Priority Pitfalls: Admission Mechanisms and Educational Outcomes

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Abstract

This paper studies whether assigning students to their most-preferred schools improves educational outcomes. I analyze a national reform in Finland that changed the centralized secondary school admissions mechanism from a strategy-proof deferred acceptance (DA) system to a manipulable hybrid resembling immediate acceptance (IA), through the introduction of priority points for vocational applicants. Using administrative data covering the universe of applicants and their outcomes, I combine difference-in-differences and counterfactual simulations to estimate the reform's causal effects. While the policy succeeded in increasing the share of students admitted to their top choice, it did not improve graduation rates. I show that even when a policy is successful at mechanically increasing the number of students matched with their first-ranked school, it can still fail to produce educational benefits if it induces strategic application.

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1 Introduction

Many education systems face high student dropout rates, particularly in vocational tracks. A key policy question is whether modifying school admission rules—particularly to prioritize access to more preferred programs—can improve student outcomes. The idea is intuitive: students who gain admission to programs they strongly prefer may be more motivated and therefore more likely to complete their studies. This prioritization, however, involves a trade off between allowing students to rank programs honestly. Consequently, whether such prioritization actually improves educational attainment remains unclear. I examine this question in the context of Finland, where a nationwide policy reform altered the centralized school assignment mechanism.

The reform in Finland aimed to reduce dropout rates by increasing first-choice admissions through a change in the assignment mechanism. This transformed the existing strategy-proof deferred acceptance (DA) system into a manipulable mechanism and thereby introducing incentives for strategic application behavior, where students may wish to avoid ranking very competitive programs at the top of their application. This shift allows me to study whether increasing first-choice matches leads to improved educational outcomes, and at what cost in terms of strategic behavior and system complexity.

A fundamental design question in student assignment is how to balance truthful reporting with capturing the intensity of preferences. The DA mechanism is widely adopted because it is strategy-proof and ensures stability. In contrast, immediate admission (IA) mechanisms may better reflect how much students value particular programs, but at the cost of manipulability. Because theoretical comparisons often rely on strong assumptions, the question of which mechanism performs better in practice remains an empirical one. My setting provides an opportunity to evaluate this trade off using rich administrative data and a nation-wide policy shift.

I compare students' matches, educational outcomes and application behavior before and after the reform in 2004. My empirical strategy uses both a difference in differences (DID) specification and counterfactual simulations to isolate the causal effects of the reform. The reform introduced priority points: vocational school applicants received three extra points for the program they ranked first and one extra point for the program they ranked second. These points were large compared to the typical variation in admission scores. This change turned the system into a Taiwan mechanism (TM)[1], which is a hybrid between the DA and the IA. A key feature of this new mechanism is that it is manipulable, and therefore students might benefit from misrepresenting their preferences to ensure a seat at a school.

[1]Dur et al. (2022) have shown that a Taiwan mechanism (TM) is a hybrid between the IA and the DA, and as such, inherits properties from both. Importantly, a TM is *manipulable*, meaning that students can misrepresent their preferences in order to gain access to a more-preferred school, especially if their favorite schools are oversubscribed

Does first-choice accommodation yield benefits on educational outcomes that outweigh the potential costs of manipulability and mechanism complexity? By answering this question, I make several contributions to the understanding of school admission policies and their impacts on applicants and students. First, I leverage rich micro data from Statistics Finland covering the universe of applicants to secondary education as well as students' short- and long term educational outcomes. Using this data, I am able to identify the effects of different admission systems on educational attainment. This is rare; while there are some papers on mechanism shifts within admission systems (eg. Terrier et al. (2021); Chen et al. (2020)), these have not been able to observe the effects on educational outcomes resulting from the reforms.

Second, the rich micro data allows me to go beyond reduced form estimates by simulating counterfactual admission outcomes for the entire pool of applicants. These simulations distinguish between the mechanical effect of the reform and the behavioral response of students. Moreover, this approach is essential for isolating the priority points from other confounding changes. Standard empirical approaches like difference in differences assume no other policies changed at the same time, but this is not always the case in policy reforms targeting complex school choice markets. The simulations address this by creating a controlled environment to validate my causal claims.

The reform was implemented because earlier studies suggested that students admitted to the programs they ranked first were less likely to drop out. I find that the reform did succeed in changing the matches. Vocational track applicants were significantly more likely to be admitted to the school they ranked highest on their application after the points were introduced. However, the primary goal of the policy was not achieved, since this increase in first choice matching did not lead to any decrease in dropout rates, as there was no difference in the likelihood of graduating within five years of admission. Even for subgroups like older applicants, who saw a very large increase in being admitted to their first choice, the graduation rates did not improve.

To make sure these results are causal, I address the fact that the 2004 reform included other changes. The most important change was the removal of age based priorities that had previously made it hard for adult applicants to get a seat at a school. This simultaneous change confounds basic estimates. To isolate the effect of priority points from other simultaneous changes, I simulate counterfactual equilibria under different admission mechanisms. Thes results of these simulations show that the points themselves had a mechanical effect of increasing first choice matches by 5.8 percentage points. This is larger than the 3.5 percentage point increase I find in my basic DID model, which suggests that the other changes in the market were actually hiding the full impact of the mechanism change.

I argue that the reform failed to improve graduation rates for two main reasons. First, the reform was based on a misunderstanding of the data. Students matched to

their first choice were more likely to graduate, but this was likely due to higher underlying ability, not the match itself. When the reform mechanically increased first-choice matches without changing ability, graduation rates remained unchanged. The second reason for the failure is strategic behavior. Because the Taiwan mechanism is manipulable, it changed the incentives for how students apply. I find evidence that applicants changed their application behavior after the reform as they were less likely to rank oversubscribed schools first or second on their applications. This suggests that students were moving toward "safer" programs to make sure they could benefit from the priority points. If students are ranking safe schools first instead of their real favorites, the first ranked program on their list no longer reflects their true preference. This means any motivational benefits that were supposed to come from first-choice fulfillment no longer apply.

I show that even when a policy is successful at mechanically increasing the number of students matched with their first-ranked school, it can still fail to produce educational benefits if it ignores student ability and induces strategic misrepresentation. Ultimately, the introduction of priority points made the application process more complex for students without providing any compensating gains in educational attainment.

This study is related to the growing literature on centralized admission systems. While the deferred acceptance (DA) mechanism is widely adopted for its student-optimality and strategy-proofness (Gale and Shapley, 1962; Abdulkadiroğlu and Sönmez, 2003), its superiority over the immediate acceptance (IA) mechanism depends on specific features of the admission context. Though the IA is manipulable and may disadvantage low-SES or unsophisticated applicants (Pathak and Sönmez, 2008; Abdulkadiroglu et al., 2006), it can outperform the DA when preferences are correlated or school priorities are coarse, as it better captures the intensity of student preferences (Calsamiglia et al., 2020; Miralles, 2009; Abdulkadiroğlu et al., 2011). This paper contributes to this debate by providing empirical evidence on how this trade off plays out in practice both in terms of matches and consequent educational outcomes following a national-level reform.

Studies on the the effects of switching between mechanisms are scarce, since mechanism shifts happen rarely. Terrier et al. (2021) find that moving from IA to DA in England reduced school quality for low-SES students, as high-SES parents had applied more conservatively under IA. The closest paper to mine is Chen et al. (2020), who study Chinese college admissions and compare outcomes under IA and a parallel mechanism (PA), which can be represented as a TM (Dur et al., 2022). They confirm earlier theoretical (Chen and Kesten, 2017) and experimental (Chen and Kesten, 2019) findings that IA encourages more preference manipulation than PA. My paper makes an important contribution by evaluating how a change in the matching mechanism affects educational outcomes, which is something that most existing studies do not observe directly.

In addition to studying the effects of reform, I combine this with a simulation approach to disentangle the mechanical and behavioral effects of the policy. A few recent papers

have used simulations to model school choice equilibria under counterfactual policies (e.g., Gandil (2024); Larroucau and Rios (2022)). However, unlike these studies, which simulate outcomes under hypothetical reforms, I use observed preferences and simulate equilibrium outcomes under two alternative mechanisms that have both been in use and for which I can observe long-term outcomes.

Moreover, I contribute to the research on how being matched with a more preferred school affects educational outcomes. Previous research that has shown that attending a more-preferred school has little or no effect on short-term educational outcomes, such as graduation, test scores or college enrollment (Abdulkadiroğlu et al., 2014; Dobbie and Fryer Jr, 2014; Deming et al., 2014; Cullen et al., 2006; Beuermann and Jackson, 2022; Gorman and Walker, 2021). These studies focus on the effects on marginal students gaining access to more preferred schools, which often also means exposure to more high-achieving peers. In contrast, when a mechanism change increases the number of students getting a preferred match across the board, the composition of peers changes, and the effect may be different. This paper provides new evidence on what happens when more students are admitted to more preferred programs and addresses the broader implications of the use of DA or IA on educational outcomes.

This paper is structured as follows. Section 2 provides details on the institutional background and presents the student selection process and admission reform of 2004. Section 3 outlines the data and sample used to estimate the effect of the reform. Section 4 presents the empirical strategy and results on match quality, application behavior and how these differ by age group. Section 5 reports robustness checks. In Section 6 I describe the simulations used to construct counterfactual scenarios, the empirical strategy I use to compare outcomes, and results from these comparisons. Section 7 concludes.

2 Institutional Background

2.1 Secondary Education in the Early 2000s in Finland

At the time of the reform, compulsory school in Finland lasted nine years. Afterwards, students could apply to and enroll in secondary education[2]. Secondary education in Finland comprises both vocational and academic high schools, each lasting, on average, three years. The same joint application system (JAS), maintained by the Finnish National Board of Education (FNBE), is used to apply to both types of secondary schools in the

[2]Since then, compulsory schooling has been lengthened to last until an individual is 18 or obtains a secondary degree.

country[3].

In 2003, there were 680 institutions offering secondary education to which applicants could apply through the JAS, wirh 64 percent being academic high schools and the remaining vocational. Unlike the academic track, vocational education is consists of various programs qualifying students for specific occupations. Thus, when applying to a vocational school, applicants also select the program that they wish to attend. In what follows, "school" and "program" are used interchangeably to refer to these school and program combinations to which students apply.

Overall, there are around 40 different programs covering education in seven fields, with Technology and transport is the most popular. Figure 1 depicts the popularity of each field. Applicants may apply to both academic and vocational track programs on the same application. I categorize a 'vocational track applicant' by the first-ranked choice: if an applicant ranks a vocational track first on their ROL, they are considered a vocational track applicant, even if all subsequent programs listed are academic. The inverse is true for academic track applicants.

While the majority of applicants apply to secondary education directly from compulsory school, the JAS is not restricted to only these applicants. Some applicants have accumulated work experience or studied and even graduated in another program before applying through the JAS. However, vocational education is divided into education targeted to 'young' applicants and 'adult' applicants (under or over the age of 20). While most vocational education targeted specifically to adult applicants was distributed primarily outside the JAS, some programs accept both types of applicants, leading some adult applicants apply in the JAS. The majority of applicants who apply in the JAS are young applicants, with 70 percent of vocational track applicants in the sample being younger than 20.

All secondary education is tuition-free and publicly funded. Vocational education is administered by municipalities or by federation of municipalities, which can relatively freely decide the number of seats available in each field of education based, among other things, on the needs of specific industries in the area. However, the certain fields where instruction is particularly expensive, such as seafaring, or that are particularly oversubscribed, such as cultural programs, have seat numbers regulated by the central government.

