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Better together? Student's benefits of educational market integration.*

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Abstract

Educational market integration have become a common practice in various countries, changing potentially student's application and enrollment behavior. We implement a difference-in-difference estimation exploiting student's geographic exposure to market integration in Chile to understand student's gain and losses from this process. Using administrative data, we show that the market integration process has no effect on overall university enrollment but changes the enrollment composition: new platform institutions increased enrollment and old ones decreased. The reduction in application costs and the release of additional information, particularly historical cutoff data, seem to play a more significant role in shaping these dynamics than the congestion reduction. Heterogeneity analysis shows that low-income students enrollment increase, reflecting application barriers to decentralized admission institutions and implying gains in equity and efficiency of the system.

JEL Classification: D47, I23, I28.

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1 Introduction

Students in a large number of countries are increasingly facing integrated educational markets, where centralized assignment platforms organize student's applications and enrollment process in an effort to increase market efficiency (Neilson, 2019). However, in these integrated markets students often also have off-platform options, which were excluded for historical or political reasons. (e.g., private versus public institutions).¹ This market setting might entail significant costs to students when trying to join platform institutions, such as 1) congestion when platform institutions try to fill rejected offers with waitlisted students;² and when trying to join off-platform institution, such as 2) application costs induced by off-platform universities' commuting³ and offer search cost,⁴ and 3) admission information cost for off-platform majors, such as admission cutoffs. The process of market integration removes partly these costs, but whether this process results in students enrolling more overall, more often in off-platform institutions, or exhibit a dynamic behavior depends on which mechanisms prevail over the others.

The inclusion of eight new universities in Chile's already-existing centralized admission platform provides an ideal setting to explore the student's behavior when educational markets become more integrated, using a quasi-experimental design. In 2010, the 25 universities managing and operating the centralized admission system (G25) invited the remaining private off-platform universities to join the platform. Eight universities joined the platform (G8), while the remaining private universities stayed off the platform (OP). The G8 are located in four commuting zones in Chile, and their inclusion increased the number of platform seats offered by 37%. Following Card (1993); Currie and Moretti (2003); Cantoni and Yuchtman (2014), we exploit the fact that students tend to enroll in a university that is close to their home and conduct a difference-in-difference analysis comparing students graduating from high schools in commuting zones that have a G8 (G8 CZ) and do not have G8 (non-G8 CZ) in it.⁵

¹For instance, the Common Application system in the US did not allow public institutions until 2002, the Brazilian centralized admission system did not accept private institutions when created in 2010, and the Chilean centralized university admission system did not allow recently created private universities until 2010.

²Congestion in markets happens when there is limited timing for transactions resulting in matching inefficiencies or no transactions (Roth and Xing, 1994, 1997; Niederle and Roth, 2009).

³Off-platform universities often only receive applications in person on first come first served basis.

⁴In integrated markets, students can observe all the programs available, and their characteristics, in one place, while institutions benefit from shared channels to communicate program information to students.

⁵We acknowledge that students decide where to enroll on other factors as well, such as university's cost and quality. In the paper we show that G8 universities have higher tuition fees and are of similar quality than G25 universities. Moreover, we show that G8 universities are located nearby competing G25 universities. The platform integration did not change any of these margins.

Our analysis uses individual level administrative data on the universe of high school graduates, which is paired with student’s high-stake exam score, platform applications and university progression data. We begin by showing that, as expected, the platform integration increased the number of platform users by 13 percentage points (pp.) and decreased the proportion of students rejecting a G25 offer. This last result implies a more efficient market that suffers less from waitlist congestion. However, we find that the platform integration did not affect student’s university enrollment in the subsequent years but changed their enrollment composition by institution type in a dynamic way. The year of the market integration, student’s G8 and G25 enrollment remain unchanged; but one year after the integration, student’s G8 enrollment increases by 3pp. (statistically significant at 5% level) and G25 enrollment decreases 1.6pp. (non-statistically significant). These effects are also followed by an increase in student’s sorting into programs. We provide suggestive evidence that the mentioned effects are driven by the release of previous year admission cutoffs for programs joining the platform, which happens the year after the integration (the integration year there is not previous year platform cutoffs).⁶ The historical admission cutoff seems to inform student’s about their probability of being admitted into a program and therefore, induce more informed student’s decisions. Finally, we show that low-income students are 3.6pp. more likely to enroll in university after the integration. This seems to happen because of lower student’s application costs to new platform university after the platform integration. All results together suggests that application and cutoff information costs could affect student’s decision making and that the platform integration has both equity and efficiency effects.

We show that our results are robust to alternative explanations. First, we show that results are not driven by the platform integration increasing the fraction of students taking the test or meeting the platform usage requirements. Second, we also evaluate whether the integration increased the fraction of students in the control group interested and enrolled in G8 commuting zone universities. Using data on ex-ante preferences of study location, we show that control group students do not seem to prefer more G8 commuting zone universities after the integration. Third, results do not change if students’ location restriction is set at the regional rather than at the commuting zone level. Finally, we provide evidence suggesting that universities did not react by increasing the number of seats, degrees offered or increasing their enrollment yield.

We add to the literature studying the integration of education markets. Liu et al. (2007) and

⁶Off-platform programs enrollment (including G8 programs in pre-integration years) is based on first come first serve system, and thus do not publish admission cutoff.

Knight and Schiff (2022) study the effects of including more institutions to the Common Application system in the US on institutions and find that universities receive more applications and mixed results on SAT university acceptance scores. They explore a setting where the application stage is centralized for all member institutions (like us) and the assigning stage is decentralized (unlike us). Machado and Szerman (2021) study the effect of the gradual integration of the clearinghouse Brazilian university education market on institutions and find that university student bodies have a higher proportion of men and of students coming from far away towns. We add to this literature by exploring the effects of a market integration on student’s outcomes (which might differ from institutional gains) and in a clearing house setting which is common to many educational settings (e.g. Brazil, Turkey, France, Germany, Taiwan). Although we do not detect strategic responses from universities due to the platform integration, this is not the focus of our paper since the decision of joining the platform is endogenous in our setting.

Our paper also relates to the literature studying the design of education markets. This literature argues that centralized admission markets are more efficient and improve student’s welfare (Abdulkadiroğlu et al., 2017; Calsamiglia et al., 2020; Hafalir et al., 2018). Kapor et al. (2022) is the paper closest to ours in this literature. They evaluate the same platform integration using an event-study type empirical analysis and a structural model, and shows the welfare effects of the integration. Kapor et al. (2022) shows that the platform integration increases enrollment by 7pp. in their event study analysis. When comparing their empirical results with ours, we show that most of the difference between the two estimates disappears when comparing students in treatment and control CZ. This highlights the relevance of having comparable groups and testing the hypothesis supporting the validity of the analysis when conducting the quasi-experimental analysis in our setting. Moreover, we show that the platform integration results are dynamic since there are not visible changes in G25 and G8 enrollment the integration year, but this changes one year after the integration, arguably due to more information to students.

Our research also builds on the literature evaluating how market design and incentives can shape access to universities. Recent papers have shown that affirmative action has positive general equilibrium effects mostly because targeted students have, on average, less profitable second options (Black et al., 2020; Bleemer, 2020; Otero et al., 2021). Our results on low-income students show that their enrollment increase likely due to the removal of application cost.

In the following section, we describe the context in which this platform integration occurs.

Section 3 presents the data and the empirical strategy. Sections 4, 5 and 6, present the results, the heterogenous analysis and the robustness tests of our results, respectively. Section 7 concludes.

2 The educational market

The Chilean higher education market is the result of a series of reforms described in Appendix Section A.1. Broadly speaking, this market compresses two groups: 1) 25 universities, which are very prestigious and with a long tradition (created before 1981), and are grouped in a consortium called the “Council of Deans” (herein, G25); and 2) less prestigious newly created private universities (created after 1981).

The centralized assignment system

For more than 50 years, G25 universities have allocated their seats using a centralized assignment platform, which operates at the national level and has remained virtually unchanged. The assignment process starts when high school graduates take the high-stake exam (PSU, by its Spanish name *Prueba de Selección Universitaria*). The PSU is a large-scale assessment that is administered simultaneously country-wide, and it is based on a set of multiple-choice questions. The PSU comprises two mandatory tests (math and Spanish) and two optional tests (history and science). All PSU test scores are standardized to resemble a normal distribution with a mean of 500 points and a standard deviation of 110 points, thus providing a ranking of students (rather than their level of knowledge) that is not comparable across years. The minimum assigned PSU score is 150 points and the maximum is 850 points. Most high school graduates take the PSU - 76% of high school graduates and 93% of academic-track high school graduates - in the years before the platform integration.

After students get their PSU scores, those obtaining a Spanish-math average of at least 450 points and taking one of the optional tests can apply through the platform. Within four days of getting their scores, students can apply online to all G25 universities in the country using the platform, and major’s seats are later assigned as in the college-proposing deferred acceptance algorithm (Gale and Shapley, 1962). This ensures that students receive only one seat offer, from their most preferred feasible major. In other words, if each major offers h seats, students receive an offer from their most preferred major in which they are ranked among the top h applicants. The

process described generates a series of major's PSU cutoffs scores, which corresponds to the PSU score of the student ranked in the h^{th} position.⁷ Students can apply to up to ten majors through the platform.⁸ Notice that before submitting applications, students know (from newspapers and websites) the number of seats offered, the previous year admission cutoff (used to evaluate admission probability), and their application score for each major-university (herein, program) applied. When the application process is over, the list of accepted and waitlisted students, along with their corresponding application score and ranking, is also publicly available. The processes described up to this point – test administration and platform application – are coordinated by the Council of Deans.

Each university manages enrollment and waitlist clearance in a decentralized manner. Students can enroll in the program they got an offer from by paying a matriculation fee. After this, universities can fill seats available, because of rejected offers, with waitlisted students by contacting them directly (e.g., through phone calls). Waitlisted students taking a seat must follow the enrollment process explained above. This occurs in a very tight schedule and presents some inefficiencies, as waitlisted students are often enrolled in another university or might be hard to reach (e.g. they might not pick up the phone). After this process is over, universities go on holiday and prepare for the next academic year. Frictions in the process of contacting waitlisted students can lead to congestion in our setting.⁹ Appendix section D presents in more detail the consequences of these frictions focusing on the 2010 admission process. We found that if frictions were removed overall enrollment could increase at most by 1.6%. On the other hand, frictions can partly drive a suboptimal allocation of students since the clearing waitlist process does not allow programs to fully fill their vacant seats with top ranked waitlisted students. We are unable to test that the waitlist clearance frictions result in suboptimal allocation because there exist special admissions (e.g. admission of elite athletes), which is also a source of major's enrollment that do not follow top ranked students.

The decentralized assignment system

Universities off the platform have a decentralized admission system with very few regulations. The admission process also starts after PSU scores are released. In the seats allocation process,

⁷Notice that this is for oversubscribed majors. Majors that are not oversubscribed do not have a cutoff since every students who meets the application requirements would be accepted.

⁸We observe in the data that around 70% of students were accepted in their first two options and more than 80% were accepted in their first three options. This suggest that for most students the number of majors to which they can apply was not bidding.

⁹Since there is limited timing for enrolling waitlisted students in this process, there is room for matching inefficiencies (or no matching at all) when trying to fill seats with these students.

students have to present themselves in-person with certificates showing their PSU score and high school GPA. Enrollment in the student's preferred program occurs on a first come first serve basis and under two conditions: 1) there are seats available, and 2) the student has the required minimum GPA and PSU score. Usually, if there are no seats available for a particular program, students are offered a seat in a different program. Notice that the first-come-first-serve enrollment process does not generate major's PSU cutoff scores, since the cutoff is set by time (the last student who arrived and met the two requirements above).

Off platform universities enroll students until right before the academic year starts. Given this, most of the off platform enrollment tends to occur after platform universities allocate their seats.

The decentralized application and admission process conducted by these universities introduce an extra search cost (information and economic) to students. If students want to know for a particular major, for instance, which optional test is required or if there is a minimum score requirement, they will have to do the search program by program using different sources (e.g., phone calls or asking in person). After sorting this information, they have to go physically to the university, in order to enroll, with the possibility of not finding a seat available in their preferred option. More details about the application and enrollment process are described in Appendix Section A.2.

The inclusion of eight universities to the platform

In 2011, the G25 invited the 33 private universities to join the university admission platform. The invitation resulted in eight private universities joining the platform (herein, G8), while the remaining decided to stay off the platform (OP).¹⁰ This increased by 37% and 51% the number of seats offered in the platform overall and in the particular commuting zones where the G8 were located, respectively. Universities joining the platform benefit from being part of the online centralized admission system and providing information about their major at no cost. However, they commit to only enroll students through the platform and to comply with its requirements.

Appendix A.3 suggests that G25 and G8 universities are similar in terms of students selectivity. In particular, Appendix Table A1 shows that students attending G8 and G25 universities obtained similar PSU scores before the platform integration, while those attending OP universities obtained lower scores. Ideally, we would also like to compare G25 and G8 universities by their quality. Un-

¹⁰Participating in the platform did not imply that G8 universities could enter the Chilean Council of Deans. OP universities are present in all G8 and G25 commuting zones.

fortunately, there is no governmental or private classification of the Chilean universities by their quality.¹¹ Some literature has attempted to construct taxonomies of the Chilean universities based on indexes of massiveness, research, and teachers' qualifications, among other variables. Within the categories shown in this literature, G25 and G8 university perform relatively similar.¹²

Appendix A.3 also shows that students enrolling in G25 seem to come from a lower socioeconomic background and more often from public schools than those enrolling in G8. Differential preferences, information, and application costs might explain this last pattern. Appendix Table A2 suggests that tuition fee cost could also explain this pattern, as G8 universities have a higher annual major's tuition cost in pre- and post- platform integration years than G25 universities. Interestingly, the G8-G25 tuition cost gap does not seem to narrow or grow after the platform integration.

