Age as a merit in admission decisions for higher education

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Abstract

This paper uses register data to study how a particular age reward feature affects admission into two highly competitive study programs: medicine and law. The Norwegian admission system to higher education is centralized, and applicants compete in two quotas: one quota almost entirely based on grade point average from upper secondary education and one quota where students can compete with improved grades and where being older automatically increases the chance of acceptance, by awarding age points. For these study programs, we find that the admission system creates a waiting game, as gaining admission in the second quota is nearly impossible without accumulating a substantial amount of age points. If age predicts completion in higher education, this waiting game might be justified. However, if anything, we find the opposite to be true. Our paper suggests that age should carry less weight in admission decisions and that countries and/or higher education institutions should carefully consider how their admission system affects student incentives and how applicants are selected.

Keywords Admission · Student composition · Study outcomes · Grade point average

1 Introduction

Admission systems to higher education (HE) determine how students are allocated to institutions and study programs, which has important consequences for both individuals and society. Where students choose to apply and where they are admitted matter for a range of outcomes. Being admitted to their first choice of study program increases the probability of completing (Heinesen, 2018). Furthermore, different fields of study have substantially different labor market pay offs, even after accounting for institution and peer quality (Kirkebøen, Leuven and Mogstad, 2016; Hastings, Neilson, and Zimmerman, 2013; Ketel, Leuven, Oosterbeek, and van der Klaauw, 2016). A country's admission system is a result

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Springer

of policy choices and affects who is admitted to a particular program. Far less is known about how these choices affect the student composition that arises from selection criteria and the subsequent implications for study progression in HE.

This paper studies admission into two highly competitive study programs in Norway: medicine and law, by using high-quality register data to follow students through the centralized application process and into HE. The Norwegian admission system to HE is centralized, and applicants compete in two quotas: one quota for the youngest applicants almost entirely based on grade point average (GPA) from upper secondary education (first quota) and one quota where students can compete with improved grades and where being older automatically increases the chance of acceptance, by awarding age points (regular quota).

We find that although GPA is the major determinant for admission, age points create a u-shaped age distribution among applicants. For applicants that are not accepted in the first quota, it is nearly impossible to gain admission through the regular quota without accumulating a substantial amount of age points. This creates a waiting game among applicants as improving grades may not be sufficient to gain admission. We further investigate whether age can predict student outcomes within these two study programs, by comparing how students with the same GPA but different age at entry, perform in HE. If age predicts higher performance, one can argue that rewarding age is justified. Our findings, however, suggest the opposite. While GPA is a positive predictor of student performance in HE, students that are relatively older than their peers at entry do no better, suggesting an inefficiency in making students wait.

Although perceived as transparent, centralized admission systems may have underlying biases with unintended consequences. Delaney and Devereux (2020b), for instance, find that students from disadvantaged schools are less likely to apply to highly selective programs, despite performing better than their peers with equal entry points, once admitted (Delaney and Devereux, 2020a). Our paper contributes to the literature by highlighting the consequences of rewarding age. Our findings suggest that age should carry less weight in admission decisions and that countries and/or HE institutions should carefully consider how their admission system affects student incentives and how applicants are selected, particularly to highly competitive studies.

The paper is organized as follows. Section 2 discusses different characteristics of admissions systems in general. Section 3 describes the Norwegian educational system and admission system, while Section 6 describes the data and method. Section 7 presents an analysis of applicants to law and medicine focusing on point and age composition. Section 8 presents regression results relating GPA and age to measures of student performance in HE. Finally, Section 9 includes a conclusion and policy implications.

2 Admission systems

Admission practices vary a lot between countries, and they vary along a range of dimensions, including how admission is organized and what basis of admission is used. Admission systems are closely linked to the school system and historical development and are a result of policy choices, either made at the local institutional level or at the government level. As such, admission systems, even in similar countries, can differ substantially.

Admission to HE is either decentralized or centralized. Decentralized admission is found in, for example, the US, where admission of applicants is left to the individual HE institution. In centralized systems, admission is usually linked primarily to program,

or a combination of program and institution, and students can rank a fixed number of alternatives. Centralized admission systems are usually run by a separate entity, outside of the universities.[1]

The basis for admission, what is required to qualify, is another dimension along which practices vary across countries. In order to qualify for admission to HE, students must have completed upper secondary education. Some countries also require a general matriculation examination in order to be eligible to apply (Estermann, Nokkala and Steinel, 2011). Further, not all types of upper secondary education qualify the student for HE, implying that they may have needed to complete a particular type of upper secondary education (see Orr, Usher, Haj, Atherton, and Geanta, 2017).