On a national level, the objective governing the number of seats in secondary education was to ensure that there would be a seat in vocational or academic secondary education for each person graduating compulsory school. From 2003 to 2004, the number of available

[3]However, the JAS during this period did not include all fields of study or all areas: applicants to dance or performing arts programs or to secondary education provided in Åland Island apply outside the JAS. These are relevant options to a very small fraction of applicants. Moreover, applicants over the age of 19 were considered 'adult applicants', and seats specifically reserved for 'adult education' were distributed primarily outside the JAS (Kumpulainen and Saari, 2006).

seats in vocational education distributed through the JAS increased by 800 seats or by 1 percent. Simultaneously, the number of applicants increased by 1070 applicants or 2 percent. However, the increase in seats was primarily in education reserved to adult applicants over the age of 19 or with a secondary degree. In contrast, the number of seats in education targeted to applicants applying directly from compulsory education *decreased* by 89 (0.2 percent) seats while the number of applicants in this group increased by 2476 (11 percent). Despite there being significantly more seats than applicants in both groups of applicants, certain geographical areas or fields of study might have experienced increased competition during the observation period[4].

2.2 The Student Selection Process

The application period to secondary programs through the JAS begins in March, and the school year starts in August. Applicants rank study programs in order of preference and send their ROL to the system. The number of seats in each program is determined and announced before the application period begins. However, for most students who continue directly into secondary education, final grades are learned only after the application period, and rendering their admission score that they attain uncertain when they send their applications. Other applicants who have graduated in previous years know their GPA but not necessarily their admission scores.

The ranking of schools that students can include on their application is limited to five. When ROL length is restricted, the DA mechanism in use may not be able to elicit truthful preferences (Haeringer and Klijn (2009), Calsamiglia et al. (2010)) and students may benefit from misrepresenting their preferences on their ROL[5]. However, a DA mechanism allowing applicants to rank five schools is less manipulable than an IA mechanism with the same limitation (Pathak and Sönmez, 2013). In other words, although the mechanism used before the reform was manipulable due to the ROL length limit, the mechanism in use after the reform was even more manipulable.

Once students submit their applications to the system, student selection proceeds in two stages: an *automated stage* and an *updating stage*. In the automated stage, school seats are assigned to students following the DA algorithm. Previously, the algorithm implemented age-based priorities, where the DA was first run on young applicants, and only if seats remained were adult applicants considered. These age-based priorities were removed in the reform. The DA algorithm proceeds in rounds as follows:

Round 1: Each applicant 'proposes' to their highest ranked program. The program tentatively accepts as many students as it has seats, following it's priority order, determ-

[4]The datasets used in this study does not include information on the number of available seats. This information, on the national level, is from Kumpulainen and Saari (2006).

[5]Less than a fourth of applicants submit a ROL with five programs listed. On average, applicants list three programs on their application.

ined by admission scores described below in more detail. The remaining proposers are rejected.

Round $k > 1$: Rejected applicants propose to their next-best choice. The schools compare the scores of the new proposers together with the tentatively accepted proposers from the previous rounds and tentatively accept the highest-ranking proposers.

The algorithm terminates when all applicants are matched to a school or when unmatched students have proposed and been rejected by all the schools on their application. Ties are resolved by considering each point category of admission scores separately, and if applicants are still tied, the tie is broken randomly. As school preferences are strict, ties are relatively rare, and even more rarely are they broken randomly.

After the automated stage, students receive offers from schools with a deadline to accept the offer. Those not accepted are placed on a substitution list and are informed of their substitute position. When an applicant rejects their offer they are no longer considered for any of the schools. When an applicant accepts their offer, they can still be considered if a seat becomes available at a more preferred school for which they are on the waiting list. As some seats are opened after the automated stage, schools make offers to students on their substitution list until the seats are full or they have offered a seat to all relevant applicants. After the updating stage, if schools have empty seats, *a replacement application process* takes place distributing the remaining seats using the same algorithm as in the automated stage. Additionally, after the automated stage, students can also contact schools to inquire about remaining seats. As a consequence, in practice, seats that become available during the updating process are not always offered in the correct order to applicants on the substitution list (see Virtanen (2016)).

2.3 The Admission Reform in 2004

The admission system operates withing the legislation set by the Ministry of Education and Culture. Among other details, the legislation determines the grading system that all secondary schools must adopt to compare applicants. Schools rank academic track applicants primarily based on their grade point average (GPA) alone. Conversely, admission priorities to the vocational track are determined by a composite score derived from points in different categories. Importantly, vocational schools calculate these scores in different ways, resulting in varying admission scores for the same applicant across programs.

Before the reform, these composite scores were determined by an applicant's GPA for all subjects, GPA of selected non-academic subjects, relevant working experience, entrance exam score, and gender priority points. Vocational schools could decide the weights of each categories independently and, for example, could only use the test score from an entrance exam to rank applicants. In practice, schools had large differences in the way in which applicants were scored, and the choice between scoring schemes was

often arbitrary. Furthermore, the differences in grading schemes seemed 'confusing' to applicants (Rantanen, 2004).

The 2004 reform aimed to simplify and standardize selection criteria, introducing the following changes to admission scores:

1. First preference points ensured three extra points for the first ranked vocational program and one extra point for the second ranked vocational program.

2. Previous age-based priority rules were replaced by 3 extra points granted to applicants who had completed compulsory schooling in the same year as they applied to secondary education.[6]

3. The grades from compulsory schools began to be scored similarly in all vocational schools, and the proportional weight of compulsory school grades was unified. Applicants received 4–16 points for their GPA and 2–8 points for their grades in the three best non-academic subjects.

4. The proportional weight of entrance exams was capped: entrance exam performance could contribute a maximum of 10 points to an applicant's composite score.

5. Vocational school applicants continued to receive extra points for working experience, but after 2004, all working experience was considered as opposed to previously only "relevant" working experience. Work experience points were capped to five.

6. After 2004, gender priority points decreased from 3 to 2. Gender priority points were given to applicants who applied to programs in which their gender was underrepresented among all applicants.

Table 1 summarizes the changes to the admission scores while figure 2 depicts the differences in admission scores before and after the reform. The post-reform admission scores were more tightly distributed around the mean, and the standard deviation 7.9 was nearly half of pre-reform standard deviation in admission scores (14.5). Within-program variation was smaller, but proportionally similar: the standard deviation of admission scores within a program was 7.3 in 2003 and 4.3 in 2004.

An important question is whether applicants or applicants' parents were aware of the reform and the changes in incentives due to it. Political discussions a few years after the reform suggest some awareness of the incentive problems related to FPPs, as noted in this written request to the Minister of Education by Member of Parliament Raija Vahasalo in 2010 (KK 37/2010):

[6]These previous age-based priorities gave under 20-year-old applicants without a secondary degree the highest priority, applicants under 25 years and without a secondary degree the second highest priority, and applicants under 25 with no vocational but an academic degree the third highest priority. These age-based priorities were implemented so that first DA was run on young applicants, and if seats remained after this, adult applicants were considered.

> Currently, a student who selects vocational education as their first choice in the application receives three additional points. If a student puts a high school as their first choice and a vocational school as their second choice, their selection for high school is considered based on their grade point average, while the vocational school selection is based on their second preference. [...] For these individuals, the choice between high school and vocational education is not neutral; the additional point system encourages hesitant students to primarily apply for vocational education.

In her reply, the Minister of Education quoted the research of Rantanen (2001) that had shown that admittance to a higher-ranked program decreases the likelihood of dropping out, and that the admission scores were a way to 'encourage the applicants to carefully evaluate their application options in advance'.

3 Data Sources and Sample

3.1 Data Sources

My primary data source is the EDUC-TYHR module maintained by Statistics Finland which is built upon the FNBE's Application registry. This dataset includes information on applicants' compulsory school performance, applicants' preference order for the schools to which they apply, and the school to which they are matched at the end of the process. I use data from the spring application round as this is when the majority of students apply and are admitted. I observe all 163,700 applicants that apply through the JAS in 2003 and 2004. Thus, the sample spans one application round before and after the reform, forming the basis for the empirical estimation in Section 4.

The results in Section 4 concentrate on the full sample of applicants applying to secondary education through the JAS in these two years. The primary group of applicants are 16-year-old recent compulsory school graduates, constituting two-thirds of the sample in both years. All secondary school programs specifically targeted to this young applicant group are in the JAS. While most seats in adult education are distributed outside the JAS, some adult and young applicants compete for the same schooling seats, and the admission reform might have shifted some of the seats from one group to another. Thus, estimating the effects of the reform for the full sample becomes crucial.

For the simulations, I use another version of the FNBE's application registry, containing slightly fewer observations but that has detailed information on applicants' scores by score category. In the simulations, I similarly include all applicants irrepective of age and prior applications, as the equilibrium is determined by the outcomes of all applicants and schools.

For applicants' background information, I use the FOLK modules from Statistics Finland that provide individual-level details on the applicants' and their parents' demographic characteristics. Information on educational outcomes come from the Student and Degree Registers that contain information on all degrees obtained in post-compulsory education.

The data also includes information on the applicants' *joint application area* (JAA). In this data, there are 20 such areas, corresponding geographically to provinces. An applicant's JAA was determined by the municipality in which the first-ranked program was taught. However, the JAA are divided by language, and applicants whose main language are Swedish and Finnish applied in different JAA. Area-specific fixed effects used in the main empirical specification are based on these JAA codes. Additionally, study field information is included for each school and program, with 40 programs classified into 10 study fields as depicted in Figure 1. I use these study fields to construct study field fixed effects.

3.2 Sample

Table 2 provides an overview of the sample used to estimate the effects of FPPs. Notably, most applicants are accepted to their first-ranked program, with the likelihood increasing for vocational track applicants in 2004 with the introduction of FPPs. On average, vocational track applicants are matched to the second-ranked school, and the mean rank of matched school decreases slightly in 2004, indicating that applicants were matched with higher-ranked programs on their preference list. The likelihood to not be matched with a school remains constant, with approximately 16 percent of vocational track applicants failing to secure a seat in the admission process.

Dropout rates are considerable for vocational track applicants, with nearly half not graduatin within the typical three years program duration. After five years, more than one-third still have not graduated from any secondary-level program, and many apply to another secondary program within six years.

Given that restricting the length of the ROL is a concern in terms of truthful application behavior, it is interesting to note that less than one in four applicants submit ROL's with all five possible programs listed. On average, applicants rank three programs.

Applicants to academic and vocational tracks differ somewhat by their background, with more women applying to the academic track, and slightly more immigrants applying to the vocational track. Noteworthy differences emerge in parental background, where academic track applicants more highly-educated parents on average, indicating that vocational track applicants are more likely to have parents with a lower socioeconomic status (SES). This SES difference might influence the degree of strategic application exerted by vocational track applicants.

Another large difference between vocational and academic track applicants lies in the average age of applicants: vocational track applicants are, on average, nearly three years older than academic track applicants. Additionally, there are nearly no adult applicants applying to the academic track. In contrast, nearly a third of vocational track applicants are at least 20 years old.

4 Reduced-Form Effects

4.1 Empirical Strategy

The objective is to estimate the reduced-form impact of introducing priority points into the admission system in 2004. I am interested in the effect of priority points on the outcomes for student i applying to vocational education in field f in area a at time t. To achieve this, I employ two distinct specifications. The first one compares the outcomes for vocational school applicants before and after the reform. The second specification is a two-way fixed effects-type difference in difference (DID) estimation, encompassing both vocational and academic track applicants and estimate the difference in outcomes for the two groups before and after the reform. As the FPPs were implemented only for vocational track applicants, and admission scores for academic track applicants did not change, academic track applicants constitute a relevant group to compare the effects of FPPs to.

Treatment status in both specifications is based on ranking a vocational track first. This is not the same as being admitted to a vocational track, and the results should not be interpreted as outcomes for individuals admitted to vocational tracks. Notably, the control group might include students accepted to the vocational track if, for instance, they failed to be admitted to their first-ranked academic track. However, the FPPs were conditional on *applying* to a vocational school as a first choice and therefore treatment status is determined by applications.

In the first specification, I limit the sample to vocational school applicants, defining them as those ranking a vocational track first on their ROL. This is the set of applicants who are directly affected by the reform. To estimate the effect of the reform in this sample, I run an OLS regression with a dummy *Post* identifying applicants in the post-reform years. The coefficient β_1 indicates whether the outcome differed after the reform:

$$Y_{iat} = \beta_0 + \beta_1 \cdot Post + X_{it} + Z_{at} + \theta_{af} + \epsilon_{iat}. \tag{1}$$

However, a simple before-after estimation focusing only on vocational track applicants overlooks potential trends that affect applicants over the period of interest. To account for this variance over time, I estimate a difference-in-differences specification that compares the vocational track applicants (treated group) to academic track applicants (control

group) before and after the reform.