3 Data and empirical strategy

3.1 Data

We have access to four administrative datasets between 2006–2013 provided by the Chilean Ministry of Education. First, the General Student Information System (*Sistema de información general de estudiantes* in Spanish) provides information on student's characteristics (gender, 12th grade attendance and GPA) and student's high school characteristics (school id, geographic location, whether the school is an academic one, and whether it is a public, private or voucher school) for the universe of students graduating from Chilean high schools.

Second, the University Admission Test dataset provides information on students' PSU scores (in math, Spanish, history, and sciences) and high school average GPA (average from 9th and 12th grade). This dataset also contains the student's ranking-ordered list of program preferences, along with their corresponding application's score, seat offer status – including waitlist – and the cutoff for each program. This information is not available for off-platform universities. Also, the PSU includes a questionnaire providing (self-reported) student's family characteristics measured at the end of 12th grade, such as family income per capita.

¹¹No national or international ranking incorporates all G8 and G25 universities. International rankings usually include only some of these universities.

¹²This literature has shown that universities can be classified commonly within four groups: (1) those dedicated to research, (2) mass-oriented, (3) those oriented to teaching, and (4) the elitist (see e.g., Torres and Zenteno (2011); Muñoz and Blanco (2013); Mondaca et al. (2019)); and G8 and G25 universities are similarly distributed among these groups.

Finally, the Information System for Higher Education (*Sistema de información de la educación superior* in Spanish) includes yearly information on students' enrollment status, along with the corresponding program, university, city, and financial aid information.

The datasets described above also provide a (unique) student identifier number that allows us to match students across datasets and follow them over the years.

3.2 Empirical strategy

Following Card (1993); Currie and Moretti (2003); Cantoni and Yuchtman (2014), we exploit the fact that students tend to enroll in universities located in their commuting zone of residence since this allows them to avoid extra commuting and housing costs when attending the local university.¹³ In our case, the costs associated with enrolling in a university outside the students' commuting zone are presumably large. For instance, those students will have to either rent a room in the commuting zone where the university is located or commute every day for at least 90 minutes to arrive at the university in which they have classes. We discuss the validity of our research design in Section 3.5.

We consider that students who live close to G8 universities are strongly affected by the platform integration, while those living far away are less affected. In this framework, we define our treatment group as those students who graduated from high schools in a commuting zone that host a G8 university (G8 CZ, hereafter).¹⁴ Conversely, our control group comprises students graduating from high schools in a commuting zone hosting a G25 but not a G8 university (non-G8 CZ, hereafter). We also acknowledge a third group of students who graduated from high schools in commuting zones in the northern or southern part of Chile (remote CZ, hereafter). These CZs are located in "remote regions", i.e., regions with special regulations because of their isolation from the rest of the country.¹⁵ These regions are not only the most isolated but also have less population than the rest.

Appendix Figure H1A illustrates the distribution of commuting zones across the country. There

¹³Card (1993) also highlighted that students living close to a university may be more prone to enroll in university, in general, because they better understand the returns to education. This potentially impacts our treatment and control group in the same way since they both live near several universities, as explained below. For completeness, some researchers also highlight that attending a nearby university might reduce the emotional cost associated with leaving home to attend university. For instance, students have family and friends that they may not be willing to give up in order to attend university (see e.g. Frenette (2006)).

¹⁴As explained below, all G8 CZ have G8 and G25 universities in it.

¹⁵For instance, regions in the southern part of Chile cannot be accessed by land and are the ones with the smallest population. Because of these and other special conditions, households in southern regions receive special subsidies and university scholarships.

are a total of 15 commuting zones in the treatment and control groups. Among them, four commuting zones host both G8 and G25 institutions, while the remaining 11 commuting zones exclusively host G25 institutions. Notably, within each commuting zone, universities tend to cluster together, regardless if they are G8 or G25. Appendix Figure H2 confirm this pattern and provides a visual representation of whether a municipality within a commuting zone hosts a G25 institution, a G8 institution, or both.

The evidence presented above shows that G8 and G25 tend to locate close by in the same commuting zone and accept students of similar quality (see Section 2). Moreover, G8 have higher tuition costs in pre- and post-platform integration year, which might make them less accessible to certain populations.¹⁶

To estimate the effect of the market integration process on different outcomes, we perform the following difference-in-differences:

$$y_i = \alpha_{s(i)} + \sum_{t=2007}^{2014} \beta_t \{T_i = t\} + \gamma_1 \{T_i \geq 2011\} \times G8_{c(i)} + \phi X_i + \epsilon_i, \quad (1)$$

where y_i is the outcome of interest for student i , $\alpha_{s(i)}$ is a school fixed effect, and T_i is the high school graduation year. $G8_{c(i)}$ is a dummy indicating whether the high school graduation commuting zone c of student i has a G8 university. X_i are a set of control variables for student i , such as gender, household income per-capita, ability,¹⁷ and government loan eligibility.¹⁸ Our parameter of interest is γ_1 , which shows the effect of the platform integration on the outcome of interest. ϵ_i is an error term that we allow to be correlated at the commuting zone level. Since clustering at the

¹⁶These factors are relevant for students application and enrollment decisions and they do not seem change with the platform integration.

¹⁷Since the PSU score is not a measure of ability but a way of ranking test-takers, it cannot be compared across years. To assess students' ability, we use the 10th grade national reading and math test score, which is administered every two years and measures students' abilities in a way that is comparable across years. Since every other year there is a cohort of students not taking the test, we predict 10th grade test score for those students using their GPA, gender, and a school fixed effect interacted with a polynomial function for the year that students are in 10th. For consistency in our measure, we use the predicted 10th grade test score for all students in the sample.

¹⁸Governmental loan eligibility is determined using student's PSU score (average Spanish-math PSU score ≥ 475 points) and socioeconomic status (SES). Eligibility on this last criterion changed during our time span (from using the social security score to using income from tax records), and it is only observed for students who applied for the loan. To obtain loan eligibility for every student in each graduation cohort, we predict students' SES using self-declared income, municipality of residency and school characteristics from all students applying for the loan. We used predicted SES to determine loan eligibility for the whole sample of students. PSU score eligibility requirement has not changed during our time span. Loan eligibility does not depend on whether the students attend a platform university. For more details on the loan, see Appendix Section B.

commuting zone level gives us a small number of clusters (15), we cluster standard errors using the wild bootstrap procedure (Cameron et al., 2008) and provide its p-values.

In the estimations described below, we focused on students meeting the platform usage requirements (average Spanish-math PSU score ≥ 450 points and taking one optional test, see Section 2) and graduating from academic high schools in commuting zones containing a G8 or G25.

3.3 Expected effects of market integration process on students

It is possible that the market integration process changes students decision-making process in a dynamic way. Particularly, in the platform integration year, we should observe a reduction in G25 waitlist congestion and G8 application cost. Congestion might be reduced because before the market integration, a fraction of students could receive an offer from a G25 and enroll in a G8, causing congestion on waitlists clearance for platform institutions when they have to enroll more students from waitlists to fill declined offers. After the market integration this is no longer possible as students can get only an offer from a G25 or a G8 (see Section 2). The reduction of G25 waitlist congestion may increase overall enrolment;¹⁹ however, this effect depends on the frictions of the G25 waitlist clearance and whether the system is working at full or under capacity. Students application cost decreases because the market integration removes G8 commuting to in-person application and facilitates the search of G8 programs for student by displaying available programs in the platform. Because some students face higher application costs it is likely that they benefit more from removing this cost.

On the other hand, one year after the market integration, the release of admission information, especially the cutoff PSU scores information for G8 institutions, provides additional information to students. This potentially increases demand for these institutions. This happens because before the market integration G8 universities did not have information of PSU cutoff scores, which could deter some students to apply.²⁰ The year of the platform integration cutoffs are generated for G8 universities, but they are only visible for students application the year after the platform integration. Then, the increase in demand for these institutions should happen with some delay.

¹⁹Recall that congestion in markets happens when there is limited timing for transactions resulting in matching inefficiencies or no transactions (Roth and Xing, 1994, 1997; Niederle and Roth, 2009). In our setting this expresses by the no enrollment of waitlisted students in oversubscribed majors or by the enrollment of waitlisted students, not following the strict major's rank order, because some top student were not contacted.

²⁰See Leshno and Lo (2021) for a theoretical foundation.

Appendix section C provides a more detailed description of the possible stages of the integration process described above.

3.4 Descriptive statistics

Table II shows the characteristics of students graduating from high school in non-G8 and G8 CZ between 2006-2010. This table shows that the share of female students in non-G8 CZ is slightly higher than in G8 CZ. Non-G8 CZ also show a higher 12th grade attendance, but a smaller Spanish-math average PSU score.

On the other hand, students in non-G8 CZ are more likely to graduate from a public high school and use the platform than G8 CZ ones. This could be the result of non-G8 commuting zones having a lower supply of private institutions at the high school and university levels. Students in non-G8 CZ are also more likely to enroll in university.

Consistently with the literature, most students want to remain in their high school CZ: only 37% and 7.7% of students in non-G8 and G8 CZ, respectively, expect to do not live with their parents if entering university. In line with this, Panel B of Table II shows that among those enrolling in university, 65% and 98.6% of students graduating from non-G8 and G8 CZ, respectively, enroll in a university located in their high school commuting zone. Figure I and Table I show how students move geographically when graduating from high school and enrolling in university, between 2006 and 2010. The majority of high school graduates chose to remain in their high school CZ when attending university, but G8 CZ students proportionally more than non-G8 CZ students.

Not surprisingly, G8 CZ students are more likely to enroll in a G8 university than non-G8 CZ students (Table II, Panel C). This further suggests that G8 CZ students should be more affected by the integration of the G8 to the platform.

3.5 Sample composition and plausible threats to identification

Appendix Table G1 shows that the platform integration did not induced a larger fraction of students to take the PSU or to meet the platform usage requirement over the years. Also, Appendix Table G2 shows that the platform integration did not change the characteristics of students that met the platform requirements.

The main assumption in our research design is that there is no contamination across CZ markets. In other words, the fraction of control and treatment group students seeking a seat in another CZ market did not change after the platform integration. As a proxy for students' preferences for universities located in other commuting zones, we check whether more students were planning to live independently (and leave their parent's home) if they continued their studies after high school graduation.²¹ Appendix Table G3 shows that students do not want to move to another commuting zone more often after the platform integration. We also discuss in Section 6 and Appendix Section F other possible threats related to CZ market contamination through out of sample students and universities' reaction by changing, for instance, seats and degrees supply, as well as an adjustment to the results due to different level of compliance.

4 Results

4.1 Platform usage and congestion effects

Figure IIA shows that between 2006-2010 (before the platform integration), students graduating from G8 CZ were approximately 19 percentage points (pp.) less likely to use the platform than students graduating from non-G8 CZ. As expected, the platform integration induced a large increase in the proportion of G8 CZ students using the platform, almost closing the gap. Figure IIB and Column (1) of Table III confirm the pattern previously discussed by showing that the fraction of G8 CZ students using the platform increased by 13 pp. after 2010 ($p\text{-value} < 0.01$). The large increase in platform users among students graduating from G8 CZ, along with the no change for students graduating from non-G8 CZ, further confirms our hypothesis that students graduating from G8 CZ are the ones most affected by the platform integration.

Results for platform users could be the consequence of the integration of two separate markets: one for students seeking a seat in G8 and another for students seeking a seat in G25. This seems plausible since the fraction of G8 CZ students who did not use the platform and enrolled in a G8 university is 11pp. in pre-integration years. This number is slightly lower than the 13pp. increase observed with our empirical strategy.²² After the platform integration, enrolling directly in a G8

²¹We use the PSU questionnaire question about where students expect to live if they continued their studies.

²²Also, in pre-integration years, some students might have 'applied' or sought a seat in G8, but ended up not enrolling. Those students would not be observed during pre-integration years, but they will be part of our estimated results if they use the platform in post-integration years. This suggests that the difference between the estimated effect and pre-existent students 'applying' only to G8 should be lower. On top of this, the platform integration could have

university was no longer possible, and those students had to use the platform, suggesting that using the platform was not the default option for all students.

On top of having G8-CZ students using more often the platform, we also expect that the fraction of students rejecting offers from G25 universities decrease after the platform integration, as explained in Section 3.3. Figure IIC shows that, before the platform integration, approximately 10.5% of students graduating from G8 CZ do not enroll in a G25 university after being offered a seat. This fraction was approximately 13% for students graduating in non-G8 CZ. Figure IIC also shows that, after the platform integration, the fraction of students rejecting a G25 offer dropped drastically. Because congestion in G25 universities increases when students reject a G25 offer, Figure IIC- suggest a decrease in congestion due to the platform integration. Column (2) of Table III confirms this by showing a decrease of 2 pp. in the fraction of students rejecting a G25 offer ($p\text{-value} < 0.01$). This result suggests that the decline in the fraction of students rejecting offers from G25 universities is due to the platform integration.

To sum up, the platform integration had the expected effects on platform users and congestion, providing further evidence in favor of our empirical strategy.

4.2 Enrollment and long-term outcomes

Figure IIIA shows that the platform integration process did not change university enrollment overall. Although relying less on the waitlist could lead to an increase on overall enrollment, the final overall effect depends on whether institutions enroll their students in waitlists and whether waitlisted students end up enrolling in another university. As platform waitlisted students can enroll in other institution, the reduction in congestion could only have a limited impact on the overall enrollment. This explanation seems plausible since around 80% of platform waitlisted students end up enrolled in another program in pre-platform integration years. Also, we show in Appendix Section D of the Appendix that in the absence of frictions the enrollment can increase at most to 1.6 pp., which is consistent with this small effect.

Kapor et al. (2022) find that the platform integration increases enrollment by 7pp. in their event study analysis (statistically significant, page 21) and by 3.3pp in their structural model estimation.

increased the total number of students seeking a seat in a G8 or G25 university, perhaps because the platform made it more attractive, motivating them to use it. We cannot directly assess this mechanism, but it is likely to play a lesser role in increasing platform use given the magnitudes described above.