Another aspect of admissions is the kind of criteria used to select students. This is linked to what is considered to constitute merit. Generally merit is associated with talent, skills, intelligence, ability and effort (Liu, 2011). HE admission systems have chosen difference ways of awarding merit. Admission can be based on GPA from upper secondary education, on grades in particular subjects completed in upper secondary, on various forms of test scores[2], or on more qualitative approaches such as interviews or motivation letters. Harman (1994, p. 320) points out that there is an increasing tendency to use more than one selection device, implying that many admission systems combine several selection tools. The criteria can be common for all studies or be specific for certain institutions or study programs, where medical study programs typically have specific criteria. Multiple criteria can be used simultaneously, e.g., as a qualitative evaluation of admission, or can be used to structure the system into quotas where admission criteria vary by quota. An example is from Sweden, where a proportion of the candidates is admitted based on GPA, while another proportion is admitted based on the SweSAT admissions test score (Lyrén and Wikström, 2020).

In admission systems in Nordic countries, another criterion that is commonly used is life or work experience, as the development of skills during post-education are thought to have merit in themselves. Both Sweden, Norway and Denmark award such experience for certain studies or quotas. In Sweden, documented work experience, including military service and child care, gives additional points when applying to certain studies. In Denmark, there is a smaller quota which also takes work experience, among other criteria, into account (Heinesen, 2018). Norway has chosen a more simple model where age, rather than documented life/work experience, is included as a criteria awarding additional admission points in the regular quota (see Section 3.2).

Awarding age points is a way to give mature students an advantage in admissions. Age points in the Norwegian system function as a proxy for documented work experience, as they are automated instead of requiring the individual to provide documentation and is as such a relatively cost-efficient way of awarding experience. Age points assume that students who apply when they are too old to compete in the first quota (age 22 and older) have done something productive in the meantime, for which they should be rewarded. However, there might also be other reasons for wanting to recruit or reward mature students. Earlier studies

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[1] In England, Universities and Colleges Admissions Service (UCAS) is a charity which provides admissions services for most universities (Gill , 2016), while in Sweden, Denmark and Norway this is run by a governmental body for all public HE institutions.

[2] In the US, college entrance examinations are run by private organizations, such as the Scholastic Aptitude Test (SAT) run by Educational Testing Services, while there are various forms of national examinations or tests in many Asian countries (Harman , 1994).

of student dropout in Norway indicate that younger students are more likely to change from one program/institution to another (transfer), which commonly prolongs the time needed to complete a degree (Hovdhaugen, 2009). Older students are more likely to have thought through their choice of program more thoroughly. This finding is also supported by Yorke and Longden (2004) and Yorke and Longden (2008) who find that poor choices regarding program is a common reason for leaving HE among younger students in the UK. Further, rewarding experience may also contribute to the admission system being perceived as fairer, as it opens up for other qualities than just GPA determining acceptance. From this point of view, age points represent a second chance for admission for mature students.

3 Norwegian educational system

3.1 Higher education system

The Norwegian HE system consists of mainly public institutions with no tuition fees. The system is often described as binary. This stems from the division of labor between universities, providing longer professional education (in areas such as medicine and law) as well as liberal education at the undergraduate/bachelors and graduate/masters levels, and university colleges, mainly offering professional diplomas of three-year duration (in areas such as nursing and early childhood education) (Kyvik, 2008). There are generally only minor differences in prestige between institutions in Norway. Hence, unlike most other countries, the general prestige of a Norwegian university bachelor's degree is only moderately higher than a bachelor's degree from a university college in a similar field (Vabø, 2002).

However, there are some differences in prestige between different *types* of degrees, particularly that longer degrees, such as medicine, psychology, civil engineering and law, all taught at universities, are considered as holding slightly higher prestige in society. This is linked to both strong competition for admission to the program and to students completing the degree receiving a higher wage premium than other graduates (Borgen and Mastekaasa, 2018).

3.2 Admission to higher education

Upper secondary education consists of academic track and vocational track, where academic track qualifies for HE.[3] In each subject, students receive teacher assessed grades from 1 (lowest) to 6 (highest). In addition, students have externally graded oral and written examinations in certain subjects, where both the number of examinations and the examination subject are determined by a draw, except for written Norwegian, the only mandatory examination. The number of grades on a transcript will differ depending on track and subject choice but is usually about 25, including examination grades. The final transcript GPA is the basis for admission to HE.[4]

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[3] Students from vocation track can attend a year of supplemental studies to qualify for HE.