The identification in this DID specification rests on comparing vocational and academic track applicants. An important limitation to this is that, as noted in the quote in Section 2.3, the reform might have incentivized some applicants to the academic track to apply instead to the vocational track. Figure 3 depicts the trend in applications. However, examining the trend in applications (Figure 3) reveals only a slight increase in the share of applicants ranking an academic track first from 58 percent to 59 percent. Moreover, estimating a linear regression yields the same average effect, suggesting no significant shift between track types when the reform occurred.

In this DID model, outcome depends on dummy variables *Post, Vocational*, and the interaction $Post \cdot Vocational$, which indicate applying in post-reform years, applying to a vocational track as a first choice, and applying to a vocational track as a first choice in post-reform years respectively:

$$\begin{aligned} Y_{iat} =& \beta_0 + \beta_1 \cdot Post + \beta_2 \cdot Vocational + \beta_3 (Post \cdot Vocational) \\ &+ X_{it} + Z_{at} + \theta_{af} + \epsilon_{iat}. \end{aligned} \tag{2}$$

The coefficient of interest is β_3, which captures the change in outcome for applicants applying to the vocational track in post-reform years compared to the change in outcomes for applicants applying to the academic track.

The identifying assumption under which β_3 captures a causal effect is that, in the absence of the reform, the outcomes of academic and vocational track applicants would have evolved similarly. This might not hold if, for instance, the local supply of education evolves differently for academic and vocational tracks. Notably, if the number of available seats decreases in one type of track but not in another, this could confound the estimates. To address potential confounding factors, I complement the reduced-form findings with simulations described in more detail in Section 6.

Besides implementing the FPPs, the reform changed other factors of how applicants were scored. Specifically, the proportional weight of each point category changed, which might change admission outcomes. In an ideal situation, I would be able to compare two exactly similar applicants with the same preferences, applying to the same program before and after the reform. This is, however, not feasible for two reasons. First, school and program codes change year-to-year making it impossible to compare applicants to the same school or program over time. Second, I only observer ROLs and not the underlying preferences, and can not be sure to compare applicants with the same preferences. To alleviate these issues, I control for applicants characteristics in order to compare similar applicants. Moreover, I add application area and study field fixed effects in order to compare applicants interested in programs in the same field and area.

More specifically, in both specifications 1 and 2 I include individual-level controls X_i

for gender, age, compulsory school GPA, parental education level, and a binary variable on immigrant status. Fixed effects θ_{af} include an interaction between the JAS application area and field-of-study dummies. These dummies correspond to those depicted in Figure 1, excluding the academic track. Therefore, the estimation compares applicants applying in the same area and to the same field over time. Standard errors are clustered at the municipality level.

As part of the reform, aside from the introduction of the FPP, a noteworthy change involved removing the previous age-based priorities. While I control for age in the main specifications, it is possible that the outcomes differ significantly by adult applicant status. Section 4.4 explores these differences in more detail.

4.2 Effect on Matches and Match Quality

I begin by examining the share of students assigned to the program that they rank first on their ROL. Here, it is important to remember that the FPPs mechanically increase the likelihood of being assigned to one's first choice, but because of changes in the application incentives, this might not be the true most-preferred program of the applicant. The results in Table 3 reveal that vocational track applicants are 1.6 pp or 2.8 percent of the mean more likely to be matched to their first-ranked program once the FPPs are in use in 2004. The DID estimates comparing the vocational track applicants to academic track applicants indicate a larger increase of 3.5 pp or 6.1 percent of the mean. Similarly, column 3 shows that applicants are, on average, admitted to tracks ranked higher on their ROL.

This effect is smaller than findings in other studies examining first-choice accomodation under the IA. For instance, Terrier et al. (2021) document a 8 pp increase in the likelihood to be admitted to the first-ranked program under the IA than in under the DA in England, while Chen et al. (2020) find an even more substantial effect of 24 pp increase in China. The comparatively modest effect in this study could be attributed to several factors. First, the updating stage of admissions, described in 2.2, alters the matches, allowing some students to access their first-ranked program in this process regardless of their match in the automated stage. This dampens the effect of the mechanism change.

Second, a significant proportion – 57 percent – of vocational track applicants are accepted to their first-ranked program in the DA, indicating relatively low competition for schools, which could explain why the estimates are lower than in other studies. Moreover, the mechanism here is not an IA mechanism but a hybrid between the IA and the DA, and it is possible that switching to an actual IA mechanism would have a larger effect.

As the FPPs increase the likelihood of access to the first-ranked school, they might simultaneously decrease the likelihood of being matched with a lower-ranked school. Consider an applicant who is not admitted to their first-ranked school. In the IA, they might

fail to get access to any school if the programs that this applicant has ranked second or lower are oversubscribed and applicants who have ranked these schools first have priority in admission because of the FPPs. In the DA, this does not happen, as the rank of the school on an applicant's ROL's does not influence the likelihood of being admitted. Consequently, transitioning to an IA mechanism is potentially associated with a larger share of students failing to gain access to any program. However, column 2 in Table 3 shows that this is not the case, and the addition of FPPs does not decrease the likelihood of being admitted. Additionally, as the admission chances remain constant before and after the reform, the result that more students are matched with their top-ranked program is not driven in overall admissions. This implies that applicants are shifted from matching with their lower-ranked programs to their first-ranked one.

I then examine the effects on match quality. A key reason for implementing FPPs was the belief that applicants accepted to programs ranked higher on their ROL would be less likely to drop out of secondary education. Results in Table 3 do not support this reasoning. After the reform, vocational track applicants were admitted to tracks ranked higher, but the likelihood of dropping out did not change. In fact, the DID estimates show that if anything, vocational track applicants accepted after the reform were slightly *less* likely to graduate within 5 years.

This decrease in graduation rates is interesting, as it could be driven by applicants accepted to schools that are no longer their true most-preferred schools. However, Figure 4 reveals that this effect is driven by applicants who are admitted to second- or lower-ranked schools and applicants accepted to first-ranked schools are, in fact, slightly more likely to graduate than before the reform.

Finally, if students apply strategically once the FPPs are in use, and schools on their ROL no longer reflect their true preferences, it is possible that they are less satisfied with their matches and more likely to reapply to another program later. I measure match quality through the likelihood to apply again through the joint application system within six years in either the spring or fall application period. Results in Table 3 show no difference in reapplying.

In summary, the results on matches suggest that applicants are more likely to be admitted to their first-ranked program after the reform. However, there is no effect on other outcomes measuring matches or match quality. In particular, the reform did not achieve its intended goal of decreasing the likelihood of dropping out.

4.3 Effects on Application Behavior

Next, I analyze the effects that FPPs had on applicant behavior. As discussed above, the introduction of FPPs into the admission system make the mechanism manipulable, and consequently, application behavior after the reform may be different. Measuring

preference manipulation poses a challenge as true preferences remain unobservable under a manipulable mechanism. However, previous research has documented how application behavior under the IA differs from application behavior under the DA.

First, I consider whether students avoid ranking an oversubscribed school first on their ROL. Since FPPs increase the likelihood to be matched with the first-ranked progam while potentially decreasing the likelihood to be matched with lower-ranked programs, students may want to apply to safer programs as first choices after the reform. This tendency to avoid oversubscribed schools as a top choices is a well-known feature of the IA, first documented by (Abdulkadiroglu et al., 2006) and supported by evidence from China in Chen et al. (2020), where students rank less prestigious schools first on their ROL under the IA.

I define a school as 'oversubscribed' by considering how many of those who rank the school first are accepted. On average in 2003 and 2004, in a vocational program, 57 % of those who rank the school first are accepted. If the share in a given program is smaller than this, I define the program as oversubscribed. Therefore, the outcome measures if students are more or less likely to rank programs that are harder to get in to in first place on their ROL. It is worth noting that this measure of oversubscription might overstate the share changing their application behavior, given the increase in the share of applicants accepted to their first-ranked program due to the reform thus mechanically reducing the number of oversubscribed programs. In an ideal situation, I would categorize a program in year t as an oversubscribed program based on the share of accepted students in $t-1$. Unfortunately, as school and program codes change each year and this prevents me from using information from previous years. Nonetheless, the outcome provides insight into whether the programs listed first on applications were less oversubscribed than the average program in these years, and as such, is indicative of application behavior.

As demonstrated in Column 2 of Table 4, post-reform applicants are slightly less likely to rank an oversubscribed program first on their ROL. The effect estimated by the specification comparing vocational track applicants before and after the reform is substantial, 7.6 percent of the mean. The DID estimate is larger and more precise, but partially driven by academic track applicants being *more* likely to rank an oversubscribed school first. This could be due to several reasons, but it is noteworthy that the number of available seats relative to applicants in academic track education did *not* change over these years, and hence the increase in competition is not due to changes in overall supply of academic track seats.

Further investigation involves examining whether students are less likely to rank oversubscribed choices second on their ROL. Under the IA, a typical strategy would be to rank a 'safe', i.e. undersubscribed, program second, so that if an applicant fails to gain access to their first-ranked program, they would not be pushed out of their second-ranked program by applicants who ranked it first if the second-ranked program is oversubscribed.

Column 3 in Table 4 demonstrates results similar to those for the first-ranked track: a large esimate in the before-after speficication and a larger and more precise estimate in the DID specification, which is driven by changes in academic track applicants' applications.

Taken together, these estimates suggest that vocational track applicants post-reform may be more likely to rank safer programs higher on their ROL. This would also suggest that applicants did, in fact, consider the reform's incentives and adapt their application behavior correspondingly.

If, indeed, students consider the first two choices 'safer', it might imply that they submit shorter ROLs after the reform: If applicants skip applying to more prestigious schools, it could decrease the length of their ROLs. Fack et al. (2019) show that applicants may 'skip the impossible' and avoid listing schools that they think they will not be accepted to. Similarly, Chen et al. (2020) document that applicants submit shorter ROL's under the IA. Results in Column 1 in Table 4 demonstrate that this was not the case when FPPs were adopted. If anything, the first panel indicates that ROLs became slightly longer with applicants ranking 0.03 more schools on their application after the reform. However, the main estimates in both panels are imprecise, small and of opposing signs. I conclude from this that there was no large effect on ROL length.

As the quote from MP Vahasalo documented in Section 1 noted, that FPPs, exclusively granted to vocational track applicants, might push some hesitant applicants to apply to the vocational track rather than the academic track. However, these applicants could still have ranked the academic track as their second or third choice. Estimates in Columns 4 and 5 in Table 4 measure whether applicants to the vocational track were more likely to rank an academic track second or third. I find no support for this. The estimates from the before-after comparison are positive but small, and statistically insignificant while the DID estimate are negative, small, and statistically insignificant. Given that very few vocational track applicants (only 5 %) rank an academic track second or third, or, in other words, are hesitant between the two track types, this potential issue appears to affect only a small fraction of the applicants.

4.4 Heterogeneous Effects by Applicant Age

Besides implementing FPPs, previous complicated age-based priorities were removed in the reform. Pre-reform, a hierarchical process favored young applicants, such that a DA mechanism was initially applied to all young applicants without a secondary degree. Only if seats remained were applicants under 25 years old considered, followed by those over 25. This approach, aimed at helping younger applicants obtain a study place faster, was deemed 'unreasonable' in practice, as it often prevented older applicants from being admitted to any school. The replacement of this approach with priority points for same-year graduates aimed to encourage young applicants to apply to secondary education

directly from compulsory school without discouraging older applicants from applying. (Rantanen, 2004)

Given that the policy of interest in this paper is the FPPs, it is important to understand how the removal of these age-based priorities affected application outcomes. To do so, I evaluate how matches of young and adult applicants changed after the reform. In order to do so, I estimate the following DID equation:

$$Y_{iat} = \beta_0 + \beta_1 \cdot Post + \beta_2 \cdot Young + \beta_3(Post \cdot Young) + X_{it} + Z_{at} + \theta_{af} + \epsilon_{iat}, \quad (3)$$

where the dummy $Young$ is equivalent to one if the applicant is younger than 20 and zero otherwise. Therefore, the coefficient β_3 captures the differential effect of the reform on young and adult applicants.