Our differences-in-differences estimation on enrollment fluctuates between -0.03pp. in 2011 and 1.4pp. post 2011 (both non-statistically significant). Appendix Section E tries to understand the causes of the difference in the results between Kapor et al. (2022) empirical estimation and ours. Results in this section show that most of the difference between the two results disappears when moving from the event study analysis (as in Kapor et al. (2022)) to the difference-in-differences analysis (as in our estimation) that compares students in treatment and control CZ. This highlights the relevance of having comparable groups and testing the hypothesis supporting the validity of the analysis when conducting the empirical analysis in our setting. On the other hand, differences between their structural model estimations and our causal ones are harder to map. They seem to come from the structural model's assumptions that might underestimate the counterfactual of enrollment. In particular, the authors assume that listing preferences after the integration could guide the students' listing preferences decisions before the integration (platform and off-platform applications). This assumption may not hold given that off-platform enrollment decisions are often taken after the platform assignment is completed. Therefore, students could list their preferences differently if they knew the platform application result in advance. For example, this assumption could be violated when students make overconfident mistakes in their application (underestimate the probability of being unassigned in the platform process),²³ because sequential applications would give them a second chance to rethink their listing preferences. Larroucau et al. (2021) analyze overconfidence in the same setting we study and found that this is a major mistake in student application process.²⁴

Despite the platform integration having null effect on enrollment, it might change the enrollment composition among platform and off-platform universities, as mentioned in Section 3.3. To evaluate the change in enrollment in G8 universities, we need a different strategy because most students enrolled in these institutions are from G8 CZ; therefore, a direct comparison would lack of a control group. To address this concern, we observe enrollment in all private universities and evaluate if students in G8 CZ are enrolling more often in these universities. Figure IIIB shows a dynamic pattern, as enrollment in private universities did not change the first year of the platform integration, but it increased the second year of the integration by 3pp. (p-value = 0.018, Table IV).²⁵ Figure

²³Larroucau et al. (2021) define overconfident mistake if students, despite having valid applications, they do not apply to programs they: (i) prefer to being unassigned, and (ii) face a positive probability of assignment.

²⁴Around 10% of the population face unassigned risk in their application, and among them 80% underestimate this risk.

²⁵Alternatively, in Appendix Figure H6, we find a similar result when using as outcome the enrollment in G8 or private universities joining the platform after our period of analysis (four private universities joined the platform in

IIIC also shows a dynamic pattern, as enrollment in G25 universities did not change the first year of the integration, but the second year decreased by 1.6pp (non-significant at 10% level, Table IV).

The increase in enrollment in G8 universities the second year of the platform integration cannot be driven by reducing congestion or application costs, because these effects should be reflected the year of the integration. One explanation for this pattern could be the release of the previous year admission cutoffs for the programs that joined the platform.²⁶ This happens the second year of the integration, since the first year there is no information about program's previous year admission cutoff yet. Since past cutoffs are often used as a sign of probability of acceptance in Chile (see Larroucau et al. (2021)), students could use this information in their application process and better match into their desire programs after the platform integration. Appendix Figure H3 provides a first insight into this by showing the distribution of the score distance to the cutoff of the first platform listed preference. The figure shows that the second year of the integration -when G8 cutoffs are released- the score distribution narrows around the cutoff for G8 universities, suggesting that students can better predict the cutoffs in their applications.

To further tests if past admission cutoffs release are part of the explanation behind the enrollment patterns, we test whether students are able to better sort into different programs within university commuting zones. Column (4) of Table IV shows the impact of the integration on the average distance to the median student enrolled - in terms of students PSU ranking - in the commuting zone and field of each student.²⁷ The results show that the distance to the median student enrolled drops by 2pp. after the second year.²⁸ This implies a reduction of 5.7% of the pre-integration average median distance. This result is consistent with the idea that students use past cutoffs information as a sign of probability of acceptance and can better sort into programs when all platform cutoffs are available.

2015 and 2016).

²⁶Recall that off platform universities enroll students on a first-come-first-serve basis and thus do not have admission cutoffs

²⁷Ideally, we would use student's distance, in terms of PSU ranking, to the median classmate. However, programs' id are sensitive to small changes in the program curriculum, making unfeasible to follow over the years. Thus, we prefer to use this measure. This outcome excludes the measured student. We measure the academic field with OECD subarea classification that identifies if a program belongs to: 1) Agriculture, Forestry and Fishing, 2) Architecture & Construction, 3) Arts, 4) Physical Science, 5) Social and Behavioral Sciences, 6) Education Sciences, 7) Life Sciences, 8) Law, 9) Business and Administration, 10) Teachers Formation, 11) Humanities, 12) Industry and Production, 13) Computer Science, 14) Engineering and Related Professions, 15) Medicine, 16) Journalism and Information, 17) Environmental Protection, 18) Personal Services, 19) Social Services, 20) Security Services, 21) Transportation Services, and 22) Veterinary.

²⁸The median ranking distance is scaled to 50 thousand students.

Alternatively, the market integration could result in a positive effect on G8 enrollment if participating in the platform increases the quality perception of G8 universities, or if G8 universities increase the budget dedicated to advertising their programs. These alternative explanations could potentially drive the positive effect on private university enrollment and the negative effect on G25 university enrollment; however, they can hardly explain why the enrollment increase in G8 universities happened the second year of the platform integration and not the first year.

Finally, when looking at the university enrollment probability four years after high school graduation, we do not observe any significant effect (Figure IVA). Figure IVB and IVC show the effects on enrollment in private and G25 universities four years after high school graduation, respectively. The results (also shown in Table V) are consistent with the dynamic short-term effects but, as expected, are less precisely estimated.

5 Heterogeneity effect

To better understand the groups benefiting the most from the platform integration, we analyze heterogeneous treatment effects along students' income and gender.

5.1 Heterogeneity by income level and gender

Table VI presents results for students reporting a household income above and below the median cohort income of our working sample (high- and low-income, hereafter). Columns (1) and (2) of Table VI show that low-income students living in G8 CZ are neither more nor less likely to use the platform or to do not enroll in a G25 after being offered a seat than their high-income counterparts.

Columns (3), (4) and (5) of Table VI show that low-income students living in G8 CZ are 3.6pp. more likely to enroll in a university after the platform integration ($p\text{-value} = 0.041$) and that this effect is driven by enrollment in private universities. The enrollment effect does not seem to be explained by a differential “treatment take-up”: low and high-income students are equally affected in terms of platform use. The pattern might be better explained by low-income students facing higher application costs before the integration. Applying to G8 universities requires in-person application (commuting cost) and information of the program/institution and the admission requirements. As shown in Section 2, students enrolling into G8 universities are richer and more often comes from private schools. This is possibly a barrier to low-income students information, since they cannot

obtain information from their peers about these programs.²⁹ Appendix Table G4 provides further evidence on this by showing that students attending schools where students did not tend to enroll in selective private universities -G8 and OP that joined the platform in the years after our period of analysis- in pre-platform integration years are the ones driving the increase in enrollment in post-integration years.

Table VII shows the heterogeneity analysis by gender. Results in this table show no statistically significant difference between men and women, with point estimates relatively low in magnitude.

6 Robustness check

6.1 Out of sample contamination

It could be that the control and treatment groups are differentially affected by the behavior of students not included in our working sample. For example, it might be that non-sample students change their preference towards universities in G8 CZ after the platform integration, increasing the demand for those programs and affecting treatment group enrollment. To address this concern, we expand the geographic area and consider exposure to the platform integration as having a G8 university in the student's high school region - instead of CZ. Figure H1B shows the distribution of G8 and non-G8 *regions* across Chile, while Appendix Table G5 shows the results of the analysis conducted at this level. Results in this table show a remarkably similar pattern to that in Tables III and IV, although point estimates are slightly lower, likely because the definition of the treatment and controls groups using regions is less able to capture exposure to the platform integration. These results suggest that out of sample students in G8 and non-G8 regions are unlikely to drive the results.

6.2 Compliance and coefficients adjustment

Although students tend to seek a seat and enroll in their commuting zone of residence, a fraction of them seek a seat and enroll outside their CZ. This last type of students pose an identification challenge because of attenuation of the treatment effect due to imperfect compliance. In our working sample, most of the students enrolling outside their treatment group are in the control group, i.e.

²⁹Indeed, we observe that waitlisted high-income students were 13 pp. more likely to enroll in a G8/OP than waitlisted low-income students in the years before the integration. For this exercise, we regress a G8/OP enrollment dummy on income and PSU admission score for G25 waitlisted students before 2011.

around 1% of the treatment group versus around $\frac{1}{3}$ of the control group (as a proportion of enrolled students). Importantly, it is rare that students apply to multiple treatment group areas (only 8% of our working sample does it), suggesting that they select the CZ beforehand and then apply to the universities available in that CZ.

Imperfect compliance when the fraction of treated units change over time is well discussed in fuzzy difference-in-differences applications and requires the additional homogeneous treatment effect assumption to adjust the estimates according to the differential take-up rate between treatment and control groups.³⁰ Appendix Table G6 presents the fuzzy adjusted coefficients of our main outcomes, i.e., divided by the differential level of treatment take-up. Appendix Section F also discusses possible threats to homogeneous treatment effect assumption – needed for the fuzzy adjusted coefficient. We show that results are consistent after choosing a subsample where homogeneous treatment assumption is more credible.

6.3 Response from universities

Finally, to shed light on whether the 2011 platform integration induced a response from G8 or G25 universities, we use administrative data from the Ministry of Education and explore how universities' number of degrees and seats offered changed over time. Data on the degrees offered by universities is very complete and has no missing values. On the other hand, missing values in the data on the number of seats offered is approximately 21% during our time span. With this caveat in mind, we evaluate whether G8 and G25 respond to the integration by providing more seats offered in G8 CZ. Figure H4 shows no sign that G25 or G8 universities responded to the integration of the platform in a particular way on these margins.

Our results could also be explained if G8 universities learn about the system and increase their enrollment yield through the years. Figure H5 shows that G25 and G8 have progressively increase their yield performance after the platform integration. However, all institutions seem to increase their yield at a similar rate after the platform integration. This could be because the platform in-

³⁰For completeness, in our context, the fuzzy difference in differences is identified under the assumptions of parallel trends, homogeneous treatment effect, stable treatment effect over time, and treatment participation equation (De Chaisemartin and d'Haultfoeuille, 2018). The first assumption is also common to the sharp difference-in-differences case. The second assumption implies that no units are switching from treatment to non-treatment (and vice-versa) between periods, as shown in Section 3.5. The third assumption implies that the treatment effect is equal for treated units in the control and treatment groups. The fourth assumption implies that the treatment effect does not change over time.

tegration changes the market landscape of the market and all institution have to make adjustment. Unfortunately, we do not have information about the yield of G8 universities before the platform integration to compare the evolution of the yield in a longer series.

7 Conclusion

We analyze how the process of university educational market integration affects student's enrollment outcomes. Using administrative databases on high school graduates, we analyze the incorporation of eight new universities to the existing 25 platform using ones in a difference-in-difference setting that exploits students exposure to an education market integration reform. As expected, we observe a large increase on students using the platform in treatment areas and a reduction in congestion. Interestingly, we find no effect on university enrollment overall, but a dynamic positive effect on G8 enrollment and a negative effect on G25 enrollment one year after G8 universities join the platform. We provide suggestive evidence that this last result on private and G25 universities seem to come from the release of previous year admission cutoff information of the new programs joining the platform. This seems to reduce the information cost about student's admission probability in G8 programs and increase student's sorting into programs.

We also observe that the platform integration increases enrollment for relatively poorer students. This effect seems to be explained by the reduction in the application costs, for institution that joined the platform.

Our results suggest that the integration of education markets and the information provided to student in this process can positively improve the efficiency of the system. Market designers should take this into account when setting up the market rules. Moreover, our results on low-income students suggest that more integrated markets can also affect the system equity and finally who enters university.

This study assesses the inclusion to an admission platform of universities that have a higher tuition fee and are similar in terms of quality and are located nearby the universities that were already part of the platform. Whether these results hold when change some of these margins remains as an open question.

Tables

Table I: Student's transitions between high school CZ and university CZ

		University CZ			Total
		G8 CZ	Non G8 CZ	Remote CZ	
School Graduation CZ	G8 CZ	318,556	3,224	548	322,328
		98.83%	1.00%	0.17%	100%
	Non G8 CZ	17,528	68,706	316	86,550
		20.25%	79.38%	0.37%	100%
	Remote CZ	3,235	1,096	16,555	20,886
		15.49%	5.25%	79.26	100%
Total		339,319	73,026	17,419	429,764
		78.95%	16.99%	4.05%	100%

Notes: This table reports the total numbers and the percentage of students who graduated from high school in G8, non-G8 and Remote CZ and enroll in universities located in G8, non-G8 and Remote CZ. Students in the sample are those with an average Spanish-math PSU score greater or equal to 450 score points the year of graduation from an academic high school in a G8, non-G8, and remote CZ.

