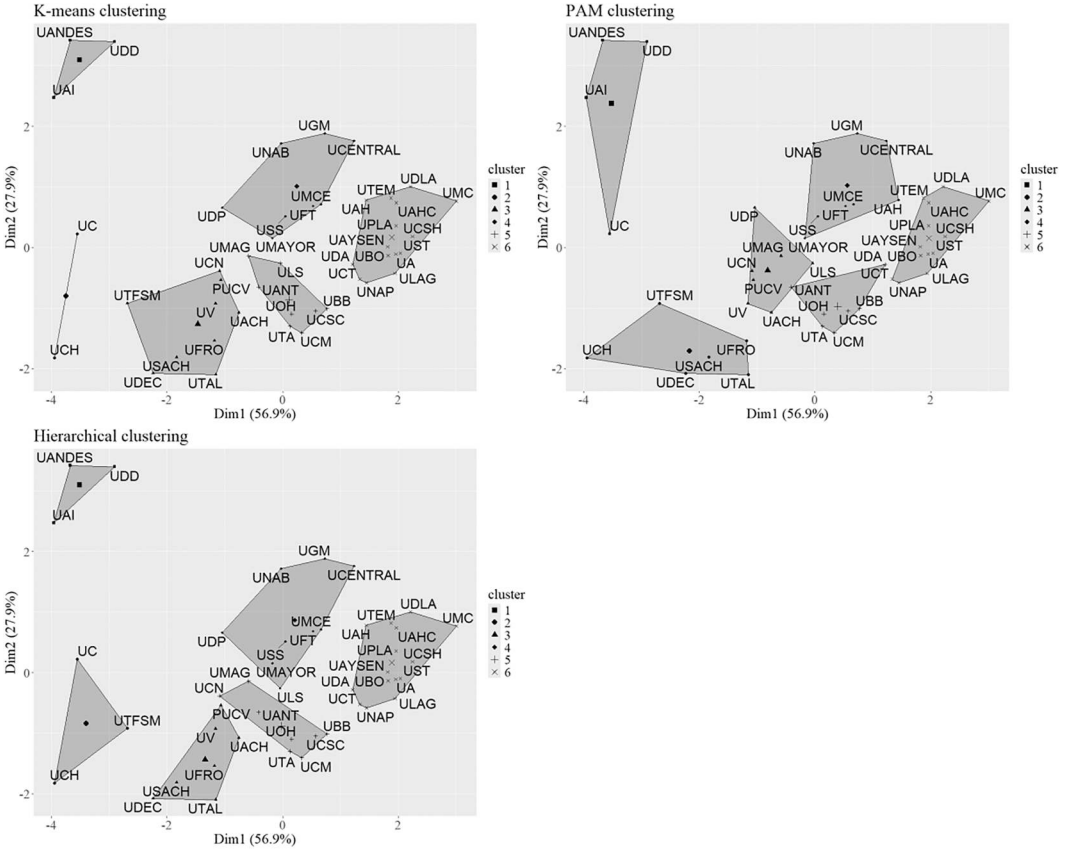
LCA fit statistics

	2 classes	3 classes	4 classes	5 classes	6 classes	7 classes	8 classes
N	72384	72384	72384	72384	72384	72384	72384
(%)	75	63	21	12	12	7	14
	25	18	20	23	16	15	9
		20	45	31	10	12	16
			14	10	32	15	23
				24	9	6	5
					21	18	7
						26	10
							15
Parameters	29	44	59	74	89	104	119
-LL (df)	410436(930)	407108(915)	403608(900)	402701(885)	402309(870)	402066(855)	401907(840)
LLRT (df)	-	6656(15)***	7000(15)***	1814(15)***	784(15)***	486(15)***	318(15)***
AIC	820929	814303	807334	805549	804796	804339	804053
BIC	821196	814708	807877	806229	805614	805295	805147
Entropy	0.75	0.68	0.63	0.59	0.60	0.60	0.55
ALCPP	0.93	0.85	0.79	0.74	0.71	0.69	0.63

ALCPP = Average latent class posterior probability
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Appendix 2

Sensitivity analysis results: K-means, PAM and Hierarchical Clustering



Appendix 3

Names and initials of the universities included in the study

Initial	Name	Initial	Name
PUCV	Pontificia Universidad Católica de Valparaíso	UDP	Universidad Diego Portales
UA	Universidad Autónoma de Chile	UFRO	Universidad de La Frontera
UACH	Universidad Austral de Chile	UFT	Universidad Finis Terrae
UAH	Universidad Alberto Hurtado	UGM	Universidad Gabriela Mistral
UAHC	Universidad Academia de Humanismo Cristiano	ULAG	Universidad de Los Lagos
UAI	Universidad Adolfo Ibáñez	ULS	Universidad de La Serena
UANDES	Universidad de Los Andes	UMAG	Universidad de Magallanes
UANT	Universidad de Antofagasta	UMAYOR	Universidad Mayor
UAYSEN	Universidad de Aysén	UMC	Universidad Miguel de Cervantes
UBB	Universidad del Bío Bío	UMCE	Universidad Metropolitana de Ciencias de la Educación
UBO	Universidad Bernardo O'Higgins	UNAB	Universidad Andrés Bello
UC	Pontificia Universidad Católica de Chile	UNAP	Universidad Arturo Prat
UCENTRAL	Universidad Central de Chile	UOH	Universidad de O'Higgins

(*Continued*)

Continued.

Initial	Name	Initial	Name
UCH	Universidad de Chile	UPLA	Universidad de Playa Ancha
UCM	Universidad Católica del Maule	USACH	Universidad de Santiago de Chile
UCN	Universidad Católica del Norte	USS	Universidad San Sebastián
UCSC	Universidad Católica de la Santísima Concepción	UST	Universidad Santo Tomás
UCSH	Universidad Católica Silva Henríquez	UTA	Universidad de Tarapacá
UCT	Universidad Católica de Temuco	UTAL	Universidad de Talca
UDA	Universidad de Atacama	UTEM	Universidad Tecnológica Metropolitana
UDD	Universidad del Desarrollo	UTFSM	Universidad Técnica Federico Santa María
UDEC	Universidad de Concepción	UV	Universidad de Valparaíso
UDLA	Universidad de Las Américas		

Appendix 4

Distribution of First-Year Enrollment by Field of Study and University Cluster"

Field/Cluster	Cluster 1 (%)	Cluster 2 (%)	Cluster 3 (%)	Cluster 4 (%)	Cluster 5 (%)	Cluster 6 (%)	Total (%)
Business & Management	20	9	11	8	9	6	9
Agriculture	0	5	3	6	2	5	4
Arts & Humanities	7	13	6	7	5	6	7
STEM	21	29	40	14	28	11	24
Social Science	12	15	9	13	9	19	13
Law	11	7	6	7	6	8	7
Education	1	5	8	4	16	9	8
Health	27	15	18	40	25	36	28
Total	100	100	100	100	100	100	100