The results in Tables 5 and 6 show that adult applicants are significantly more likely to be admitted to their first-ranked track and admitted overall after the reform. This suggests that the results described above in Tables 3 and 4 are at least partially driven by large changes in outcomes of *adult* applicants. However, a policy report evaluating some of the effects of the reform by Väänänen et al. (2008) noted that age-based priorities were very efficient in granting recent compulsory school graduates precedence. Consequently, even post-reform, adult applicants remained much less likely to securea dmission to their first-ranked track or accepted overall compared to young applicants.

Results in Table 5 show that, in comparison to young applicants, adult applicants were 9.8 pp more likely to be admitted to the first-ranked track and 10.6 pp more likely to be admitted overall after the reform. This is partially driven by a decline in both outcomes for young applicants, as especially the likelihood to be admitted to any school decreased by 2.9 pp for young applicants. Although adult applicants are more likely to be admitted, this does not translate into improved graduation likelihood. However, adult applicants are less likely to reapply again in the following years. This might be attributed to fewer unmatched adult applicants post-reform, reducing the incentive to reapply.

The results in Table 6 suggest that both adult and young applicants apply to less-oversubscribed programs after the reform, with adult applicants displaying a more pronounced shift. This could be due to the measure of oversubscription used here is being somewhat linked to application success, as it is derived from a measure of how many of applicants who rank a program first are accepted. If programs adult and young applicants apply to are segregated, the fact that more adult applicants are accepted to their first-ranked program means that a larger share of overall applicants who rank the program first are accepted, and hence the program would change from oversubscribed to not oversubscribed. Additionally, adult applicants also submit slightly shorter ROLs than before, although a large disparity in ROL length persists.

Overall, the results in this Section pose the following question: to what extent is

the enhanced likelihood of being admitted to the first-ranked track attributable to FPPs versus the removal of age-based priorities? While it is evident that adult applicants are more likely to be matched with their first choice after the reform, it is possible that this effect is amplified by the introduction of FPPs. Similarly, the FPPs might attenuate the negative effect that removing the age-based priorities would have had on young applicants' likelihood to be matched with their first choice. To answer this, I use simulations to construct a counterfactual scenario of matches without FPPs in 2004 in Section 6.

5 Robustness Checks and Heterogeneous Effects

5.1 Adding More Years

The analysis presented above focuses on one year before and one year after the reform. It could be, however, that the effects of the reform grow with time, if the changes occur gradually once applicants learn the incentives of the mechanism. To investigate this, I extend the analysis until 2007. Additionally, I add more pre-reform years to discern any differential trends.

This event-study -type specification plots the coefficient β_1 from Equation 1 in different years. The estimation equation is

$$Y_{iat} = \beta_0 + \sum_{j=2000}^{2007} \delta_j Year_j + X_{it} + Z_{at} + \theta_{af} + \epsilon_{iat}, \tag{4}$$

where $Year_j$ indicates dummies for each year from 2000 to 2007. The base year of 2003 is omitted, and therefore the coefficients δ_j capture the difference in the outcome relative to the base year of 2003. These coefficients along with 95% confidence intervals are plotted in Figures 5 and 6. Additionally, Figures A1 and A2 in the Appendix depict the evolution of the coefficient β_3 in a event-study style DID specification similar to that of Equation 2, where the dummy *Post* is replaced with year dummies as in Equation 4.

The results in Figures 5 and 6 confirm that applicants to vocational tracks were more likely to be accepted to their first-ranked track and this effect persisted four years after the reform. However, as more years elapse since the reform, it seems that applicants are less likely to gain admission to any school; in 2007 vocational track applicants are 2.4 pp less likely to be accepted at all in than in 2003. This could be driven by changes in educational supply. Nevertheless, as the likelihood of being matched with the first-ranked school increases over time the admission outcomes seem to become more extreme: either an applicant is matched with their first-ranked program or not matched at all, similarly as in an IA mechanism.

The effects on match quality seem to evolve over time as well. The likelihood to

reapply to any program increases in the post-reform years. Moreover, somewhat contradictorily, while the results in Section 4 noted no difference in the likelihood of dropping out, there seems to be a small increase in this likelihood when more post-reform years are analyzed. The effect, however, is small (2.5 percent of the mean) and could be driven in other changes in the effectiveness of vocational education taking place simultaneously, such as the implementation of performance pay for vocational institutions.

Furthermore, the results from Section 4 on application behavior differences in 2003 and 2004 appear consistent when examining several years after the reform. Applicants remain less likely to rank an oversubscribed program first or second on their ROL, with minimal effect on ranking an academic track second or third. It is worth noting, though, that ranking an oversubscribed school second or third was less likely than in 2003 even before the reform, in 2001 and 2002, suggesting a pre-existing trend. Similarly, the ROL length does seem to decrease over time, but it seems to be a trend that had begun before the admission reform.

Overall, interpreting the long-term changes as causal effects of the reform is somewhat difficult. As more years elapse, factors beyond those changed in the reform may influence admission outcomes. Two main conclusions, however, arise from the results in this section: First, there are no large differences in the longer-term effects compared to the results in Section 4 in most cases. Second, the results indicating a decrease in the likelihood to rank an oversubscribed program first or second seem to be part of a trend that predate the reform, and these estimates should be interpreted cautiously.

5.2 Heterogeneous Effects by Applicant Background

Applicant background might play a significant role in how they react to changes in the mechanism. Notably, it is likely that high-SES applicants may be able to observe and react to changes faster than low-SES applicants. Findings in previous literature indicate that sophistication – often proxied by applicants socioeconomic background – helps applicants gain admission to a more preferred school once strategic application becomes profitable.

In order to evaluate the difference in the effect of the reform for low- and high-SES applicants, I estimate the following regression:

$$Y_{iat} = \beta_0 + \beta_1 \cdot Post + \beta_2 \cdot LowSES + \beta_3(Post \cdot LowSES) + X_{it} + Z_{at} + \theta_{af} + \epsilon_{iat}. \quad (5)$$

I limit the sample to vocational track applicants. The coefficient β_3 captures differential effects on low-SES versus high-SES applicants.

Tables 7–8 display results on matches and application behavior. No discernible differences emerge by applicant background. In particular, there is no difference in the effects on the application behavior between these groups. Notably, it does not seem to be the case that high-SES applicants would apply to safer programs after the reform. There-

fore, as high-SES applicants did not seem to benefit more from strategizing than low-SES applicants, it does not seem that the reform exacerbated gaps in educational attainment.

6 Simulations

A key open question from the previous sections is disentangling the impact of FPPs from other changes in the reform, especially the removal of age-based priorities. To evaluate this in this section, I employ simulations to isolate the effects that the FPPs had on outcomes in 2004. The simulation of the student selection process, both with and without FPPs, allows for the direct identification of applicants whose matches changed due to FPPs. As the ROLs in 2004 already include potential strategic behavior, the results of the simulations demonstrate the effect that the FPPs have on the allocation once students already have taken the incentives of FPPs into account. Given that results in Section 4.3 suggest that applicants apply to 'safer' programs after the reform, changes in application behavior are likely to increase the amount of applicants matched with first-ranked programs. Therefore, incorporating this *behavioral effect* to the *mechanical effect* estimated in these simulations suggest that the results in this section are likely to be an upper bound to the total effect of the reform.

Because of data limitations, this simulation sample is slightly different than the sample in Section 4. Table 9 outlines the differences between the samples, revealing that while the ssimulation sample is slightly smaller, no other significant differences emerge. Like the main sample, the *simulation sample* includes information applicants' preference order for the schools to which they apply and the school to which they are matched. The important difference between these two samples is that the simulation sample considered hereafter includes information on applicants' admission points by point category. This data ends in 2004, and therefore that is the only year in which the FPP have been in use for which I observe admission points and am able to run the simulations.

6.1 Parameters in the Simulations

The parameters of the school choice problem and, hence, the information needed to replicate the matching, are:

1. a set of m schools $S = \{s_1, \ldots, s_m\}$,
2. a set of n applicants $I = \{i_1, \ldots, i_n\}$,
3. student preferences over schools $P_I = (P_{i1}, \ldots, P_{in})$,
4. school capacities $Q = (q_{s1}, \ldots, q_{sm})$,
5. school priorities over students: $f = (f_{s1}, \ldots, f_{sm})$.

The mechanism ϕ in use in 2004 was a DA mechanism with no age-based priorities. Given the mechanism and the above information, the student matches nder different school priorities can be recomputed. In the empirical work that follows, students I and schools S are the universe of applicants and schools in the simulation sample from the spring application round in 2004. Student preferences P_I are the rank order lists students submit along with their application.

School capacities Q in the simulations correspond to the number of accepted students in each program in 2004. Therefore, the number of students accepted in 2004 determines the maximum seats that a school has in the simulation. An important limitation of the analysis is that this might not, in fact, have been the true maximum number of seats in the original process as schools may have had empty seats at the end of the assignment rounds. The results can then be interpreted as what the allocation would have been without the FPPs if the schools had accepted exactly the same number of applicants as in the original process.

School s has a priority order over its applicants $f_s = a_{si}, \ldots, a_{sn}$, determined by their admission scores. Since the FPPs change applicants admission scores, they directly affect school priorities. School priorities are described below in more detail.

6.2 Empirical Strategy for Comparing Simulations

In this section, I compare matches from two different simulations. The objective is to estimate how the matches would have differed in 2004 if the FPPs had not been in use.

First, I run *a baseline simulation* replicating the initial assignment. As described in Section 2.1, students are accepted during the automated and updating stages as well as the replacement application process. The simulations only reproduce the automated stage and therefore there is some, although little, discrepancy between the original matches and matches from the baseline simulation.

The matches produced by the baseline simulation are the same as the original matches for 95 percent of applicants. Academic track matches are the same for 98 percent of the applicants whereas only 93 percent of vocational track applicants are matched to the same school as in the original process. This indicates that vocational track matches are slightly more likely to change than academic track matches after the automated stage.

Second, I run another simulation on a sample where the FPP are removed from vocational school applicants' admission scores. In other words, I modify the students' admission scores to the first and second most preferred vocational school so that 3 points are removed from the admission score for the first-ranked school and 1 point is removed for the second-ranked school.

Formally, let $a^o_{si_1}$ be student i_1's original admission score to school s in the data. The admission score in the baseline simulation is the original admission score in the data: $a^o_{si_1}$.

The modified admission score in the sample without FPPs is then

$$a^s_{si_1} = a^o_{si_1} - 3I(s_{i_1} = \text{first}) - I(s_{i_1} = \text{second}),$$

where $I(s_{i_1} = \text{first})$ indicates if i_1 has ranked school s first on her rank order list and similarly for $I(s_{i_1} = \text{second})$.

Having run these two simulations, the sample used in the empirical estimation includes matches (and students left unmatched) from both the baseline simulation and the simulation with modified admission scores. Consequently, the same applicant is included twice in the sample. I measure the effect of FPPs first with a similar empirical strategy as in Section 4. First, I estimate an OLS regression, where I include only vocational track applicants and compare the simulations with and without the FPP:

$$Y_{ia} = \beta_0 + \beta_1 \cdot WithFPP + X_i + Z_a + \theta_{af} + \epsilon_{ia}. \tag{6}$$

The coefficient β_1 captures how the outcomes differ between the two simulations once FPPs are added to the admission scores. Moreover, I estimate the following DID model on both vocational and academic track applicants:

$$\begin{aligned} Y_{ia} =& \beta_0 + \beta_1 \cdot WithFPP + \beta_2 \cdot Vocational + \beta_3(WithFPP \cdot Vocational) \\ &+ X_i + Z_a + \theta_{af} + \epsilon_{ia}, \end{aligned} \tag{7}$$

where β_3 depicts how the matches of vocational track applicants change in relation to academic track applicants. The controls and fixed effects included in both specifications are the same as in Equation 2 and 1.