Table II: Characteristics of students graduating from high school between 2006-10 by commuting zone groups

	Non-G8 CZ (1)	G8 CZ (2)
Panel A: student's characteristics		
Female	0.538	0.525
12th grade attendance	93.042	91.339
Public school	0.292	0.233
Avg. Spanish-math PSU score	567.486	577.295
Platform user	0.710	0.523
Loan eligible	0.602	0.569
Live independently	0.370	0.077
Enrolled at university	0.680	0.600
G25 offer and enrol G8	0.021	0.034
G25 offer and enrol G8/OP	0.061	0.053
Panel B: student's enrollment by university CZ		
Enrolled in a non-G8 CZ	0.442	0.006
Enrolled in a G8 CZ	0.232	0.592
Enrolled in a remote CZ	0.002	0.000
Panel C: student's enrollment by university type		
Enrolled G25	0.458	0.281
Enrolled G8	0.065	0.184
Enrolled OP	0.155	0.133
N	57196	228130

Notes: This table reports descriptive statistics of high school graduates in pre-platform integration years (2006-2010). The sample is restricted to high school graduates from academic high schools and from G8 and non-G8 commuting zones (CZ) who took the PSU in the year of graduation and obtained an average Spanish-math score greater or equal to 450 score points (required to apply through the platform). Column (1) reports the characteristics of high school graduates in non-G8 CZ and column (2) reports the characteristics of high school graduates in G8 CZ. *12th grade attendance* is the percentage of days students attended in 12th grade. Loan eligible is a dummy indicating whether the student is eligible for a state guaranteed loan (predicted based on income and other family criteria, see Section 3.2).

Table III: Platform integration effect on using the platform and congestion

	Platform user (1)	Accepted G25 and not enrolled (2)
G8 CZ $\times$ 1{grad. cohort $\geq$ 2011}	0.134 [0.008]	-0.020 [0.003]
Mean treat. 2006-10	0.523	0.103
Mean ctrl. 2006-10	0.710	0.128
Controls	YES	YES
R2	0.285	0.025
N	464122	464122

Notes: This table reports results of regressing several outcome variables on the interaction between a G8 commuting zone (CZ) dummy (from the student's high school location) and a dummy indicating whether the student graduated in 2011 or later. Students in the sample are those with an average Spanish-math PSU score greater or equal to 450 score points the year of graduation from an academic high school in a G8 or non-G8 CZ. All regressions control for graduation cohort fixed effect, school fixed effect, income, female, predicted ability, and predicted government loan eligibility. Square brackets report the p-values of the coefficients after clustering standard errors at the commuting zone level and using the wild bootstrap procedure proposed by Cameron et al. (2008).

Table IV: Platform integration effect on university enrollment and peers' PSU ranking

	Enroll			Peers
	University (1)	G25 (2)	Private (3)	rank PSU (4)
G8 CZ $\times$ 1{grad. cohort $\geq$ 2011}	-0.003 [0.822]	0.001 [0.951]	-0.004 [0.596]	0.011 [0.040]
G8 CZ $\times$ 1{grad. cohort $\geq$ 2012}	0.014 [0.216]	-0.016 [0.194]	0.030 [0.018]	-0.021 [0.048]
Mean treat. 2006-10	0.600	0.281	0.318	0.369
Mean ctrl. 2006-10	0.680	0.458	0.221	0.367
Controls	YES	YES	YES	YES
R2	0.188	0.262	0.113	0.177
N	464122	464122	464122	230976

Notes: This table reports results of regressing several outcome variables on the interaction between a G8 commuting zone (CZ) dummy (from the student's high school location) and a dummy indicating whether the student graduated either in 2011 or later, or in 2012 or later. Students in the sample are those with an average Spanish-math PSU score greater or equal to 450 score points the year of graduation from an academic high school in a G8 or non-G8 CZ. All regressions control for graduation cohort fixed effect, school fixed effect, income, female, predicted ability, and predicted government loan eligibility. Square brackets report the p-values of the coefficients after clustering standard errors at the commuting zone level and using the wild bootstrap procedure proposed by Cameron et al. (2008).

Table V: Platform integration effect on university enrollment four years after taking the PSU

	University (1)	G25 (2)	Private (3)
G8 CZ $\times$ 1{grad. cohort $\geq$ 2011}	-0.004 [0.671]	-0.021 [0.112]	0.017 [0.114]
G8 CZ $\times$ 1{grad. cohort $\geq$ 2012}	-0.004 [0.513]	-0.016 [0.214]	0.012 [0.170]
Mean treat. 2006-10	0.702	0.316	0.386
Mean ctrl. 2006-10	0.758	0.470	0.288
Controls	YES	YES	YES
R2	0.204	0.253	0.111
N	464122	464122	464122

Notes: This table reports results of regressing several outcome variables on the interaction between a G8 commuting zone (CZ) dummy (from the student's high school location) and a dummy indicating whether the student graduated either in 2011 or later, or in 2012 or later. Students in the sample are those with an average Spanish-math PSU score greater or equal to 450 score points the year of graduation from an academic high school in a G8 or non-G8 CZ. All regressions control for graduation cohort fixed effect, school fixed effect, income, female, predicted ability, and predicted government loan eligibility. Square brackets report the p-values of the coefficients after clustering standard errors at the commuting zone level and using the wild bootstrap procedure proposed by Cameron et al. (2008).

Table VI: Platform integration effect on using the platform, congestion, and university enrollment by student's household income level

	Platform user (1)	G25 accepted & not enrolled (2)	Enroll		
			University (3)	G25 (4)	Private (5)
G8 CZ $\times$ 1{grad. $\geq$ 2011}	0.145 [0.008]	-0.020 [0.025]	-0.008 [0.530]	-0.015 [0.366]	0.007 [0.329]
G8 CZ $\times$ 1{grad. $\geq$ 2011} $\times$ low-income	-0.017 [0.343]	-0.001 [0.950]	0.036 [0.041]	0.000 [0.984]	0.036 [0.049]
Controls	YES	YES	YES	YES	YES
R2	0.286	0.026	0.191	0.263	0.114
N	464122	464122	464122	464122	464122

Notes: This table reports results of regressing several outcome variables on the triple interaction between a G8 commuting zone (CZ) dummy, a low-income dummy, and a dummy indicating that the student graduated in 2011 or later. Students in the sample are those with an average Spanish-math PSU score greater or equal to 450 score points the year of graduation from an academic high school in a G8 or non-G8 CZ. All regressions control for graduation cohort fixed effect, school fixed effect, income, female, predicted ability, and predicted government loan eligibility. Square brackets report the p-values of the coefficients after clustering standard errors at the commuting zone level and using the wild bootstrap procedure proposed by Cameron et al. (2008).

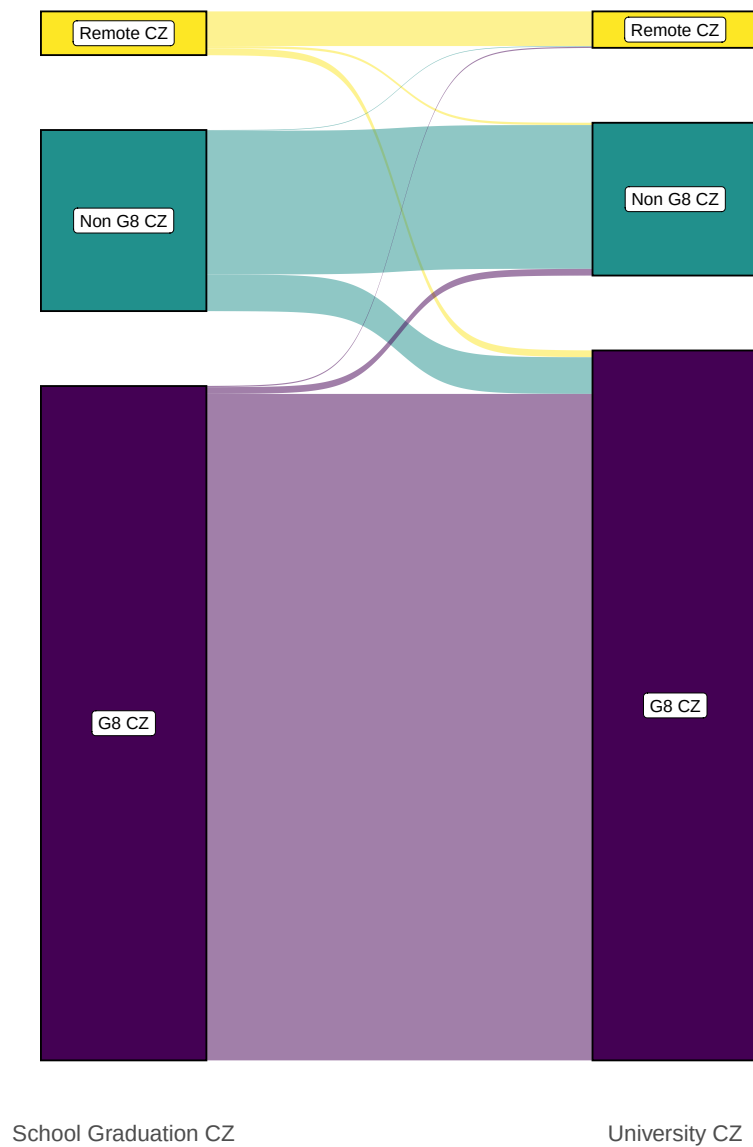
Table VII: Platform integration effect on using the platform, congestion, and university enrollment by student's gender

	Platform	G25 accepted	Enroll		
	user (1)	& not enrolled (2)	University (3)	G25 (4)	Private (5)
G8 CZ $\times$ 1{grad. $\geq$ 2011}	0.121 [0.007]	-0.017 [0.042]	0.006 [0.730]	-0.016 [0.437]	0.021 [0.069]
G8 CZ $\times$ 1{grad. $\geq$ 2011} $\times$ female	0.032 [0.136]	-0.007 [0.122]	0.001 [0.925]	0.001 [0.957]	0.000 [0.987]
Controls	YES	YES	YES	YES	YES
R2	0.285	0.025	0.188	0.263	0.113
N	464122	464122	464122	464122	464122

Notes: This table reports results of regressing several outcome variables on the triple interaction between a G8 commuting zone (CZ) dummy, a female dummy, and a dummy indicating that the student graduated in 2011 or later. Students in the sample are those with an average Spanish-math PSU score greater or equal to 450 score points the year of graduation from an academic high school in a G8 or non-G8 CZ. All regressions control for graduation cohort fixed effect, school fixed effect, income, female, predicted ability, and predicted government loan eligibility. Square brackets report the p-values of the coefficients after clustering standard errors at the commuting zone level and using the wild bootstrap procedure proposed by Cameron et al. (2008).

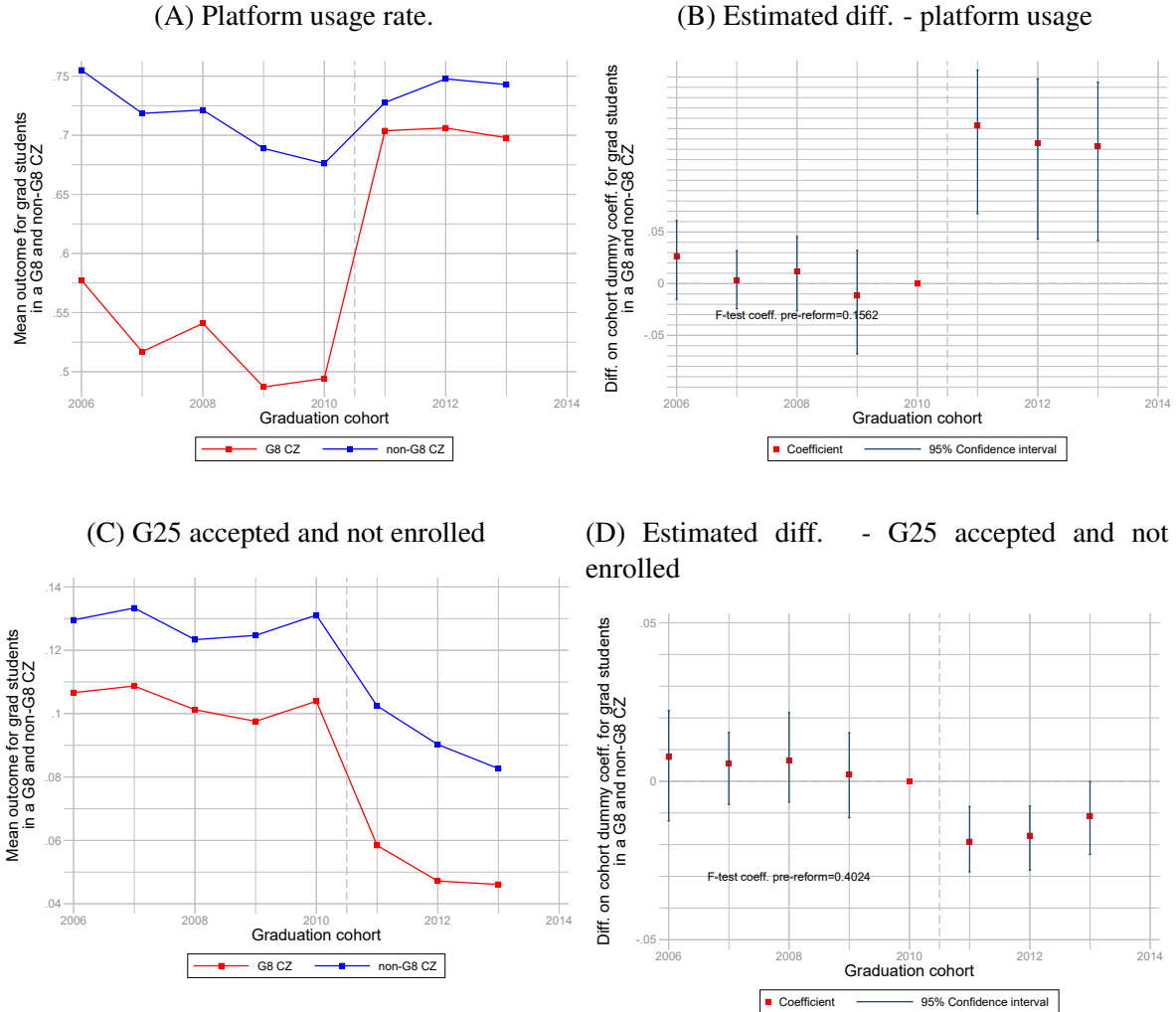
Figures

Figure I: Transitions from high school CZ to university CZ for students graduating between 2006-10.