[4] Candidates who apply from outside of Norway have their transcript translated into a Norwegian GPA based on standard pre-determined conversions and receive the same type of additional points as other applicants when this can be documented, which is always the case for age points. However, as nearly all under-

Table 1 Application points for first and regular quota

First quota, *age* < 22	Max	Regular quota	Max
Grade points: Original GPA×10	60	Grade points: Improved GPA×10	60
Subject points	4	Subject points	4
		HE/military points	2
		Age (2 per year age 20-23)	8
Total points	64	Total points	74

The application system to HE is centralized and has included most HE institutions since 1996/1997 (Norwegian Ministry of Education and Research, 2020). There are two quotas, the first quota and the regular quota, that differ in age limits and how total points are calculated, illustrated in Table 1.

In the first quota, only applicants aged 21 and younger are eligible. Grade points are calculated as the GPA of original transcript grades multiplied by ten, where each grade is given equal weight. A transcript GPA of 4.5 gives 45 grade points, while a transcript GPA of 5.5 gives 55 grade points, etc. In addition, the applicant can receive up to 4 additional subject points. Subject points incentivize students to take certain advanced science and language courses, by awarding 0.5-1 additional points per course.

In the regular quota, all applicants compete, as there is no age limit. This quota allows applicants to apply with grade points that have been improved by retaking examinations or passing examinations in new subjects. In addition to subject points, in this quota applicants receive up to 2 points for completing HE or military service[5] and up to 8 age points, 2 points per year from age 20 to 23.[6]

The number of study places is equally distributed over the two quotas. Applicants automatically apply to all quotas where they are eligible, which implies that only applicants 21 and younger compete in the first quota, while all applicants compete in the regular quota. As such, applicants 21 and younger compete for 100% of the study places, while older applicants only compete for 50% of the study places. If an offer is not accepted, the next applicant in line within the same quota receives an offer.

When applying, applicants rank up to ten study program alternatives,[7] and applicants receive an offer at the highest ranked study program where they qualify and have sufficient points. The point limit for each study program is determined by the number of applicants, the number of study places available and applicants' points.[8] Once offered a study program,

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Footnote 4 (continued)

graduate programs are taught in Norwegian, very few international students who do not have a background from Norway apply.

[5] Two points are given for either completing one year of military service, civil service, folk high school, HE or vocational HE.

[6] Certain study programs add 1-2 gender points or points based on admission tests, but this is not the case for law and medicine, the studies we focus on in our paper.

[7] A study program is a combination of study field, study location and possibly semester, such that "Medicine, fall, University of Oslo", "Medicine, spring, University of Oslo" and "Medicine, fall, University of Bergen" are three different study program alternatives.

[8] The point limit is such that no qualified applicant who does not receive an offer has (a) points exceeding the point limit and (b) the study program ranked higher than the study program they were offered. Point limits differ each year but are quite stable over time as the same studies tend to be popular.

applicants can decide to stay on the wait list for other study programs and may receive later offers if study places become available.

Our analysis focuses on the studies law and medicine, both five-year profession studies. For law, there is no requirement other than being qualified for studies in HE. Law is offered at the University of Oslo (UiO), the University of Bergen (UiB) and the University of Tromsø (UiT). For medicine, students are required to have completed certain science subjects in order to qualify.[9] Medicine is offered at UiO, UiB, UiT and the Norwegian University of Science and Technology (NTNU).

When admission was centralized in 1996/1997, admission models varied across studies and institutions (see e.g. NUCAS, 1999). While some study programs required documented life/work experience, other study programs used age point as a simpler way of doing the same. In 2000/2001 this was changed and a common quota and point system was introduced for nearly all studies (Norwegian Ministry of Church Affairs, Education and Research, 1999). In the new admission model, the regular quota included age points equivalent to those we have today. Medicine received an exception, keeping their particular requirements for documenting life/work experience until 2009/2010, when they also changed to the common age point reward system (NUCAS, 2020). Although there have been some changes, the admission system as a whole has been fairly stable since its inception. This has contributed to the admission system being perceived as fair and predictable (Hovdhaugen and Carlsten, 2018).

4 Data and methods

The data are from the Directorate for ICT and Joint Services in HE and Research (UNIT) and include data on the entire population of applicants to HE and students in HE. The data combine information from the National diploma database (NVB), the Norwegian Universities and Colleges Admission Service (NUCAS, also known as Samordna opptak) and the student administrative system (FS). All categories of points from Table 1 are available for each applicant, as well as information on gender, age, the 10 ranked study program choices, whether the applicant was qualified for each choice, and the study program offer the applicant received. The data from HE include nearly all HE institutions in Norway and have information on active status, credits earned and grades.