Then, given that the estimation sample includes the same applicant twice, I can estimate how the matches of the *same applicant* changes once the FPPs are added. To do so, I include applicant fixed effects η_i, and estimate the following OLS model:

$$Y_{ia} = \beta_0 + \beta_1 \cdot WithFPP + \eta_i + \epsilon_{ia}. \tag{8}$$

The coefficient β_1 captures how the matches of the same individual changes when FPPs are added to the mechanmism. I estimate this specification separately for vocational and academic track applicants.

6.3 Effects on Matches

Results in Column 1 of Table 10 demonstrate that in the simulation with FPPs, applicants are 5.8 pp (10.1 percent of the mean) more likely to be matched with their first-ranked program. This is the *mechanical* effect of the FPPs: how changing only the FPPs change the equilibrium in absence of any other behavioral or institutional changes,

such as differences in the number of available seats. Correspondingly, Column 3 depicts a significant decrease in the mean rank of matched school. The number of vocational track applicants being admitted to a school increases slightly as depicted in Column 2. Given that the number of seats is constant in the simulations, this is likely due to some seats being shifted from academic track applicants to vocational track applicants.

The results in Table 11 support these findings. Comparing the matches of the same person under different school priorities shows that FPPs increase the likelihood to be matched with the first-ranked program and decrease the rank of matched school, but only for vocational track applicants. There is no effect on academic track applicants, apart from some seats shifting from academic track applicants to vocational track applicants as depicted in Columns 2 and 5.

Overall, the results are larger than in the empirical part. There are several explanations for this. First, the sample – schools and applicants – are different, as the simulations are run on data from 2004 only, and this alone could change the magnitude of the effect. For example, if school's or student's preferences become more correlated, competition for school seats could increase even if the supply and demand of education remained constant. However, as described in Section 2.2, the supply and demand did *not* remain constant, as the number of available seats decreased from 2003 to 2004 and more applicants applied to the vocational track. Therefore, it is possible that in the absence of the FPP reform the number students matched with their first-ranked program would have decreased.

Table A1 in the Appendix precisely addresses this concern: the results are derived by comparing matches in 2003 to the simulation with no FPPs in 2004. The results suggest that, had the FPPs not been in place, applicants would have been 4.8 pp (7.9 percent of the mean) less likely to be admitted to their first-ranked track.

Moreover, these results in this Section underscore the difficulty in estimating causal effects of changes in school choice mechanisms. In order for the estimates from Equations 1 and 2 to be causal, the important assumption that *no other changes occurred simultaneously* has to be made. In a complex market such as school choice, this assumption can very easily not be true. Hence, the simulations in this section provide important additional information in understanding the effect of the FPPs.

7 Conclusion

In 2004, Finland implemented an admission reform that altered the scoring system for applicants to vocational tracks. The reform implemented first preference points which meant that the assignment mechanism transitioned from a DA mechanism to a Taiwan Mechanism, a hybrid between the DA and the IA. In this paper, I have analyzed the effects of this transition by comparing both realized and simulated matches in 2003 and 2004.

The reform was implemented because applicants accepted to first-ranked tracks were less likely to drop out. While this can be true, changing the mechanism changes the application incentives such that the first-ranked program might no longer correspond to the true most-preferred program of the applicants. Correspondingly, my results suggest that the reform did not decrease drop-out rates and as such, did not reach its objectives.

Nevertheless, the reform did increase the number of applicants matched with their first-ranked track. The simple reduced-form estimate including all applicants masks important heterogeneity as the effect is much larger for adult applicants. This is due, partly, to removing age-based priorities, and this simultaneous policy change complicates the assesment of the effect of introducing the FPPs. To overcome this, I simulate what matches would have been without the FPPs and show that the FPPs did, in fact, lead to more applicants being matched with their first-ranked school and that a simple pre-post reduced-form analysis does not reveal the full effect due to simultaneous changes.

My findings document the effects of implementing a Taiwan mechanism, and the effects of shifting from a DA mechanism to an IA mechanism. Related to findings in this literature, my findings document that mechanically increasing the amount of applicants admitted to their first-ranked school does not lead to improvements in educational outcomes. In addition, my empirical strategy as well as the data available enable me to compare both realized and simulated matches, and compare the outcomes under different counterfactual scenarios. In the context I study, these counterfactual scenarios give important insight into the effects the mechanism change had. Whenever data availability allows for it, the same approach could be implemented in other contexts as well.

While the paper clarifies the impact on matches and dropout rates, a question that remains relatively open is whether applicants changed their application behavior and, if so, what was the effect on observed matches. Future work estimating the effects of this reform could look into this question in more detail.

8 Tables and Figures

Table 1: Maximum points in each category for vocational school applicants.

	2003	2004
GPA, non-academic subjects	0-38	2-8
GPA	0-18	4-16
Relevant working experience	0-18	0-5
Entrance exam	0-100	0-10
First preference points	0	0-3
Second preference points	0	0-1
Recent graduate priority points	0	0-3
Gender priority points	0-3	0-2

Notes: Table 1 reports minimum and maximum scores in each point category before and after the reform.

Table 2: Vocational and academic track applicant comparison

	Pre-period		Post-period	
	Vocational	Academic	Vocational	Academic
	(1)	(2)	(3)	(4)
Match Characteristics				
Accepted to 1st school on ROL	0.57	0.78	0.59	0.76
Accepted to any school on ROL	0.84	0.96	0.84	0.96
Rank of matched school	1.49	1.28	1.46	1.30
Re-applies within 6 years	0.26	0.22	0.27	0.22
Has a sec. degree 3 years later	0.37	0.76	0.39	0.76
Has a sec. degree 5 years later	0.49	0.88	0.51	0.88
Application Characteristics				
Full ROL	0.22	0.20	0.23	0.20
ROL length	3.00	2.78	3.06	2.79
Ranks an oversubscribed program 1st on ROL	0.52	0.19	0.49	0.21
Ranks an oversubscribed program 2nd on ROL	0.50	0.27	0.46	0.32
Academic track 2nd on ROL	0.05	0.62	0.06	0.62
Academic track 3rd on ROL	0.05	0.46	0.06	0.47
Applicant Characteristics				
Age	18.96	16.08	18.70	16.08
Female	0.51	0.56	0.51	0.56
Immigrant	0.05	0.03	0.05	0.03
Share of adult applicants	0.31	0.00	0.29	0.01
GPA	6.82	8.23	6.85	8.26
Parent has at least sec. degree	0.81	0.94	0.83	0.94
Parent has at least tert. degree	0.68	0.80	0.68	0.79
Urban	0.82	0.83	0.81	0.83
JAS Area Characteristics				
Share of applicants accepted	0.89	0.89	0.89	0.89
Share accepted to vocational track	0.55	0.53	0.54	0.53
Share applying to vocational track	0.59	0.58	0.59	0.58
Share accepted to 1st program on ROL	0.74	0.73	0.74	0.74
Share accepted to academic track	0.43	0.44	0.43	0.44
Applies in Uusimaa JAS region	0.19	0.26	0.19	0.26
Applies in Swedish-language JAS region	0.04	0.06	0.04	0.06
Observations	50637	35987	51710	36332

Notes: This table reports descriptive statistics for the sample. Columns 1 and 2 report statistics for applicants in 2003 and columns 3 and 4 in 2004. Columns 1 and 3 describe vocational track applicants, that is, applicants who rank a vocational program as first choice on their ROL and columns 2 and 4 describe applicants who list an academic program first. All columns include both accepted and unmatched applicants.

Table 3: Main results on matches

	Accepted in 1st school on ROL	Accepted in any school	Rank of matched school	Re-applies within 6 years	Has a degree 3 years later	Has a degree 5 years later
	(1)	(2)	(3)	(4)	(5)	(6)
Post	0.016***	-0.001	-0.021**	0.003	-0.001	-0.007*
	(0.005)	(0.003)	(0.010)	(0.004)	(0.004)	(0.004)
Observations	93133	93133	75270	93133	93133	93133
Pre-period mean	0.573	0.841	1.488	0.262	0.374	0.491
Post x Vocational	0.035***	-0.002	-0.051***	0.009*	-0.003	-0.005
	(0.008)	(0.003)	(0.013)	(0.005)	(0.004)	(0.003)
Post	-0.026***	-0.003	0.035***	-0.003	0.000	-0.003
	(0.006)	(0.003)	(0.010)	(0.004)	(0.005)	(0.003)
Vocational	-0.213***	-0.015	0.349***	0.020	-0.025	-0.006
	(0.053)	(0.030)	(0.097)	(0.042)	(0.032)	(0.036)
Observations	163700	163700	142841	163700	163700	163700
Pre-period mean	0.573	0.841	1.488	0.262	0.374	0.491

Notes: This table reports the results from Equations 1 and 2, which estimate the difference in matches before and after the FPP reform in 2003. In the uppermost panel the sample is limited to vocational track applicants whereas the lower panel includes both academic and vocational program applicants. The uppermost panel depicts results from an OLS regression where the outcome Y_ati is regressed on a dummy variable indicating whether the applicant applied before or after (*Post*) the FPPs were granted to applicants, control variables on applicant's backgrounds and an interaction between study field and JAS area fixed effects. The lower panel depicts results from a DiD estimation with the same controls, but with dummy $Vocational$ equal to one if the applicant applies to a vocational program, a dummy *Post* equal to one if they apply in the pre- or post-period and an interaction between these dummies $Vocational$ and *Post*. The outcome in column 1 is a dummy equal to one if the applicant is accepted to the first-ranked school on their ROL; the outcome in column 2 is a dummy equal to one if the applicant is accepted to any school on their ROL; the outcome in column 3 depicts the ROL rank of the school the applicant is accepted to. Column 4 depicts a dummy equal to one if the applicant applies again to any track or field within 6 years of the first application and finally columns 5 and 6 are outcomes that are dummies equal to one if the applicant has a secondary degree 3 or 5 years after applying. Standard errors are clustered at the municipality level. $*p < .10 * *p < 0.05 * * * p < 0.01$

Table 4: Main results application behavior

	ROL length	Oversubscribed school 1st on ROL	Oversubscribed school 2nd on ROL	Academic track 2nd on ROL	Academic track 3rd on ROL
	(1)	(2)	(3)	(4)	(5)
Post	0.029**	-0.040*	-0.041**	0.006*	0.005*
	(0.010)	(0.020)	(0.015)	(0.003)	(0.002)
Observations	93133	92971	80068	93133	93133
Pre-period mean	2.997	0.521	0.500	0.048	0.054
Post x Vocational	-0.009	-0.064***	-0.081***	-0.004	-0.007
	(0.020)	(0.024)	(0.025)	(0.007)	(0.006)
Post	0.022	0.044**	0.059***	0.011	0.009
	(0.024)	(0.017)	(0.022)	(0.007)	(0.007)
Vocational	0.596***	0.527***	0.208***	-0.100***	-0.045
	(0.132)	(0.053)	(0.063)	(0.032)	(0.032)
Observations	163700	163524	131798	163700	163700
Pre-period mean	2.997	0.521	0.500	0.048	0.054

Notes: This table reports the results from Equations 1 and 2, which estimate the difference outcomes depicting application behavior before and after the FPP reform in 2003. In the uppermost panel the sample is limited to vocational track applicants whereas the lower panel includes both academic and vocational program applicants. The uppermost panel depicts results from an OLS regression where the outcome Y_ati is regressed on a dummy variable indicating whether the applicant applied before or after (*Post*) the FPPs were in granted to applicants,control variables on applicant's backgrounds and an interaction between study field and JAS area fixed effects. The lower panel depicts results from a DiD estimation with the same controls, but with a dummy *Vocational* equal to one if the applicant applies to a vocational program, a dummy *Post* equal to one if ther they apply in the pre- or post-period and an interaction between these dummies *Vocational* and *Post*. The outcome in depicts how many choices the applicant ranks on their ROL (1-5); the outcome in column 2 is a dummy equal to one if the applicant ranks an oversubscribed school indicating a school to which less than 85 percent of applicants who rank it first are accepted and the outcome in column 3 is a similar dummy for the second school on the applicants ROL. Columns 4 and 5 depict a dummy equal to one if the applicant ranks an academic track first or second on their ROL. Standard errors are clustered at the municipality level. $*p < .10 * *p < 0.05 * * * p < 0.01$