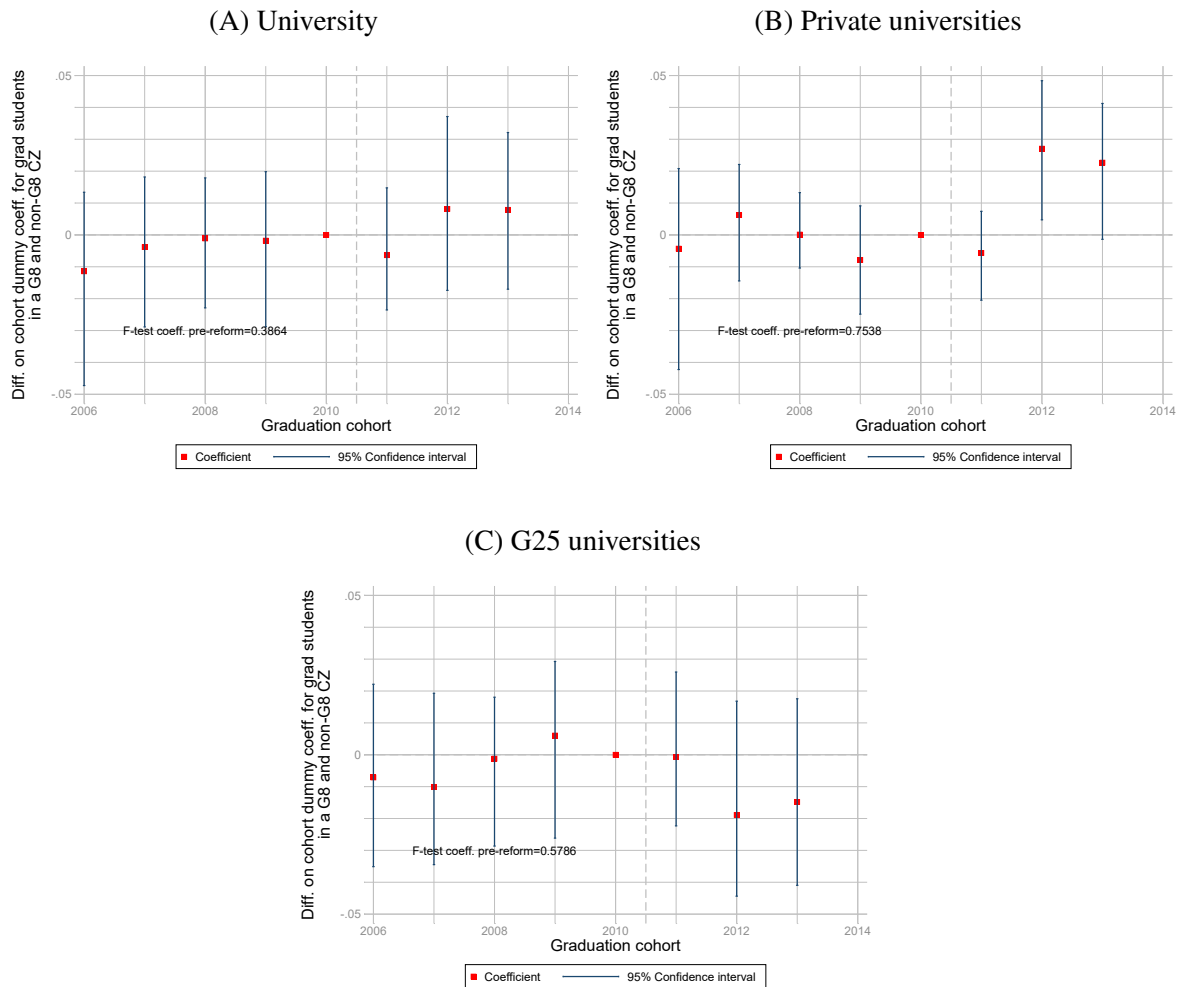
Notes: This Figure show a Sankey diagram showing transitions from high school CZ to university CZ.

Figure II: Platform integration effect on platform usage and congestion.



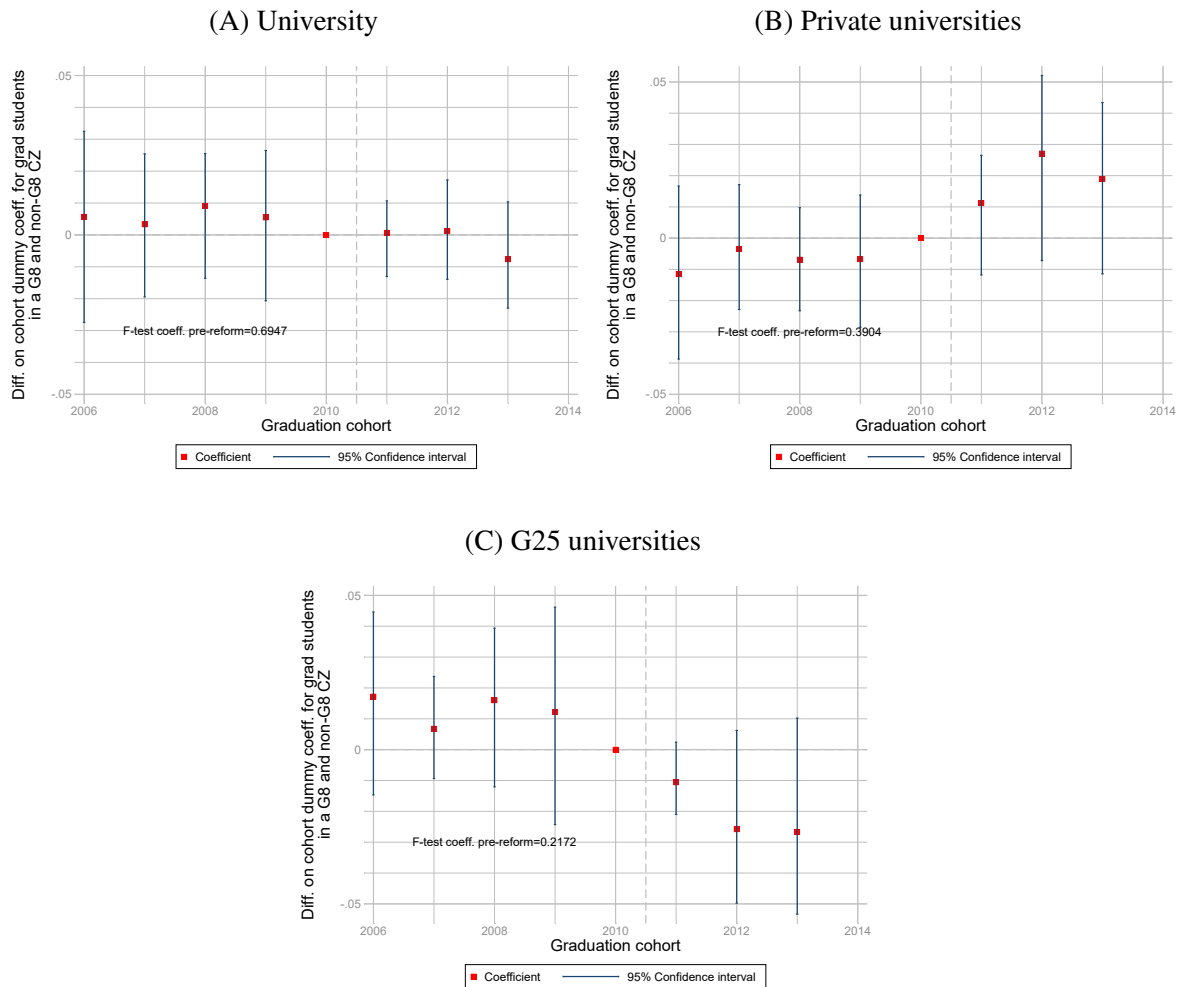
Notes: The left panels display the mean outcome for students graduating in G8 (red line) and non-G8 CZ (blue line) in different years. The right panels display the outcome estimated difference between students graduating in G8 and non-G8 CZ obtained from regressing the outcome on high school graduation cohort $\times$ G8 CZ, high school graduation cohort fixed effect, school fixed effect, income, female, predicted ability, and predicted government loan eligibility.

Figure III: Enrollment by university group



Notes: Each panel presents the estimated difference in enrollment between treatment and control groups. Panel A presents the estimated difference in university enrollment. Panel B presents the estimated difference in private university enrollment. Panel C presents the estimated difference in G25 enrollment.

Figure IV: Enrollment by university group four years after taking the PSU



Notes: Each panel presents the estimated difference in enrollment between treatment and control groups four years after taking the PSU. Panel A presents the estimated difference in university enrollment. Panel B presents the estimated difference in private university enrollment. Panel C presents the estimated difference in G25 enrollment.

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Appendix A Institutional background

A.1 The higher education market

The Chilean higher education market, as we know it today, is the result of a series of reforms carried by the military dictatorship in 1981. Before 1981, there existed eight universities, with regional campuses across the country, all grouped in a consortium called the Chilean Council of Deans. In 1981, the new General University Law (“*Ley General de Universidades*” in Spanish) mandated that the regional campuses of these eight universities divide into new autonomous universities. This resulted in a total of 25 universities (G25) which were all part of the Chilean Council of Deans.

The 1981 reform not only fragmented the oldest universities in the country, but also facilitated the creation of new private universities (henceforth *private universities*). Not surprisingly, the country saw a proliferation of these universities. Between 1981–91, 27 universities were created. After 1991, the number of private universities participating in the market changed very little.¹ On the other hand, from 1990 to 2010, enrollment in the university system expanded from around 130 thousand to 660 thousand students. In 2011, private universities accounted for 50% of the first-year university enrollment. It is significant that private universities are present in most Chilean urban commuting zones.

A.2 The application and enrollment process

Throughout the period of our study, the PSU registration process was free of charge for all students from schools receiving government subsidies. This induce most high school graduates to take the PSU. As mentioned in Section 2, 76% of high school graduates and 93% of academic-track high school graduates, in the years before the platform integration, took the PSU.

The platform application process have features that are worth highlighting. Seats are assigned as in the college-proposing deferred acceptance algorithm (Gale and Shapley, 1962). In this process students can submit a ranking-ordered list of program preferences with a maximum of 10 picks, defining a strict order of preferences. Students can submit online applications to all platform universities in the country. Once the application process ends, universities: (1) rank students using their PSU and high school GPA score, and (2) offer seats to students strictly following the

¹In 2010, the year before integration, universities created between 1981–91 accounted for 82% of the enrollment in private universities.

ranking, as in the college-proposing deferred acceptance algorithm (DA, Gale and Shapley (1962)). The DA system ensures that students receive only one offer, from their most preferred program in which they are ranked among the top h students. Here, h is the number of seats offered for the program. Programs rankings are determined by a weighted average of the PSU and high school GPA score, which allow programs to give more weight to certain subjects (e.g. economics gives more weight to the math PSU score). This process generates a series of major's PSU cutoffs scores, which corresponds to the score of the student ranked h , the last admitted for a particular major.² Applicants who did not manage to be listed among the top h students are placed on the waitlist of all the listed programs they preferred over the offered one. All programs ranked below the offered one are discarded.

The process described ensures that students are offered a seat in their most preferred feasible option. A special department of the Council of Deans coordinates and overlooks the PSU administration and the application process.

After the application and selection process end, students can enroll in the program they got an offer from by paying a matriculation fee. There is no cost for rejecting the offer and not enrolling, and those withdrawing from the program after enrolling forfeit the fee.

A.3 Off platform universities and their platform integration

For off-platform universities, the admission process also starts after PSU scores are released, as universities need to consider PSU scores in their admission process to enroll students with public loans.

In 2011, the G25 invited the 33 private universities to join the platform following a strong pressure from the Minister of Education at that time. According to our conversations with officials managing the platform, G25 Deans were reluctant to do this as they thought that the inclusion of private universities could damage their reputation. Participating in the platform did not imply that G8 universities could enter the Chilean Council of Deans, which by that time was a prestigious classification. Belonging to the Chilean Council of Deans also implies access to public funds unavailable to other private universities.

Table A1 shows the characteristics of students enrolled in G25, G8 and OP universities between 2006 and 2010. This table shows that students attending G8 and G25 universities obtained

²Cutoffs in the centralized system are the result of the combination between the seats available to students and the number of students that apply. In particular, the program cutoff is set by the application score of the student ranked in position h . Cutoffs scores are very persistent as the correlation of cutoff scores for G25 universities between year 2010 and 2011 is 0.97.

similar Spanish-math PSU scores average before the platform integration, while those attending OP universities obtained lower scores. Moreover, students enrolling in G25 are more likely to come from public schools, be eligible for governmental loans, and have a lower household income than students enrolling in G8. Since students enrolled in G25 and G8 have similar PSU scores, but differ in other observable characteristics (e.g. income), it is not surprising that a fraction of high school graduates preferred not to use the platform and enroll directly in a G8 in pre-integration years. OP universities are present in all commuting zones where G8 and G25 are present. Table

Table A1: Student's characteristics by type of university enrolled

	G25 (1)	G8 (2)	OP (3)
Female	0.483	0.531	0.596
12th grade attendance	93.059	92.057	91.209
Public school	0.258	0.093	0.246
Rural school	0.012	0.01	0.017
Avg. Spanish-math PSU score	628.115	600.66	535.324
Household income (CLP)	530	740	440
Loan eligible	0.619	0.457	0.655
Platform user	0.994	0.441	0.404

Notes: This table reports descriptive statistics of 1st year university students in pre-platform integration years (2006-2010). Column (1) reports the characteristics of students enrolled in a G25, column (2) reports characteristics of students enrolled in a G8, and column (3) reports the characteristics of students enrolled in an OP. G25 are the universities that participate in the platform before the integration. G8 are the universities that were incorporated to the platform after the integration. OP are other private universities that were not part of the platform during the period studied in this paper. *12th grade attendance* is the percentage of days students attended in 12th grade. Loan eligible is a dummy indicating whether the student is eligible for a loan (predicted based on income and other family criteria).