When studying applicants to medicine and law (Section 5), we focus on admissions for the study year 2019/2020 using a combination of the NVB and NUCAS data. The sample consists of applicants who are qualified to study in HE, who have non-missing total points and who have law or medicine as one of their ten alternatives, with the restriction that the applicant is qualified for the study program and that the study program needs to be ranked higher than the study program they were offered. This eliminates applicants to law or medicine where the applicant has a study program with a lower point limit ranked higher, in which case the study program choice of medicine or law is not deemed to be realistic. The qualification restriction eliminates applicants to medicine who have not taken the prerequisite courses. We divide the group of qualified applicants into applicants who received an offer to the study program at one

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[9] The requirements are courses in mathematics, physics and chemistry. These subjects also award subject points, and qualified applicants to medicine therefore have at least two subject points.

of the study locations where they applied to law or medicine (*offer*) and applicants not receiving an offer (*no offer*). In addition, when investigating age composition, we include a third group, *marginal applicant*s. This is a subset of the *no offer* group and includes applicants that almost received an offer, defined as having total points within 5 percent of the quota's point limit for any of the study locations where they applied. These groups are compared along various dimensions to investigate differences in group composition.

In Section 6 we analyze study progression for law and medical students using linear regression analysis including fixed effects of study location and quota. The sample includes students that started the study program in the fall of 2017, allowing us to include outcomes from the first two years of HE. The data is a combination of NVB and FS data. We use three indicators: Whether the student is active, number of credits earned and HE GPA for the first two years. This sample differs from the first sample by using a different cohort and including students who started the study program rather than the students who received an initial offer. The sample is none the less highly comparable as the intake system has not changed and point limits for both studies have been stable from 2017 to 2019.

5 An analysis of applicants to law and medicine

Table 2 shows descriptive statistics for students applying to law and medicine, respectively, who receive or do not receive an offer for the year 2019/2020 for both the first quota and the regular quota. The table displays the total point limit and grade point limit for each study program and quota. The total point limit is the minimum total points required to receive an offer in any of the study locations. The grade point limit is the lowest possible grade points an applicant can have if they have all possible additional points, i.e., total point limit minus subject points for the first quota and total point limit minus subject, HE/military and age points for the regular quota. The remaining rows display the average value for total points, grade points, subject points and age points for the groups *no offer* and *offer* in each quota. Additionally, average age and share of women are included. The total number of students for each group (N) and the number of applicants per offer for each quota[10], a measure of study popularity, are presented at the bottom of each table.

For both law and medicine, the total point limit is higher in the regular quota than in the first quota. The difference is 6.7 for law and 7.9 for medicine. This means that an applicant who falls below the cutoff for the first quota by a narrow margin will not be able to gain admission in the regular quota without accumulating at least as many points. As the difference is lower than the additional points it is possible to accumulate (10), this means that the grade point limit in the regular quota is lower. Hence, some students who were not accepted in the first quota have the potential to be accepted in the regular quota once they accumulate enough additional points.

How do students gain additional points? Average subject points are similar across quotas for the two study programs, which indicates that applicants in the regular quota are not taking new subjects to gain more subject points.[11] The grade point averages are lower

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[10] Applicant / Offer = (N(No offer)+N(Offer)) / N(Offer).

[11] Subject points are much more common for applicants to medicine, where many of the subjects that give additional points are required to be qualified for admission.

Table 2 Descriptive statistics

	Law							
	First quota				Regular quota			
	No offer		Offer		No offer		Offer	
Total point limit			52.8				59.5	
Grade point limit			48.8				45.5	
Average total points	46.9	(4.9)	55.6	(2.0)	50.5	(6.1)	62.0	(2.6)
Average grade points	45.9	(4.7)	54.1	(2.1)	44.9	(5.3)	51.7	(2.3)
Average subject points	1.0	(1.2)	1.6	(1.4)	1.0	(1.2)	1.5	(1.3)
Average age points					3.9	(3.3)	7.2	(1.6)
Average age	19.6	(0.8)	19.4	(0.7)	22.6	(5.4)	25.4	(5.8)
Share women	0.67		0.73		0.64		0.62	
N	2395		735		4146		731	
Applicants / Offer			4.3				6.7	
	Medicine							
Total point limit			52.8				59.5	
Grade point limit			48.8				45.5	
Average total points	46.9	(4.9)	55.6	(2.0)	50.5	(6.1)	62.0	(2.6)
Average grade points	45.9	(4.7)	54.1	(2.1)	44.9	(5.3)	51.7	(2.3)
Average subject points	1.0	(1.2)	1.6	(1.4)	1.0	(1.2)	1.5	(1.3)
Average age points					3.9	(3.3)	7.2	(1.6)
Average age	19.6	(0.8)	19.4	(0.7)	22.6	(5.4)	25.4	(5.8)
Share women	0.67		0.73		0.64		0.62	
N	1289		385		2231		384	
Applicants / Offer			5.0				7.7	