Table 5: Differences in match outcomes for young and adult applicants

	Accepted in 1st school on ROL	Accepted in any school	Rank of matched school	Re-applies within 6 years	Has a degree 3 years later	Has a degree 5 years later
	(1)	(2)	(3)	(4)	(5)	(6)
Post x Adult	0.098***	0.106***	-0.086***	-0.022***	0.009	0.001
	(0.008)	(0.009)	(0.018)	(0.007)	(0.007)	(0.006)
Post	-0.009*	-0.029***	-0.004	0.009*	-0.003	-0.007
	(0.005)	(0.004)	(0.010)	(0.005)	(0.005)	(0.004)
Adult	-0.543***	-0.959***	-0.929***	-0.404***	-0.660***	-0.856***
	(0.047)	(0.031)	(0.065)	(0.038)	(0.043)	(0.031)
Observations	93133	93133	75270	93133	93133	93133
Pre-period mean	0.466	0.651	1.435	0.220	0.131	0.212

Notes: This table reports the results from Equation 3, which estimates the difference in matches for young and adult applicants before and after the FPP reform in 2003. An 'adult' applicant is defined as an applicant who is 20 years or older. The sample in this table limited to vocational track applicants only. The outcome in each column is regressed against a dummy indicating applicant's age (*Adult*), the admission period (*Post* for applications after the reform) and an interaction of the two (*PostxAdult*), control variables on applicant's backgrounds and an interaction between study field and JAS area fixed effects. The outcome in column 1 is a dummy equal to one if the applicant is accepted to the first-ranked school on their ROL; the outcome in column 2 is a dummy equal to one if the applicant is accepted to any school on their ROL; the outcome in column 3 depicts the ROL rank of the school the applicant is accepted to. Column 4 depicts a dummy equal to one if the applicant applies again to any track or field within 6 years of the first application and finally columns 5 and 6 are outcomes that are dummies equal to one if the applicant has a secondary degree 3 or 5 years after applying. Standard errors are clustered at the municipality level. $*p < .10 * *p < 0.05 * * * p < 0.01$

Table 6: Differences in application behavior for young and adult applicants

	ROL length	Oversubscribed school 1st on ROL	Oversubscribed school 2nd on ROL	Academic track 2nd on ROL	Academic track 3rd on ROL
	(1)	(2)	(3)	(4)	(5)
Post x Adult	-0.043**	-0.024**	-0.026***	-0.003	0.000
	(0.021)	(0.010)	(0.008)	(0.003)	(0.002)
Post	0.022	-0.033**	-0.033***	0.004	0.002
	(0.018)	(0.014)	(0.011)	(0.003)	(0.003)
Adult	-2.554***	-0.840***	-0.651***	-0.241***	-0.291***
	(0.096)	(0.064)	(0.039)	(0.029)	(0.032)
Observations	93133	92971	80068	93133	93133
Pre-period mean	2.997	0.521	0.500	0.048	0.054

Notes: This table reports the results from Equation 3, which estimates the difference in application behavior for young and adult applicants before and after the FPP reform in 2003. An 'adult' applicant is defined as an applicant who is 20 years or older. The sample in this table limited to vocational track applicants only. The outcome in each column is regressed against a dummy indicating applicant's age (*Adult*), the admission period (*Post* for applications after the reform) and an interaction of the two (*PostxAdult*), control variables on applicant's backgrounds and an interaction between study field and JAS area fixed effects. The outcome in Column 1 depicts how many choices the applicant ranks on their ROL (1-5); the outcome in column 2 is a dummy equal to one if the applicant ranks an oversubscribed school indicating a school to which less than 85 percent of applicants who rank it first are accepted and the outcome in column 3 is a similar dummy for the second school on the applicants ROL. Columns 4 and 5 depict a dummy equal to one if the applicant ranks an academic track first or second on their ROL. Standard errors are clustered at the municipality level. $*p < .10 * *p < 0.05 * * * p < 0.01$

Table 7: Differences in match outcomes for low- and high-SES applicants

	Accepted in 1st school on ROL	Accepted in any school	Rank of matched school	Re-applies within 6 years	Has a degree 3 years later	Has a degree 5 years later
	(1)	(2)	(3)	(4)	(5)	(6)
Post x LowSES	0.001	0.006	0.001	0.005	0.004	0.009
	(0.006)	(0.004)	(0.013)	(0.006)	(0.006)	(0.006)
Post	0.016***	-0.003	-0.021*	0.002	-0.002	-0.008*
	(0.006)	(0.004)	(0.011)	(0.005)	(0.005)	(0.005)
LowSES	0.004	-0.001	-0.006	-0.009**	0.019***	0.012**
	(0.005)	(0.003)	(0.011)	(0.004)	(0.004)	(0.005)
Observations	93612	93612	75621	93612	93612	93612
Pre-period mean	0.583	0.832	1.457	0.247	0.370	0.477

Notes: This table reports the results from Equation 5 which estimates the difference in matches for low and high-SES applicants before and after the FPP reform in 2003. SES status is determined by parental education; an applicant with at least one parent with a tertiary degree is defined as a 'high-SES' applicant. The sample in this table is limited to vocational track applicants. The outcome in each column is regressed against a dummy indicating applicant's background ($LowSES$), the admission period ($Post$ for applications after the reform) and an interaction of the two ($PostxLowSES$), control variables on applicant's backgrounds and an interaction between study field and JAS area fixed effects. The outcome in column 1 is a dummy equal to one if the applicant is accepted to the first-ranked school on their ROL; the outcome in column 2 is a dummy equal to one if the applicant is accepted to any school on their ROL; the outcome in column 3 depicts the ROL rank of the school the applicant is accepted to. Column 4 depicts a dummy equal to one if the applicant applies again to any track or field within 6 years of the first application and finally columns 5 and 6 are outcomes that are dummies equal to one if the applicant has a secondary degree 3 or 5 years after applying. Standard errors are clustered at the municipality level. $*p < .10 * *p < 0.05 * * * p < 0.01$

Table 8: Differences in application behavior for low- and high-SES applicants

	ROL length	Oversubscribed school 1st on ROL	Oversubscribed school 2nd on ROL	Academic track 2nd on ROL	Academic track 3rd on ROL
	(1)	(2)	(3)	(4)	(5)
Post x LowSES	-0.008	0.004	0.007	-0.003	-0.002
	(0.019)	(0.006)	(0.008)	(0.003)	(0.003)
Post	0.016	-0.040***	-0.040***	0.004	0.003
	(0.017)	(0.015)	(0.011)	(0.003)	(0.003)
LowSES	0.017	-0.007	-0.010*	-0.002	-0.005**
	(0.015)	(0.005)	(0.006)	(0.002)	(0.002)
Observations	93612	93448	80495	93612	93612
Pre-period mean	2.997	0.521	0.500	0.048	0.054

Notes: This table reports the results from Equation 5 which estimates the difference in outcomes depicting the application behavior for low and high-SES applicants before and after the FPP reform in 2003. SES status is determined by parental education; an applicant with at least one parent with a tertiary degree is defined as a 'high-SES' applicant. The sample in this table is limited to vocational track applicants. The outcome in each column is regressed against a dummy indicating applicant's background ($LowSES$), the admission period ($Post$ for applications after the reform) and an interaction of the two ($PostxLowSES$), control variables on applicant's backgrounds and an interaction between study field and JAS area fixed effects. The outcome in depicts how many choices the applicant ranks on their ROL (1-5); the outcome in column 2 is a dummy equal to one if the applicant ranks an oversubscribed school indicating a school to which less than 85 percent of applicants who rank it first are accepted and the outcome in column 3 is a similar dummy for the second school on the applicants ROL. Columns 4 and 5 depict a dummy equal to one if the applicant ranks an academic track first or second on their ROL. Standard errors are clustered at the municipality level. $*p < .10 * *p < 0.05 * * * p < 0.01$

Table 9: Difference between the main sample and the simulation sample

	Main sample (1)	Simulation sample (2)
Rank of matched school	1.73	1.76
Vocational track 1st on ROL	0.59	0.57
Age	17.62	17.26
Accepted to 1st school on ROL	0.74	0.73
Observations	88042	85639

Notes: This table describes differences between the main sample used in section 4 (Column 1) and the simulation sample used in section 6 (Column 2).

Table 10: Differences between matches with and without FPP in 2004

	Accepted to 1st school on ROL (1)	Accepted to any school (2)	Rank of matched school (3)
WithFpp	0.058	0.004	-0.092
	(0.002)	(0.001)	(0.008)
Observations	92258	92258	73571
Baseline mean	0.572	0.785	1.432
WithFpp x Vocational	0.058	0.008	-0.089
	(0.002)	(0.001)	(0.008)
WithFpp	0.000	-0.004	-0.004
	(0.000)	(0.001)	(0.001)
Vocational	-0.250	-0.056	0.460
	(0.073)	(0.058)	(0.069)
Observations	163050	163050	141475
Baseline mean	0.665	0.843	1.335

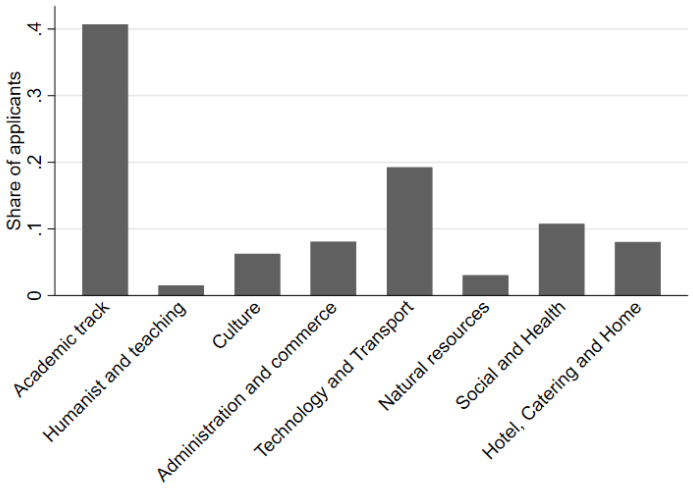
Notes: This table reports the results from Equations 6 and 7, which estimate the difference in simulated matches with and without FPPs added to admission scores in 2004. In the uppermost panel the sample is limited to vocational track applicants whereas the lower panel includes both academic and vocational program applicants. The uppermost panel depicts results from an OLS regression where the outcome Y_{ati} is regressed on a dummy variable indicating whether the simulation in question included FPPs ($WithFPP$), control variables on applicant and JAS area characteristics, vocational track study field fixed effects, JAS area fixed effects and an interaction between field and JAS area fixed effects. The lower panel depicts results from a DiD estimation with the same controls, but with dummy $Vocational$ equal to one if the applicant applies to a vocational program, a dummy $WithFPP$ the simulation in question includes FPPs and an interaction between these dummies $Vocational$ and $WithFPP$. The outcome in column 1 is a dummy equal to one if the applicant is accepted to the first-ranked school on their ROL; the outcome in column 2 is a dummy equal to one if the applicant is accepted to any school; the outcome in column 3 depicts the ROL rank of the school the applicant is accepted to. Standard errors are clustered at the municipality level.