A2 presents the tuition fee costs, in US dollars,³ for different types of universities in pre- and post-platform integration years. To obtain the tuition fee cost for each university type, we use major's tuition fee for G25 and G8 universities before and after the platform integration. In other words, Table A2 shows the mean of the outcome variable for majors in G25 and G8 universities before and after the platform integration.

This table shows that G8 universities have a higher annual tuition fee in pre- and post- treatment periods. Interestingly, tuition fee cost gap does not seem to narrow or grow after the platform inte-

³The data available has the tuition fee cost in Chilean pesos. To transform this to US dollar, we used the purchasing power parity index available at <https://data.oecd.org/conversion/purchasing-power-parities-ppp.htm>

gration. Overall, this pattern suggest that, in monetary terms, G8 universities seem less accessible than G25 universities, however this does not seem to change with the platform integration.

Table A2: Major's annual tuition cost (in US dollars) for G8 and G25 universities

	G8 (1)	G25 (2)
a) Pre integration (2006-2010)	8,360	5,593
b) Post integration (2011-2013)	9,453	6,593
c) Post - pre integration	1,093	1,000
$[G8]_{(c)} - [G25]_{(c)}$		93.7 (131.0)
P-value		0.477

Notes: This table shows the average annual tuition cost (in US dollars) for G8 and G25 universities. Column (1) displays results for G8 universities and Column (2) for G25 universities. Row (a) present statistics for pre-platform integration years (2006-2010), row (b) present statistics for post-platform integration years (2011-2013), and row (c) shows the difference between the pre- and post-platform integration years. The last three rows show the difference in row (c) between G8 and G25 universities and its corresponding standard errors and p-value.

Appendix B Financial aid

Financial aid allocation in Chile follows clear rules informed before the university admission process begins. The eligibility criteria of these aids are, most of the time, based upon PSU score (average of math and Spanish test score) and household socioeconomic status. Before taking the PSU test, students apply for scholarships and loans by filling a questionnaire. Then, they receive their PSU test score together with their estimated income quintile, so they acknowledge the financial aid they would receive at the moment of application to university.

The Chilean government has changed how the household's income quintile is measured over the years. Before 2012, the household's income quintile was measured using self-reported information and information from tax records. From 2012 onwards, the household's income quintile is measured using self-reported information and information from the social security index. This change allowed that more people receive loans.

Throughout the period of our study, the university system had an extensive and generous loan system, the State Guaranteed Loan, which have been shown to ease access to university to those who qualify. According to Solis (2017) the State Guaranteed Loan increased 100% college enroll-

ment and effectively eliminates the income gap in enrollment. In 2007, the eligibility requirements for this loan was to have a PSU test score average of Spanish and math above 475 score point and to be in the poorest 40% of the population. Over the years, the poverty requirement was relaxed, and higher-income students became loan eligible.

Appendix C Expected effects of market integration on students

To comprehend market integration dynamics, we can break down the process into three distinct stages.

C.1 Stage 1: Pre-Integration

Before the market integration, students could apply to both platform (or G25) and off-platform (or G8) institutions. Then, due to the lack of integration, a student who chooses to enroll in an off-platform institution may reject an offer from a platform institution. This situation causes congestion on platform institution waitlists, as discussed in section 2. When students reject offers from platform institutions, those institutions face the challenge of enrolling students from the waitlists quickly, which may result in the enrollment of fewer students than the vacancies available. Platform institutions may also fill vacancies but bypass some top ranked students because they cannot reach them in a short time, leading to inefficient student sorting. This issue is particularly relevant for oversubscribed programs with waitlists. In contrast, off-platform institutions can continue enrolling students until the school year begins, making waitlist congestion less problematic for them, especially in a setting where enrollment is a first come first serve basis.

C.2 Stage 2: Market Integration

The second stage involves the integration of markets, which eliminates the waitlist congestion described earlier, since students cannot receive a G25 and a G8 offer at the same time. This integration could lead to increased overall enrollment or better sorting of oversubscribed programs in platform institutions. However, the impact may be negligible if waitlist congestion was minimal before integration, or if there are more seats available in the system than students seeking a seat. It's important to note that the market integration also removes the student's application cost for off-platform institutions. This change can result in increased demand for off-platform institutions, particularly from students sensitive to application costs, such as those with lower incomes.

C.3 Stage 3: Release of G8 historical Cutoffs

In the third stage, the historical cutoff scores for G8 institutions are released, allowing a portion of students to obtain extra information about the admission requirements and, perhaps, consider these institutions. The concept of cutoff scores enabling program applications is derived from the work of Leshno and Lo (2021). Their theoretical model highlights how students who lack information about cutoff scores, or those facing uncertainty regarding their score budget constraints and effective choice set, may make suboptimal decisions. This can include not applying to programs they would have considered if they had known the cutoff scores. The release of G8 cutoff scores could result in increased demand for G8 institutions. Similar to the second stage, this heightened demand can lead to better sorting for oversubscribed programs and increased enrollment for undersubscribed programs in new platform institutions.

In summary, understanding the dynamics of market integration involves examining these three stages, each of which brings about significant changes in how students apply to and are sorted into various educational programs.

Appendix D Market frictions

This section describes the frictions that could reduce efficiency of the market-clearing house process, created through the DA algorithm, in the college admission process in Chile. In this context, we define friction as any obstacle that hinders institutions from filling their available slots in accordance with the waitlist order. We posit that the primary source of friction in this process is likely related to the communication between institutions and students, specifically the phone calls made by institutions to contact students. Issues such as wrong numbers and unanswered calls may hinder the allocation of available slots, although it is possible that other sources of friction exist that have yet to be identified.

This friction can have two non-exclusive implications; first, if institutions are not able to reach enough students to fill their vacancy, then these institutions will not run at its maximum capacity; second, if highly ranked waitlisted students are not reached, then the market allocation will be suboptimal because institutions and students can be better off. To evaluate both implications we focus on the year before the platform integration. Table D1 shows the percentage of vacant seats in G25 institutions. In total, the surplus is 9.5% of the enrolled students in G25. However, some of the programs are not over-demanded; therefore, their vacant seats are not due to frictions in cleaning the waitlist. When consider only programs with waitlisted students, the number is reduce

to 2.9% of the enrolment in G25.¹ Notably, we also show the proportion of vacant seats caused by frictions in relation to the population of interest, which is merely 1.6%. This suggests that the platform integration, and the reduction of frictions may have limited effects on enrollment.

On the other hand, frictions can cause suboptimal market allocation, when institutions fill the vacancies but not in the ranking order, suggesting that some students and institutions can be better off. To illustrate this, Figure D1A shows student's probability of enrolment, based on the program ranking, for all programs with waitlisted students. In the absence of friction, we would expect this probability to decrease smoothly after the cutoff point.² Figure D1A, however, shows a significant drop in probability after the cutoff point, indicating the presence of frictions in the aftermarket process. To further investigate this phenomenon, in Figure D1B and D1C we plot the probability of enrollment depending on applicants' ranking, for Law and Odontology at University of Chile. Law is a highly reputed program,³ and students applying there are unlikely to decline a seat, while Odontology students are more likely to look for a seat in medicine or another related program in the aftermarket. As expected, applicants to Law are more likely to enroll before the cutoff compare to Odontology. After the cutoff, however, Odontology applicants tend to enroll based on the ranking (smooth decreasing) but not Law applicants. The difference between these two programs is that Odontology have to fill many vacant seats while Law only a few of them. The findings indicate that the waitlist clearing process may function effectively but programs may also have decentralized criteria for special admission. Although we cannot fully confirm this hypothesis, we observe that in 2019 - when institutions started to publish this information – 8.7% of enrolment was through special admission suggesting that the potential friction may be due to special admission.

Table D1: Percentage of vacant seats in G25 institutions

	Vacant seats (1)	Vacant seats programs with waitlist (2)
As a share of enrolment in G25	9,5%	2,9%
As a share of population of interest	6%	1.6%

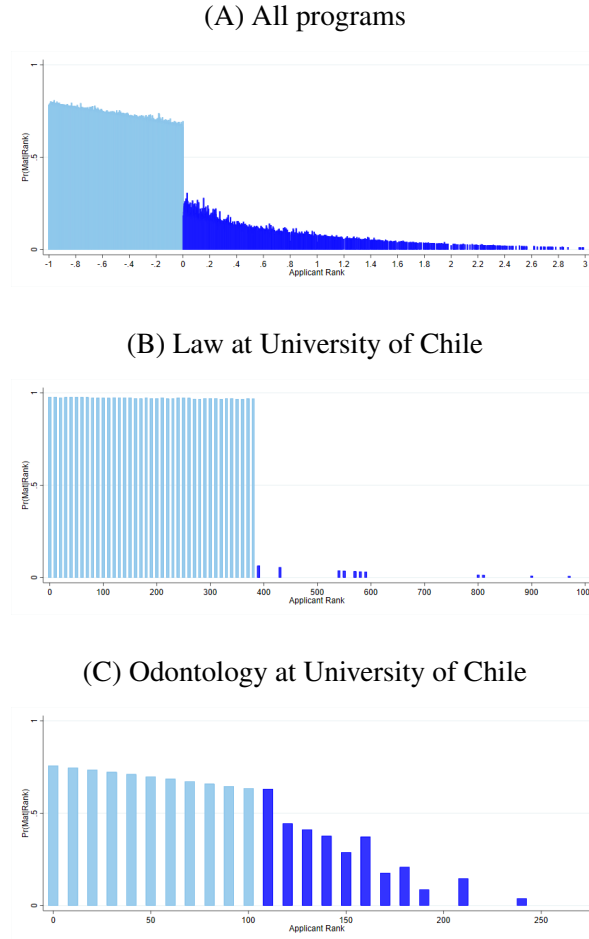
Notes: This table reports the percentage of vacant seats in G25 institutions. Column (1) presents percentages using all programs, while column (2) presents percentages using only over-demanded programs.

¹We take into account that some of the programs have waitlists but do not have waitlists long enough to fill the surplus.

²It should decrease because the general pattern is that lower score and therefore ranking is related to lower probability of enrollment.

³Graduates of this prestigious program tend to be the leaders of top public and private sector organizations in Chile; for example, 15 former presidents and the current president graduated from this program.

Figure D1: Probability of enrolment by students' program application ranking position



Notes: These figures shows student's probability of enrollment by their program application ranking position. Panel A employs all programs with waitlisted students. Panel B and C employs all student applying to Law and Odontology at University of Chile. The vertical axis shows student's probability of enrollment. In panel A, the horizontal axis displays student's ranking application position for the program applied. The student's ranking application position is normalized using the program capacity (h), in the following way: $(\text{students' application ranking position} - h)/h$. In panel B and C, the horizontal axis displays the raw student's ranking application position for the program applied. The light blue vertical lines represents admitted students; and the blue vertical lines represent waitlisted students.

Appendix E Comparison of our results with those on Kapor et al. (2022)

As mentioned in Section 4.2, results presented in this paper differ from the empirical results in Kapor et al. (2022). One relevant aspect is to understand why the two results differ and the potential advantage of our empirical strategy. To do this exercise, we begin by replicating columns (1) and (2) of Table 2 in Kapor et al. (2022). Appendix Table E1 shows this replication and, even though

we cannot exactly replicate results in Kapor et al. (2022), since their code is not published yet, our replication, following the description in Kapor et al.’s paper, produces estimates that are remarkably similar to theirs. Although not shown in Kapor et al. (2022) paper tables, we are also able to replicate Kapor et al.’s result described in page 21, where they mention that overall enrollment increases by 7pp. after the platform integration.

One relevant point is that Kapor et al.’s outcomes of interest in columns (1) and (2) of their Table 2, admission and enrollment, are conditional on applying through the platform. This might be in itself problematic in our empirical strategy since the fraction of students using the platform increase after the integration, which might lead to pre- and post- treatment student populations that are not comparable. Keeping this in mind, column (1) of Table E2 produces results for our two main outcomes, platform user and university enrollment (not conditional on using the platform), when using Kapor et al. (2022) sample and event study empirical strategy that pools all students (as us).⁴ The following columns in this table change the specification so they are more similar to the sample and fuzzy difference-in-differences empirical strategy in our study, until reproducing exactly our results in column (6). Results in this table shows that Kapor et al. (2022) estimates are 6% higher than ours for the case of platform user, which we tend to interpret as a ‘first stage’ in our empirical strategy. On the other hand, estimates are 7.4 times higher than ours for the case of university enrollment, which we interpret as one of our main outcomes.

In particular, column (2) of panel B shows that keeping only academic schools in the analysis and students who just graduated from high school does virtually not affect point estimates. Column (3) shows that including only students graduating from high schools in CZ that have universities in it increase point estimates, possibly because students who graduated from high school in CZ without universities are less impacted by the integration. Column (4) shows that adding the controls used in equation 1 decrease point estimates, probably because of their correlation with the treatment. Finally, most of the difference converges in column (5), when the comparison between treatment and control group students are taken into account. This highlights the relevance of having comparable groups and testing the hypothesis supporting the validity of the analysis when conducting the empirical analysis in this setting.

The results from this exercise shed some light on some of the differences between our empirical results and Kapor et al. (2022) empirical results.

⁴Notice that since results in Kapor et al. (2022) are conditional on applying through the platform, results in column (1) of Table E2 do not match with the ones reported in Section 3 in Kapor et al. (2022), which are conditional on using the platform.