Standard deviaton in paretheses. Lowest point limit is the minimum of point limits for 2019 for all study locations that offer the study program. Lowest grade point limit is the grade point limit needed if you have all other points that count towards total points

for accepted applicants in the regular quota compared to the first quota, so it also does not seem that applicants are gaining access solely by improving their GPA. Where we see the big difference is the average age among accepted applicants in the regular quota versus the first quota and this is connected to age points. The average age points among accepted applicants to law and medicine are 7.2 and 7.1, respectively, nearly the maximal amount of 8. For applicants who are not accepted in the first quota, the way to gain admission is to accumulate a substantial amount of additional age points in order to be accepted in the regular quota.

Additional points play an important role in the regular quota. Accepted applicants in medicine and law have close to the maximum amount of age points. We now take a closer look at the distribution of age within each applicant group and quota. In addition to the groups *no offer* and *offer*, we include the group *marginal applicant*s. This is a subset of the *no offer* group and includes applicants that almost received an offer, defined as having total points within 5 percent of the quota's point limit for any of the study locations where they applied.

Figure 1 shows the age distribution for applicants to law and medicine in each group. Applicants can apply in the first quota until the year they turn 21, while there is no age
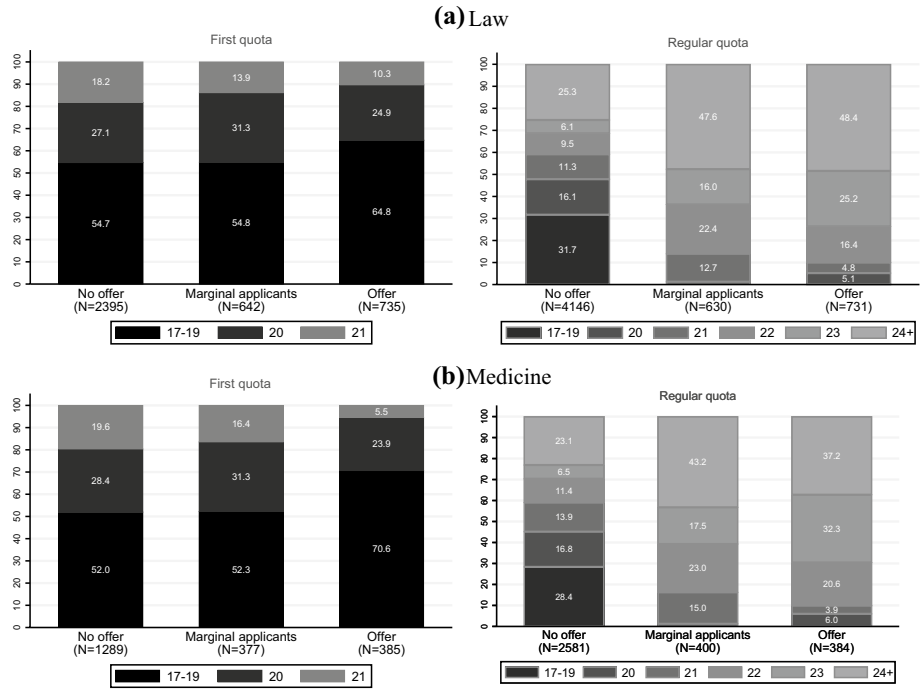
Fig. 1 Age, first and regular quota

Figures show the distribution of age for applicants to law in the first and regular quota for 2019/2020. The sample consists of applicants who are qualified to study in HE and who have the study program as one of their ten alternatives, with the restriction that the applicant is qualified for the study program and that the study program needs to be ranked higher than the study they were offered, or be the study they were offered. No offer includes all applicants that did not receive an offer to the study program in any of the study location where they applied to. Marginal applicants is a subset the no offer group and is defined as having total points within 5 percent of the quota's point limit for any of the study locations where they applied. Offer includes all applicants who received an offer to the study program at one of the study locations where they applied

limit in the regular quota. Age 17-19 is the normal age for completing upper secondary education, with most students finishing at age 19. In the regular quota, applicants receive 2 age points every year for four years from the year they turn 20, such that applicants age 23 and older have the maximum of 8 age points.

For the first quota, more than half of the applicants are applying straight out of upper secondary school. For applicants receiving an offer, this age group is even larger, 65 percent for law and 71 percent for medicine. 20- and 21-year-old applicants in this quota can do nothing to improve their grades from upper secondary school, but might be applying later because they finish upper secondary at a later age (e.g., spending more than three years to complete upper secondary education) or because they have spent time after completing upper secondary school on other activities (e.g., military service, gap year or other studies).