Table 11: Differences between matches for same person with and without FPP in 2004

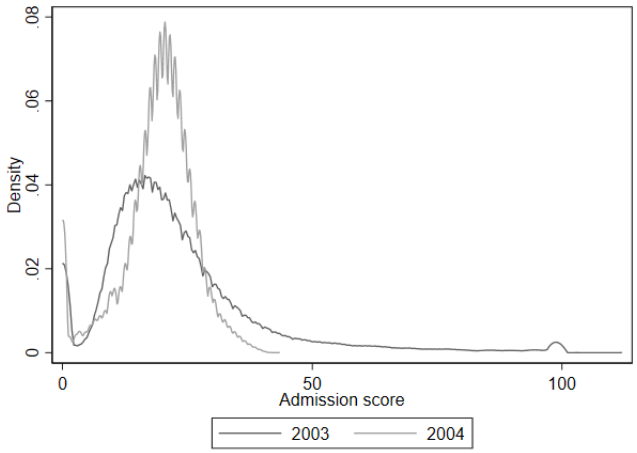
	Vocational			Academic		
	Accepted to 1st school on ROL	Accepted to any school on ROL	Rank of matched school	Accepted to 1st school on ROL	Accepted to any school on ROL	Rank of matched school
	(1)	(2)	(3)	(4)	(5)	(6)
WithFpp	0.058	0.004	-0.050	0.000	-0.004	0.003
	(0.001)	(0.001)	(0.002)	(0.000)	(0.000)	(0.000)
Observations	92800	92800	71852	70808	70808	67726
Baseline mean	0.572	0.785	1.432	0.824	0.959	1.218

Notes: This table reports the results from Equation 8, which estimate sthe difference in simulated matches for the same person with and without FPPs in 2004. The regressions include person fixed effects, and therefore estimate how the matches of each person would have differed had the FPPs not been in use in 2004. The results are split by the type of first-ranked program i.e. whether the applicant applies to the vocational or academic track as their first choice. The outcome Y_{ati} in each column is regressed on a dummy variable indicating whether the simulation in question included FPPs ($WithFPP$) and person-level fixed effects. The outcome in Columns 1 and 4 is dummy equal to one if the applicant is accepted to the first-ranked school on their ROL; the outcome in Columns 2 and 5 is a dummy equal to one if the applicant is accepted to any school; the outcome in Columns 3 and 6 depicts the ROL rank of the school the applicant is accepted to. Standard errors are clustered at the municipality level.

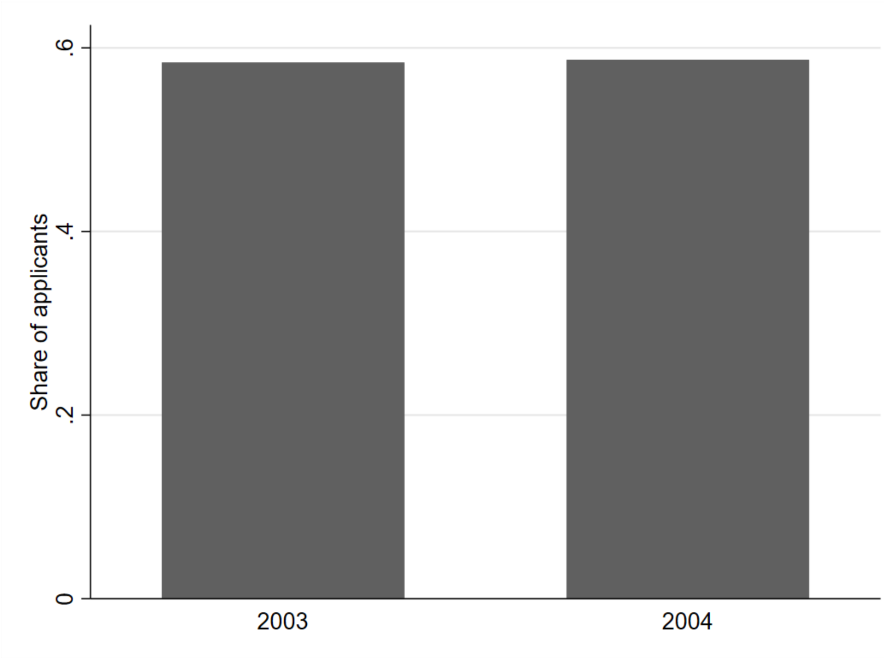
Notes: Figure 1 depicts the share of applicants to each field of education in 2003. The figure depicts the shares of each study field as the first choice on applicants rank order list (ROL).



Notes: Figure 2 reports the distribution of admission scores of applicants accepted to vocational programs before and after the reform to the admission system.



Notes: Figure 3 depicts the share total applicants who rank an academic track first on their application.



Appendix

en realized matches in 2003 and matches in 2004 without FPPs

oted in any school (2)	Rank of matched school (3)	Re-applies within 6 years (4)	Has a degree 3 years later (5)	Has a degree 5 years later (6)
.012***	0.097***	0.009**	0.003	0.003
0.004)	(0.008)	(0.003)	(0.003)	(0.003)
91462	72703	91462	91462	91462
0.786	1.363	0.322	0.583	0.692
.015**	0.061***	0.010*	-0.002	0.000
.006)	(0.012)	(0.005)	(0.004)	(0.004)
.003	0.011	-0.002	0.008**	0.006***
.003)	(0.007)	(0.004)	(0.004)	(0.002)
0.031	0.217***	0.025	-0.017	0.007
.048)	(0.050)	(0.046)	(0.058)	(0.068)
63935	140938	163935	163935	163935
.786	1.363	0.322	0.583	0.692

cation that estimates the difference in match outcomes between realized matches in 2003 and matches
nost panel the sample is limited to vocational track applicants whereas the lower panel includes both
rmost panel depicts results from an OLS regression where the outcome Y_ati is regressed on a dummy
or after (*Post*) the FPPs were in granted to applicants, control variables on applicant outcomes and
ed effects, JAS area fixed effects and an interaction between field and JAS area fixed effects. The lower
ne controls, but with dummy *Vocational* equal to one if the applicant applies to a vocational program,
re- or post-period and an interaction between these dummies *Vocational* and *Post*. The outcome in
ccepted to the first-ranked school on their ROL; the outcome in column 2 is a dummy equal to one if
he outcome in column 3 depicts the ROL rank of the school the applicant is accepted to. Column 4
ain to any track or field within 6 years of the first application and finally columns 5 and 6 are outcomes
econdary degree 3 or 5 years after applying. Standard errors are clustered at the municipality level.

Notes: Figure 4 depicts the share of vocational school applicants who graduate from a secondary-level program within 5 years of being admitted by rank of matched school.

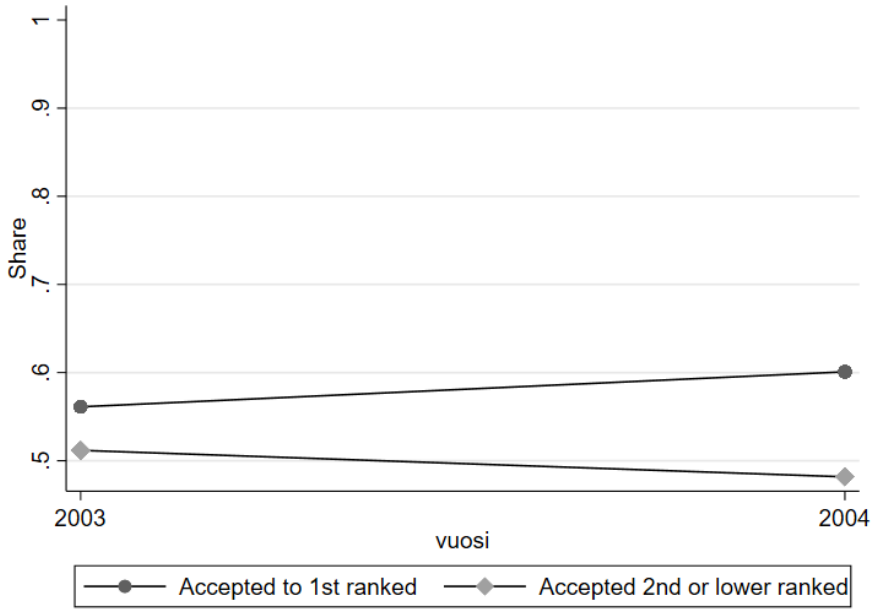


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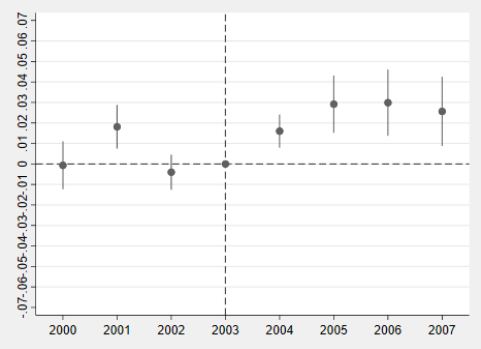
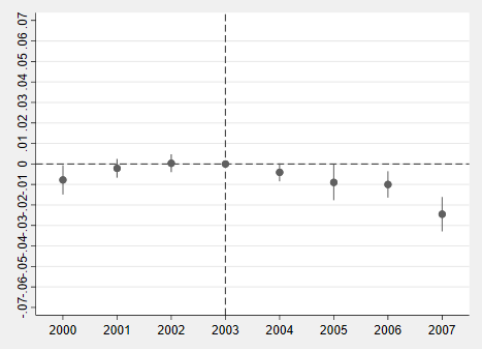
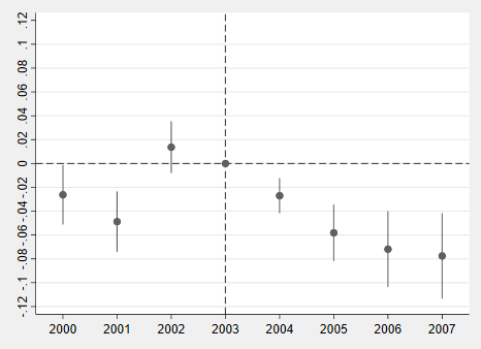
Figure 5: Evolution of vocational track applicants' match outcomes in the years 2000-2007.



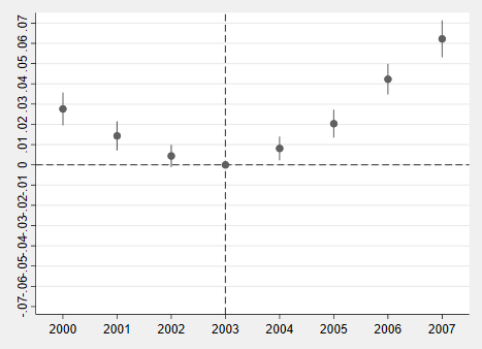
(a) Accepted in 1st school on ROL



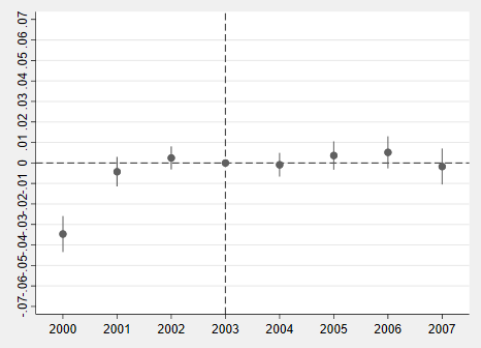
(b) Accepted in any school



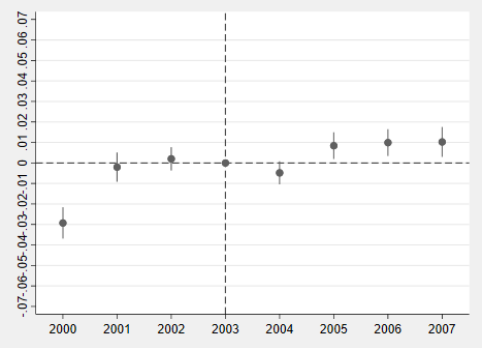
(c) Rank of matched school



(d) Reapplies within 6 years



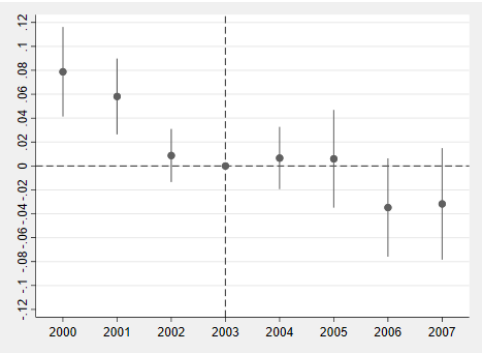
(e) Has a secondary degree 3 years later



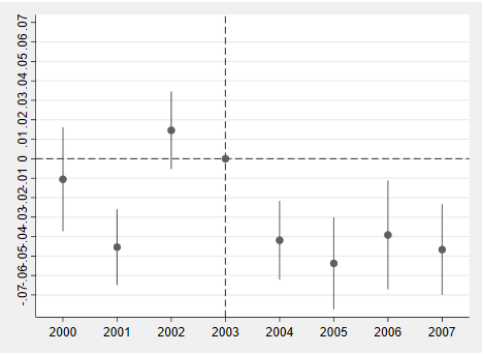
(f) Has a secondary degree 5 years later

Notes: These graphs table reports the coefficients and 95 % confidence intervals from an event study estimating the evolution in match outcomes in the years 2000 to 2007 for vocational track applicants. The coefficient plotted are coefficients estimated for the $Post_t$ term in the Equation 1, with the difference that $t = 2000, ..., 2007$, with the base year 2003 omitted. Therefore the coefficients plot how the outcomes evolved three years before and four years after the reform in comparison to the base year of 2003. The same controls and fixed effects are included as in Equation 2.