Table E1: Replication of columns (1) and (2) in Table 2 of Kapor et al. (2022)

	Admission (1)	Enrollment (2)
Male $\times$ Private $\times$ Year 2010	-0.001 (0.006)	0.004 (0.007)
Male $\times$ Private $\times$ Year 2012	0.132*** (0.005)	0.118*** (0.007)
Male $\times$ Private $\times$ Year 2013	0.138*** (0.005)	0.135*** (0.007)
Male $\times$ Private $\times$ Year 2014	0.149*** (0.005)	0.136*** (0.007)
Male $\times$ Private $\times$ Year 2015	0.135*** (0.005)	0.142*** (0.006)
Male $\times$ Public $\times$ Year 2010	-0.042*** (0.003)	0.012*** (0.003)
Male $\times$ Public $\times$ Year 2012	0.095*** (0.002)	0.061*** (0.003)
Male $\times$ Public $\times$ Year 2013	0.096*** (0.002)	0.077*** (0.003)
Male $\times$ Public $\times$ Year 2014	0.099*** (0.002)	0.089*** (0.003)
Male $\times$ Public $\times$ Year 2015	0.068*** (0.002)	0.089*** (0.003)
Female $\times$ Private $\times$ Year 2010	-0.017** (0.007)	0.004 (0.009)
Female $\times$ Private $\times$ Year 2012	0.129*** (0.006)	0.147*** (0.008)
Female $\times$ Private $\times$ Year 2013	0.148*** (0.005)	0.169*** (0.008)
Female $\times$ Private $\times$ Year 2014	0.152*** (0.005)	0.178*** (0.008)
Female $\times$ Private $\times$ Year 2015	0.141*** (0.005)	0.170*** (0.008)
Female $\times$ Public $\times$ Year 2010	-0.042*** (0.003)	0.020*** (0.004)
Female $\times$ Public $\times$ Year 2012	0.077*** (0.003)	0.065*** (0.004)
Female $\times$ Public $\times$ Year 2013	0.089*** (0.003)	0.102*** (0.004)
Female $\times$ Public $\times$ Year 2014	0.101*** (0.003)	0.121*** (0.004)
Female $\times$ Public $\times$ Year 2015	0.066*** (0.003)	0.119*** (0.004)
Observations	600739	390373

Notes: This table replicates results in column (1) and (2) of Table 2 in Kapor et al. (2022)

Table E2: Platform integration effects using different specifications

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Platform user						
$1\{\text{grad. cohort} \geq 2011\}$	0.142*** (0.001)	0.118*** (0.001)	0.152*** (0.001)	0.149*** (0.001)		
$G8\text{ CZ} \times 1\{\text{grad. cohort} \geq 2011\}$					0.134*** (0.003)	0.134*** (0.008)
Academic schools	NO	YES	YES	YES	YES	YES
Graduation cohorts 2006-13	NO	YES	YES	YES	YES	YES
Only CZ with Unis.	NO	NO	YES	YES	YES	YES
Controls in (Kapor et al., 2022)	YES	YES	YES	NO	NO	NO
Controls in our paper	NO	NO	NO	YES	YES	YES
Treat/ctrl CZ	NO	NO	NO	NO	YES	YES
Wild bootstrap S.E.	NO	NO	NO	NO	NO	YES
R2	0.284	0.276	0.299	0.022	0.285	0.285
N	1002832	633865	464122	464122	464122	464122
Panel B: University enrollment						
$1\{\text{grad. cohort} \geq 2011\}$	0.037*** (0.001)	0.036*** (0.001)	0.041*** (0.001)	0.035*** (0.001)		
$G8\text{ CZ} \times 1\{\text{grad. cohort} \geq 2011\}$					0.005 (0.003)	0.005 (0.008)
Academic schools	NO	YES	YES	YES	YES	YES
Graduation cohorts 2006-13	NO	YES	YES	YES	YES	YES
Only CZ with Unis.	NO	NO	YES	YES	YES	YES
Controls in (Kapor et al., 2022)	YES	YES	YES	NO	NO	NO
Controls in our paper	NO	NO	NO	YES	YES	YES
Treat/ctrl CZ	NO	NO	NO	NO	YES	YES
Wild bootstrap S.E.	NO	NO	NO	NO	NO	YES
R2	0.197	0.2	0.204	0.001	0.188	0.188
N	962884	633865	464122	464122	464122	464122

Notes: This table shows the platform integration effects using different specifications. Panel A shows the effects using the platform user as outcome; while Panel B shows the effect using university enrollment as outcome. Column (1) to (4) performs an event study analysis. Column (5) performs a difference in differences analysis as the one in Section 3.2. Column (1) uses the specification in (Kapor et al., 2022). Column (2) restricts the sample only to academic schools and use students who graduated from high school between 2006-13. Column (3) further restrict the sample to students graduating from high schools in commuting zones that have a university in it. Column (4) adds the controls used mentioned in Section 3.2. Column (5) uses an specification that compares students in treatment control commuting zones as specified in Section 3.2. Column (6) uses the specification in column (5) and cluster standard errors at the commuting zone level, as specified in Section 3.2.

Appendix F Robustness checks

Homogenous treatment effect

The fuzzy adjustment requires that the control and treatment units have the same treatment effect when treated. We already showed in Section 3.5 that the proportion of students willing to move did not change after the integration; however, it could be that control group students interested in G8 universities enroll more in the G8 after integration because of heterogeneous treatment effect. We estimate that enrollment of control students in treatment areas and vice versa decrease 1.3pp. after the integration (p-value= 0.049). This could be problematic in satisfying this assumption if control students -after acknowledging they were not assigned to the platform- did not use G8 as a second alternative due to distance constraint and benefit more with the integration compared to students in the treatment group. To show results more robust in this assumption, we choose a subsample where the distance effect is less relevant and select the CZ in the center-south regions (from Metropolitan region to Los Rios region). With this subsample the increase on cross-market enrollment is reduced to -0.7pp (non-significant, Column (4) of Table F1) and results in effective application, decline seats and enrollment are very similar, suggesting that our results are not driven by the cross-market enrollment.

Table F1: Platform integration effect on platform user, congestion, university enrollment and enrollment in a different CZ, for students living between the Metropolitan and Los Rios regions

	Platform user (1)	Accepted G25 & not enrolled (2)	Enroll University (3)	Enrolled Different CZ (4)
G8 CZ $\times$ 1{grad. cohort $\geq$ 2011}	0.108 [0.02]	-0.021 [0.01]	-0.003 [0.87]	-0.007 [0.243]
Mean treat. 2006-10	0.523	0.103	0.600	0.003
Mean ctrl. 2006-10	0.682	0.133	0.664	0.276
Controls	YES	YES	YES	YES
R2	0.285	0.027	0.19	0.417
N	420276	420276	420276	420276

Notes: This table reports results of regressing several outcome variables on the interaction between a G8 commuting zone (CZ) dummy (from the student's high school location) and a dummy indicating whether the student graduated in 2011 or later. Students in the sample are those with an average Spanish-math PSU score greater or equal to 450 score points the year of graduation from an academic high school in a G8 or non-G8 CZ, between the Metropolitan and Los Rios regions. All regressions control for graduation cohort fixed effect, school fixed effect, income, female, predicted ability, and predicted government loan eligibility. Square brackets report the p-values of the coefficients after clustering standard errors at the commuting zone level and using the wild bootstrap procedure proposed by Cameron et al. (2008).

Appendix G Tables

Table G1: Platform integration effect on taking the PSU and obtaining and Avg. Spanish-math PSU score ≥ 450

	PSU taker (1)	Avg. Spanish-math PSU score ≥ 450 (2)
G8 CZ $\times$ 1{grad. cohort ≥ 2011 }	0.001 [0.417]	-0.002 [0.643]
Mean treat. 2006-10	0.973	0.782
Mean ctrl. 2006-10	0.966	0.764
Controls	YES	YES
R2	0.086	0.291
N	592934	592934

Notes: This table reports results of regressing several outcome variables on the interaction between a G8 commuting zone (CZ) dummy (from the student's high school location) and a dummy indicating that the student graduated from an academic high school in 2011 or later. Students in the sample are those graduating from an academic high school in a G8 or non-G8 CZ. All regressions control for graduation cohort fixed effect, school fixed effect, and a female dummy. Square brackets report the p-values of the coefficient after clustering standard errors at the commuting zone level and using the wild bootstrap procedure proposed by Cameron et al. (2008).

Table G2: Balancing checks

	Took PSU		Private school	Female	Ability	Income	Avg. admission score
	History (1)	Science (2)					
G8 CZ $\times$ 1{grad. cohort $\geq$ 2011}	0.012 [0.344]	0.005 [0.489]	-0.019 [0.412]	0.002 [0.515]	1.038 [0.483]	-0.063 [0.270]	-0.543 [0.633]
Mean treat. 2006-10	0.556	0.643	0.757	0.525	296.570	4.021	574.960
Mean ctrl. 2006-10	0.546	0.709	0.723	0.538	296.292	3.751	571.435
Controls	YES	YES	YES	YES	YES	YES	YES
R2	0.048	0.045	0.881	0.216	0.552	0.541	0.305
N	465211	465211	465211	465211	464150	465183	465211

Notes: This table reports results of regressing several pre-determine covariates on the interaction between a G8 commuting zone (CZ) dummy (from the student's high school location) and a dummy indicating whether the student graduated in 2011 or later. All regressions are performed in our working sample of students obtaining an average Spanish-math PSU score greater or equal to 450 score points the year of graduation from an academic high school in a G8 or non-G8 CZ. All regressions control for graduation cohort fixed effect and school fixed effect. Square brackets report the p-values of the coefficients after clustering standard errors at the commuting zone level and using the wild bootstrap procedure proposed by Cameron et al. (2008).

Table G3: Platform integration effect on the probability that students desire to live independently if continuing their studies at university

	Live independently when attending university	
	Yes (1)	Missing (2)
G8 CZ $\times$ $1\{\text{grad. cohort} \geq 2011\}$	-0.004 [0.650]	-0.007 [0.363]
Mean treat. 2006-10	0.077	0.128
Mean ctrl. 2006-10	0.370	0.121
Controls	YES	YES
R2	0.231	0.161
N	411311	464122

Notes: This table reports results of regressing several outcome variables on the interaction between a G8 commuting zone (CZ) dummy (from the student's high school location) and a dummy indicating whether the student graduated in 2011 or later. All regressions are performed in our working sample of students obtaining an average Spanish-math PSU score greater or equal to 450 score points the year of graduation from an academic high school in a G8 or non-G8 CZ. All regressions control for graduation cohort fixed effect, school fixed effect, income, female, predicted ability, and predicted government loan eligibility. Square brackets report the p-values of the coefficients after clustering standard errors at the commuting zone level and using the wild bootstrap procedure proposed by Cameron et al. (2008).

Table G4: Platform integration effect on using the platform, congestion, and university enrollment by the fraction of school peers attending a G8 or an OP university joining the platform in 2015 or later

	Platform	G25 accepted	Enroll		
	user	& not enrolled	University	G25	Private
	(1)	(2)	(3)	(4)	(5)
G8 CZ $\times$ 1{grad. $\geq$ 2011}	0.125	0.008	0.005	0.002	0.003
	[0.017]	[0.549]	[0.717]	[0.912]	[0.720]
G8 CZ $\times$ 1{grad. $\geq$ 2011} low % of students enrolled in sel. G8/OP	-0.009	-0.020	0.038	-0.005	0.043
	[0.682]	[0.159]	[0.010]	[0.805]	[0.057]
Controls	YES	YES	YES	YES	YES
R2	0.287	0.026	0.191	0.265	0.116
N	452075	452075	452075	452075	452075

Notes: This table reports results of regressing several outcome variables on the triple interaction between a G8 commuting zone (CZ) dummy, a low fraction of school classmates in pre-treatment periods attending a G8 or an OP university joining the platform in 2015 or later dummy, and a dummy indicating that the student graduated in 2011 or later. Students in the sample are those with an average Spanish-math PSU score greater or equal to 450 score points the year of graduation from an academic high school in a G8 or non-G8 CZ. All regressions control for graduation cohort fixed effect, school fixed effect, income, female, predicted ability, and predicted government loan eligibility. Square brackets report the p-values of the coefficients after clustering standard errors at the commuting zone level and using the wild bootstrap procedure proposed by Cameron et al. (2008).

Table G5: Platform integration effect on enrollment, when defining treated and control areas using regions

	University (1)	G25 (2)	Private (3)
G8 CZ $\times$ $1\{\text{grad. cohort} \geq 2011\}$	-0.007 [0.766]	-0.012 [0.658]	0.005 [0.593]
G8 CZ $\times$ $1\{\text{grad. cohort} \geq 2012\}$	0.011 [0.335]	-0.013 [0.292]	0.024 [0.103]
Mean treat. 2006-10	0.600	0.304	0.295
Mean ctrl. 2006-10	0.664	0.454	0.210
Controls	YES	YES	YES
R2	0.189	0.258	0.112
N	574173	574173	574173

Notes: This table reports results of regressing several outcome variables on the interaction between a G8 *region* dummy (from the student's high school location) and a dummy indicating that the student graduated from an academic high school either in 2011 or later, or in 2012 or later. Students in the sample are those with an average Spanish-math PSU score greater or equal to 450 score points the year of graduation from an academic high school in a G8 or non-G8 region. All regressions control for graduation cohort fixed effect, school fixed effect, income, female, predicted ability, and predicted government loan eligibility. Square brackets report the p-values of the coefficients after clustering standard errors at the commuting zone level and using the wild bootstrap procedure proposed by Cameron et al. (2008).