For the regular quota, a very different age pattern emerges. Although applicants are spread across all age groups for both law and medicine, for those receiving an offer, more than 65 percent are age 23 or older (8 age points), and more than 90 percent are age 22 or older (minimum 6 age points). *Marginal applicants* have a similar distribution; more than
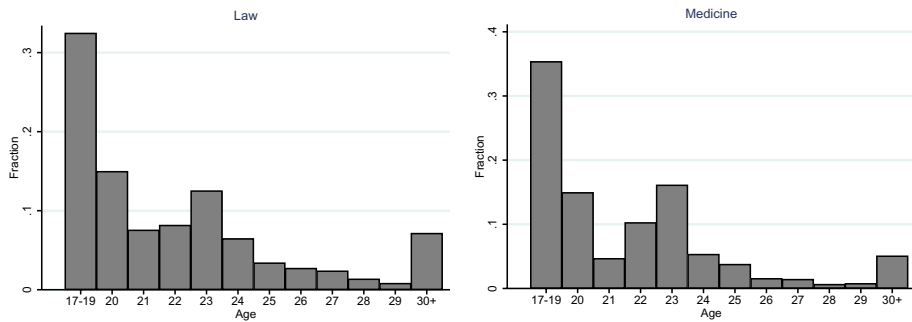
Fig. 2 Age distribution for applicants receiving an offer
The figure displays the number of applicants accepted to either law or medicine in each age group in 2019/2020. Applicants in the regular quota receive 2 age points per year from age 20-23, such that all applicants 23 and older have the maximal amount of age points, 8

60 percent are age 23 or older and more than 80 percent are age 22 or older. By the time they have reached age 23, most applicants have also received 2 points for military service or HE.[12] Compared to a student coming straight from upper secondary education, 23-year-olds are therefore likely to have a 10-point advantage in the regular quota.

How big is this advantage? Grade points, as described in Section 3, are the average grade from the upper secondary transcript, weighing all grades equally, multiplied by 10. Grades range from 1 (lowest) to 6 (highest) such that the range of grade points is from 10 to 60. A typical academic track transcript has about 25 grades. To increase grade points by one point, students have to improve their grade by at least one grade in three subjects. To increase their grade points by ten points, they have to do the same 25 times. Gaining 10 grade points by retaking examinations is obviously very difficult and most likely unrealistic, particularly when the grade point limit is high to begin with, as is the case with law and medicine. The difference between the total point limit in the first and regular quota is at least 6.7 for law and 7.9 for medicine, which is the minimum amount of points an applicant who fell just below the first quota limit has to acquire in order to be accepted to the regular quota. By only waiting, this can be achieved in four years. By waiting and gathering HE/military points, this can be achieved in three years. Improving grades and gathering additional subject points might decrease the waiting time further, but likely make a small contribution compared to age points.

The result of this system can be seen clearly in Fig. 2, displaying the age distribution for applicants receiving an offer in either quota for law and medicine.[13] There is a u-shaped pattern for applicants up to age 23, when they receive the maximum amount of age points in the regular quota. This tells a clear story of an admission system that creates a waiting game for sought after study programs. Either applicants have the required grades straight out of upper secondary education, or applicants are likely to have to wait to simply become old enough to receive an offer. For medicine, subject requirements create a second hurdle. If an applicant does not have the required subjects when leaving upper secondary

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[12] 92 percent of applicants receiving an offer for law or medicine have at least one HE/military point.

[13] Figure 3 in Appendix displays the same figures separately for women and men, showing that the pattern is the same for both genders although it is most clear for women accepted to medicine.

education, taking the subject after graduating means improving the transcript, automatically disqualifying the applicant from the first quota. This implies that even if the applicant has the required GPA for the first quota, there is no solution but to wait until enough additional points have been acquired to receive an offer in the regular quota.

6 Regression results

Our analysis shows that law and medicine require high grade points for both quotas. Students applying to medicine are more likely to have subject points than students applying to law, but the distribution of subject points is similar across quotas. Where we see the biggest difference across quotas is the age distribution, illustrating that age points have a relatively large weight when determining acceptance in the regular quota. Next, we investigate how these student characteristics predict study outcomes.

Table 3 displays regressions results using three study outcomes for law and medicine. The sample includes students that started the study program in the fall of 2017, allowing us to include outcomes from the first two years of HE. *Active status* is an indicator variables equal to one if the student earns at least one credit during the first two years. C*redits* is the number of credits earned during the first two years where only students with nonzero credits are included. Regular study progression is 60 credits per year. The final outcome, *HE GPA* is the GPA from all courses in HE during the first two years, where grades are weighted by credits and A=5, B=4, C=3, D=2 and E=1. *HE GPA* is standardized with mean 0 and standard deviation 1.