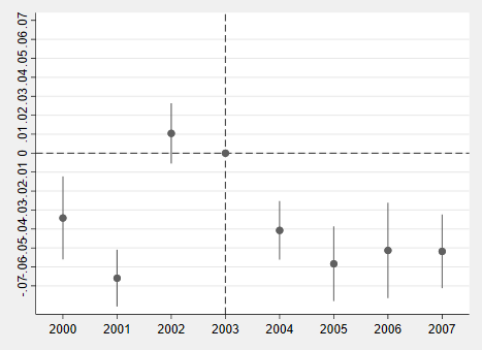
Figure 6: Evolution of vocational track applicants' application outcomes in the years 2000-2007.



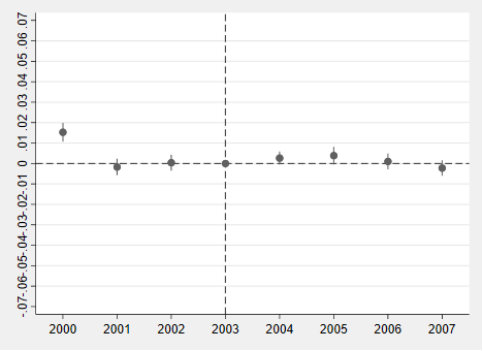
(a) ROL length



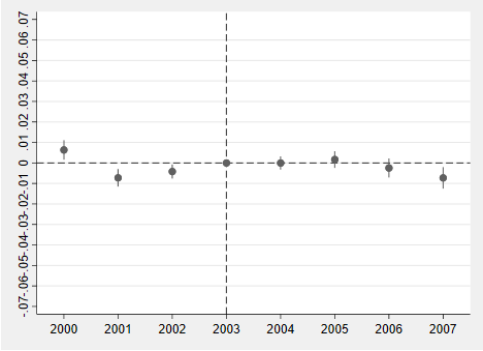
(b) Oversubscribed school 1st on ROL



(c) Oversubscribed school 2nd on ROL



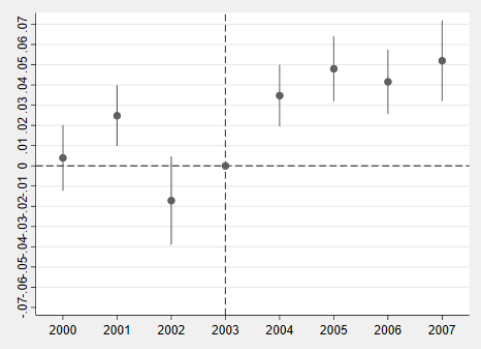
(d) Academic track 2nd on ROL



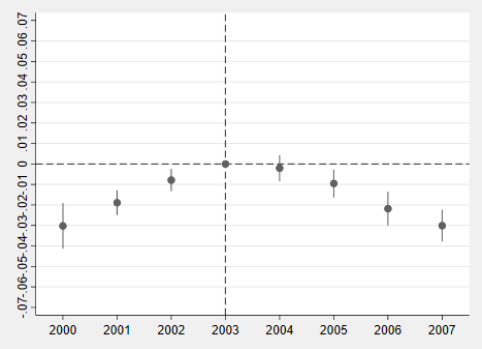
(e) Academic track 3rd on ROL

Notes: These graphs table reports the coefficients and 95 % confidence intervals from an event study estimating the evolution in application behavior in the years 2000 to 2007 for vocational track applicants. The coefficient plotted are coefficients estimated for the $Post_t$ term in the Equation 1, with the difference that $t = 2000, ..., 2007$, with the base year 2003 omitted. Therefore the coefficients plot how the outcomes evolved three years before and four years after the reform in comparison to the base year of 2003. The same controls and fixed effects are included as in Equation 2.

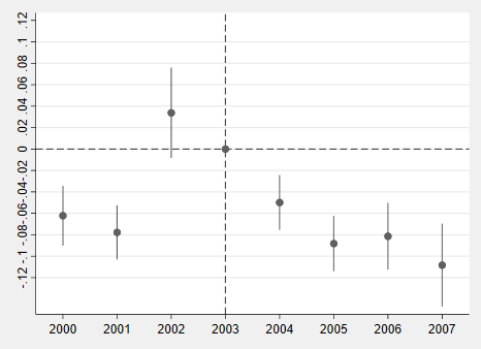
Figure A1: Evolution of vocational track applicants' match outcomes in the years 2000-2007.



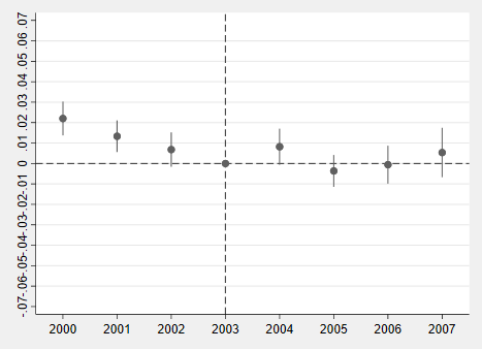
(a) Accepted in 1st school on ROL



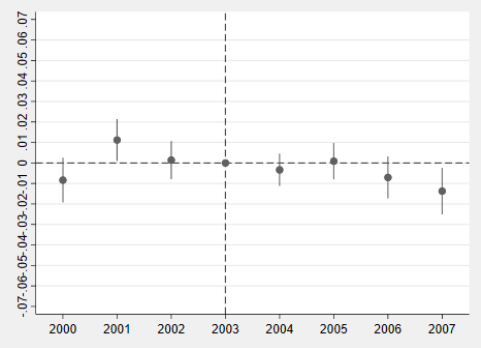
(b) Accepted in any school



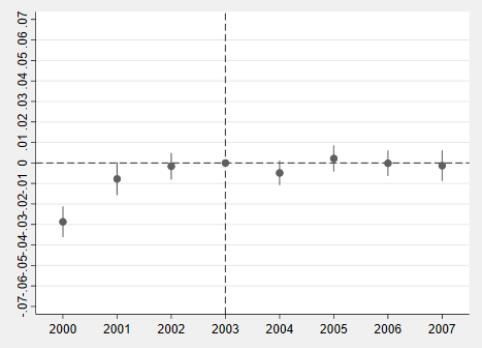
(c) Rank of matched school



(d) Reapplies within 6 years



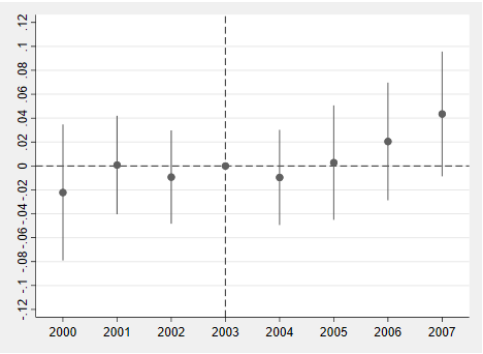
(e) Has a secondary degree 3 years later



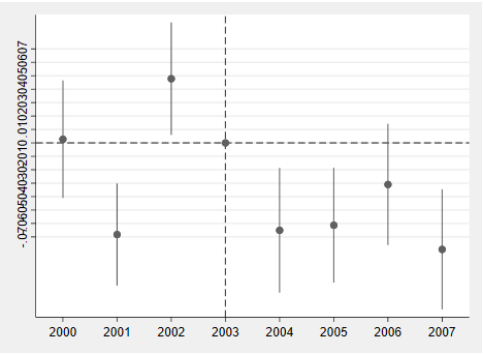
(f) Has a secondary degree 5 years later

Notes: These graphs table reports the coefficients and 95 % confidence intervals from an event study estimating the evolution in match outcomes in the years 2000 to 2007 for vocational track applicants. The coefficient plotted are coefficients estimated for the $Post_t * Vocational$ term in the Equation 2, with the difference that $t = 2000, ..., 2007$, with the base year 2003 omitted. Therefore the coefficients plot how the outcomes evolved three years before and four years after the reform in comparison to the base year of 2003. The same controls and fixed effects are included as in Equation 2.

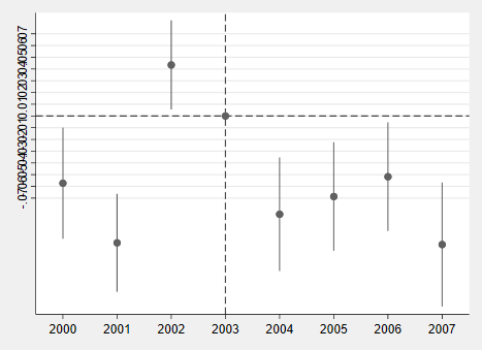
Figure A2: Evolution of vocational track applicants' application outcomes in the years 2000-2007.



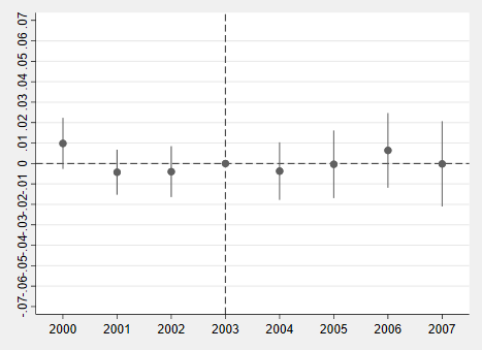
(a) ROL length



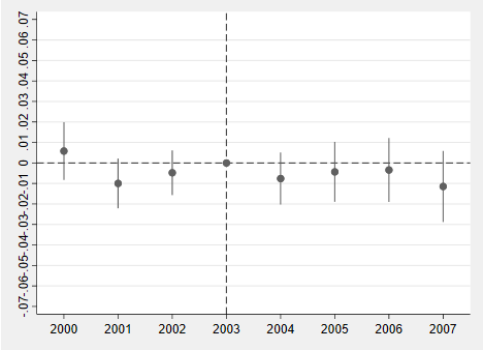
(b) Oversubscribed school 1st on ROL



(c) Oversubscribed school 2nd on ROL



(d) Academic track 2nd on ROL



(e) Academic track 3rd on ROL

Notes: These graphs table reports the coefficients and 95 % confidence intervals from an event study estimating the evolution in application behavior in the years 2000 to 2007 for vocational track applicants. The coefficient plotted are coefficients estimated for the $Post_t * Vocational$ term in the Equation 2, with the difference that $t = 2000, ..., 2007$, with the base year 2003 omitted. Therefore the coefficients plot how the outcomes evolved three years before and four years after the reform in comparison to the base year of 2003. The same controls and fixed effects are included as in Equation 2.

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