Table G6: Platform integration effect with adjusted coefficients

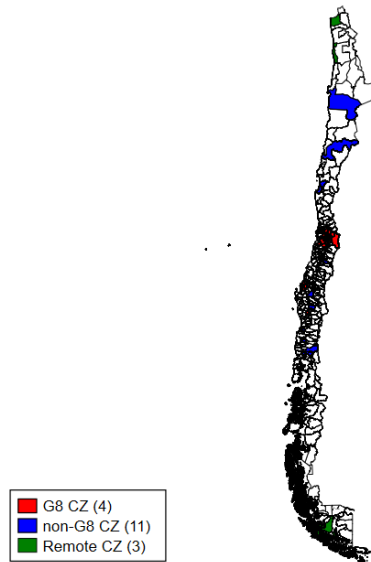
	Platform user (1)	Accepted G25 and not enrolled (2)	Enroll University (3)
<i>Panel A: coefficients from tables III and IV</i>			
G8 CZ $\times$ 1{grad. cohort $\geq$ 2011}	0.134 [0.008]	-0.020 [0.003]	0.006 [0.593]
<i>Panel B: Fuzzy adjusted coefficients</i>			
G8 CZ $\times$ 1{grad. cohort $\geq$ 2011}	0.239	-0.035	0.011
Mean treat. 2006-10	0.523	0.103	0.601
Mean ctrl. 2006-10	0.710	0.128	0.680
Controls	YES	YES	YES
N	464122	464122	464122

Notes: This table reports results of regressing several outcome variables on the interaction between a G8 commuting zone (CZ) dummy (from the student's high school location) and a dummy indicating whether the student graduated in 2011 or later. Students in the sample are those with an average Spanish-math PSU score greater or equal to 450 score points the year of graduation from an academic high school in a G8 or non-G8 CZ. All regressions control for graduation cohort fixed effect, school fixed effect, income, female, predicted ability, and predicted government loan eligibility. Square brackets report the p-values of the coefficients after clustering standard errors at the commuting zone level and using the wild bootstrap procedure proposed by Cameron et al. (2008). Panel A presents the coefficients estimated using our main empirical strategy (from tables III and IV). Panel B presents the *fuzzy adjusted coefficients*, which divide the coefficients in panel A by the differential level of treatment take-up. As a proxy of treatment take-up, we consider whether students want to remain with their parents in their high school CZ when entering university. As shown in section 3.4, 63% in non-G8 CZ and 92.3% in G8 CZ are potentially treated.

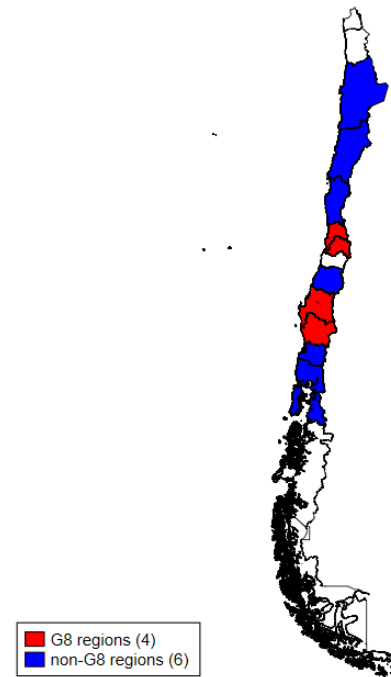
Appendix H Figures

Figure H1: Location of G8, non-G8, and remote commuting zones and regions in Chile

(A) G8, non-G8, and remote commuting zones.

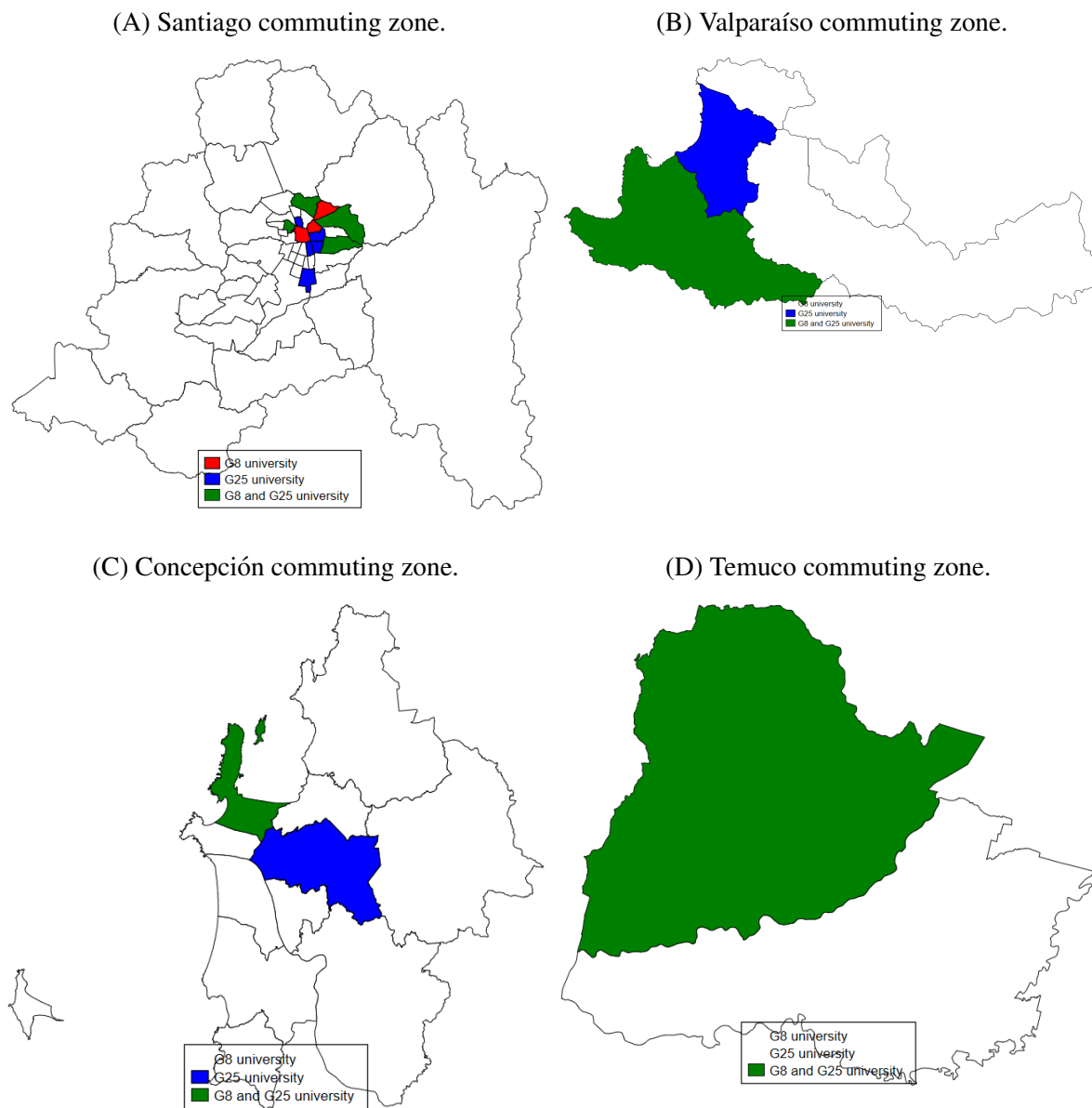


(B) G8 and non-G8 regions.



Notes: The left panel displays the location of G8, non-G8, and remote commuting zones in Chile. The right panel displays the location of G8 and non-G8 regions in Chile.

Figure H2: Municipality hosting G8, G25 and both universities in G8 commuting zones in Chile.



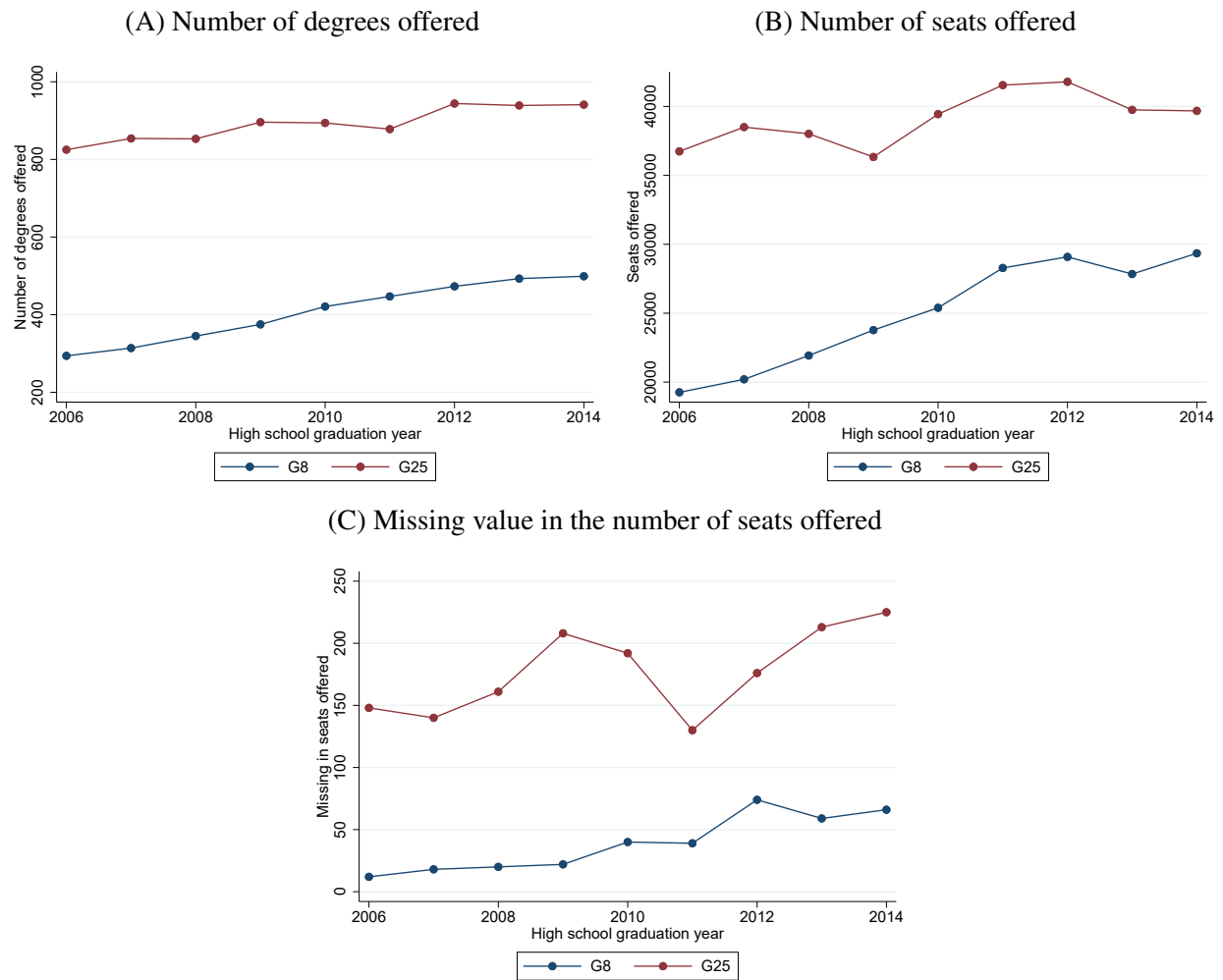
Notes: Each panel displays whether municipalities host G8, G25 or both universities in G8 commuting zones in Chile.

Figure H3: Distribution of score distance from the cutoff of students first choice application, by G8 and G25 universities



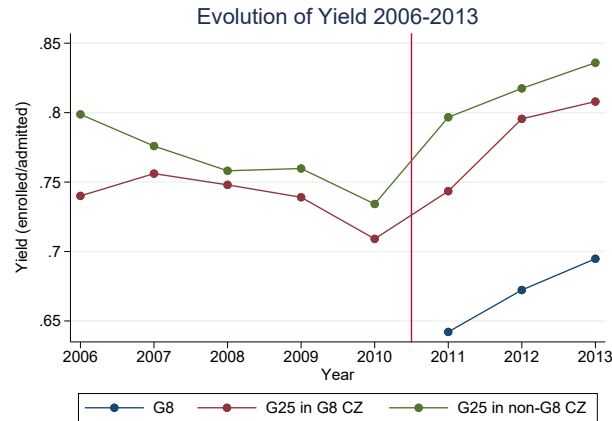
Notes: This figure displays the distribution of score distance from the cutoff of students first choice application in G8 and G25 universities. The box represents the score distance from the cutoff that contains one standard deviation of students in each side. The solid line inside the box displays the median score distance from the cutoff. The vertical lines represent the score distance from the cutoff that contains 95% of the distribution of students.

Figure H4: Degrees and seats offered by G8 and G25 over time



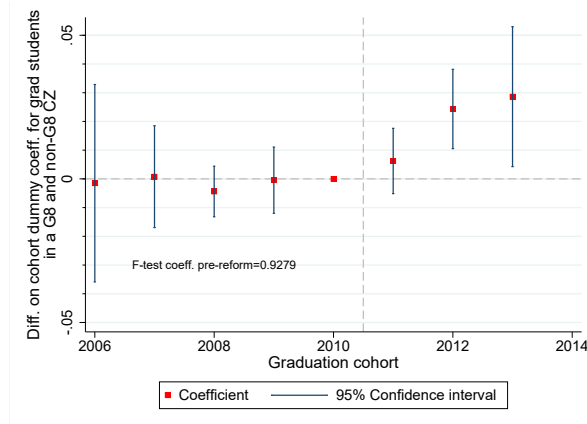
Note: This figure shows, in G8 CZ, the number of degrees and seats offered by G8 and G25 universities over time. Panel A shows the number of degrees offered by G8 and G25 universities. Panel B shows the number of seats offered by G8 and G25 universities. Panel C shows the number of degrees having a missing value in the number of seats offered by G8 and G25 universities.

Figure H5: Yield over the years for G8 and G25 universities.



This figure shows the enrollment yield over the years for G8 and G25 universities in G8 and non-G8 CZ. The yield is computed by dividing the number of enrolled students over the number of students that received a seat offer. We cannot compute the yield for G8 in pre-integration years, since we do not know the number of students that received a seat offer.

Figure H6: Platform integration effect on enrollment at a G8 or an OP university joining the platform in 2015 or later



Notes: This figure presents the estimated difference between treatment and control group when using as outcome enrollment at a G8 or an OP university joining the platform in 2015 or later.