For each outcome, two separate models are presented. 1 is a regression that uses grade points (the GPA of transcript grades multiplied by ten), standardized with mean 0 and standard deviation 1, as an explanatory variable. In addition, the regression includes controls for gender and study location and quota fixed effects, thereby comparing students with the same gender at the same university accepted in the same quota. Model 2 is equivalent to model 1, except that age is also added as an explanatory variable. Model 2 shows the association between age and study outcomes when we control for grade points and compare students with the same gender at the same university accepted in the same quota. The bottom of the table includes the mean and standard deviation of the outcome variables. On average, at the end of the second year, 85 percent of law students are still active having earned 109 credits, while 88 percent of medical students are still active having earned 115 credits.

Model 1 shows that, for both law and medicine, there is no significant association between grade points and being an active student (columns 1 and 4). There is also no significant association between grade points and credits earned for medicine (column 5), while the association is positive and significant at the $p<0.1$ level for law (column 2). However, there is a clear association between grade points and GPA in HE for both studies (columns 3 and 6). By the second year, increasing grade points by one standard deviation increases GPA in HE by 1.5 standard deviations for law and 1.4 standard deviations for medicine.

The second half of the table shows results with age also included as an explanatory variable. There is a negative association between age and active student (columns 1 and 4) and between age and credits earned (columns 2 and 5) for both law and medicine. By the second year, being a year older decreases active student status by 1.2 percentage points for law and 2 percentage points for medicine and reduces credits earned among active students by 0.9 for law and 1.0 for medicine. There is no significant association between being older

Table 3 Study outcomes, law and medicine

	Law			Medicine		
	(1)	(2)	(3)	(4)	(5)	
	Active student	Credits	HE GPA	Active student	Credits	HE GPA
Model 1						
Grade points	-0.016	6.968*	1.498***	-0.016	3.779	1.391***
	(0.073)	(3.628)	(0.206)	(0.079)	(3.121)	(0.232)
Woman	-0.009	-0.008	0.026	-0.065**	0.247	0.043
	(0.029)	(1.438)	(0.081)	(0.032)	(1.291)	(0.096)
Study location FE	Yes (3)	Yes (3)	Yes (3)	Yes (4)	Yes (4)	Yes (4)
Quota FE	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	
R2	0.03	0.09	0.15	0.08	0.07	0.22
Model 2						
Age	-0.012***	-0.926***	-0.010	-0.021***	-1.035***	0.000
	(0.004)	(0.229)	(0.013)	(0.006)	(0.306)	(0.025)
Grade points	-0.039	4.810	1.475***	-0.119	-1.377	1.391***
	(0.073)	(3.620)	(0.208)	(0.083)	(3.436)	(0.263)
Woman	-0.013	-0.232	0.023	-0.074**	-0.222	0.043
	(0.029)	(1.421)	(0.082)	(0.032)	(1.282)	(0.097)
Study location FE	Yes (3)	Yes (3)	Yes (3)	Yes (4)	Yes (4)	Yes (4)
Quota FE	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)
R2	0.04	0.11	0.16	0.11	0.10	0.22
Sample	All	Active student	Active student	All	Active student	Active student
N	698	593	593	453	399	392
Mean outcome	0.85	109.22	0	0.88	115.32	0
SD outcome		16.97	1		12.42	1

Table reports results from separate regression for each outcome. Model 1 includes grade points, gender, study location FE and quota FE, while Model 2 adds age to the model. Sample includes all students starting the study program in the fall of 2017. Grade points are standardized with mean 0 and standard deviation 1 for the law or medicine sample. Active student is an indicator variable for whether the student has obtained credits during the first two years of the study program. Credits measures number of credits achieved during the first two years of the study program. HE GPA measures average GPA from the first two years of the study program, standardized with mean 0 and standard deviation 1. Regressions for credits and HE GPA include only active students. Table A1 in Appendix includes Model 3 where age is replaced by age points linearly and Model 4 where age is replaced by age points as indicator variables. Standard errors reported in parentheses

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

and HE GPA for both studies (column 3 and 6). Table 4 in the Appendix displays results from two alternative specifications, Model 3 where age is replaced by age points linearly, and Model 4 where age points are included as categories. Adding age points rather than age displays the same pattern of estimates, although the negative association between age and active status is no longer significant for law. When adding age points categorically, we see that the negative association between age points and active status and age points

and credits increase as age points increase. Interestingly, we also see some heterogeneity emerge for the association between age points and GPA in HE. While students age 20 and 21 (2 and 4 age points, respectively) are more likely to have higher GPA in HE relative to younger students, the coefficient becomes negative for older students. There are no significant gender associations except for a significant negative association between being a women and being an active student for medicine.[14]

Taken together, Models 2-4 indicate that there is a significant negative association between age and active student status and between age and credits earned, although the coefficients are not large. The results do, however, indicate that being older, awarded with age points in the regular quota, does not predict improved study outcomes.

7 Conclusion

In this paper we have used register data to study how the particular age reward feature affects admission into two highly competitive study programs in Norway: medicine and law. We find that age points play an important role in determining who gains admission in the regular quota to these study programs. Even though all applicants formally compete in the regular quota, only older applicants are able to actually compete. Due to the lack of age points, qualified applicants who fall below the cutoff for the first quota by a narrow margin will not be able to gain admission due to their lack of age points. They are trapped in a waiting game. Additionally, as age does not seem to be associated with improved study outcomes in HE, it can be argued that this creates inefficiencies not only on the individual but also on the societal level.

Is age a good indicator of merit? The initial intention of age points was as a proxy of life/work experience, and only certain study programs or institutions awarded points based on age. Gradually, however, all study programs have introduced age points and their aggregate relative weight has increased. Becoming a year older and thus gaining two age points is equivalent to improving their grade by at least one grade in six subjects. Greater effort is needed to improve GPA compared to just waiting to become older. This raises the question if age as a merits is fairly weighted. Studies show that Norway, compared to several other European countries, has an admission system which is perceived as fair and effective both by current and future students (see Orr, Usher, Haj, Atherton, and Geanta, 2017; Hovdhaugen and Carlsten, 2018). However, for highly selective study programs, age points do not seem to contribute to fairness in admissions.

We suggest that age should carry less weight in admission decisions as they merely contribute to creating a waiting game. When considering changing the determinants for application, however, it is important that changes are announced in advance or changed gradually, such that current applicants are not unreasonably harmed by the changes, ensuring that the system is still perceived as fair. For age points, a policy change can be achieved by announcing a gradual reduction in either the amount of age points per year or the number of years qualifying for age points.

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[14] We may be concerned that results for age are driven by very old students, but when we restrict Model 2-4 to only including students age 25 and younger, the results remain qualitatively the same. Results are available upon request.

Table 4 Study outcomes, law and medicine. Alternative age specifications

	Law			Medicine		
Model 3						
	(1)	(2)	(3)	(4)	(5)	(6)
	Active student	Credits	HE GPA	Active student	Credits	HE GPA
Age points	-0.012	-2.118***	-0.002	-0.020**	-1.245***	-0.043
	(0.009)	(0.421)	(0.024)	(0.009)	(0.395)	(0.030)
Grade points	-0.047	1.109	1.492***	-0.076	0.067	1.262***
	(0.076)	(3.741)	(0.216)	(0.083)	(3.303)	(0.248)
Woman	-0.007	0.371	0.026	-0.061*	0.428	0.049
	(0.029)	(1.411)	(0.082)	(0.032)	(1.278)	(0.096)
Study location FE	Yes (3)	Yes (3)	Yes (3)	Yes (4)	Yes (4)	Yes (4)
Quota FE	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)
R2	0.03	0.12	0.15	0.09	0.10	0.22
Model 4						
2 age points	0.055	-2.064	0.393***	0.054	-2.652	0.327**
	(0.041)	(2.016)	(0.115)	(0.048)	(1.897)	(0.138)
4 age points	0.038	-6.986**	0.310*	-0.014	-0.640	0.493*
	(0.057)	(2.795)	(0.160)	(0.083)	(3.455)	(0.259)
6 age points	-0.063	-14.301***	-0.004	-0.020	-4.665	-0.480**
	(0.077)	(3.722)	(0.213)	(0.081)	(3.301)	(0.242)
8 age points	-0.101	-17.168***	-0.019	-0.130*	-10.091***	-0.319
	(0.071)	(3.390)	(0.194)	(0.077)	(3.204)	(0.235)
Grade points	-0.091	0.231	1.300***	-0.121	-1.485	1.183***
	(0.078)	(3.894)	(0.222)	(0.086)	(3.431)	(0.250)
Woman	-0.008	0.420	0.020	-0.068**	0.211	0.013
	(0.029)	(1.419)	(0.081)	(0.032)	(1.287)	(0.095)
Study location FE	Yes (3)	Yes (3)	Yes (3)	Yes (4)	Yes (4)	Yes (4)
Quota FE	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)	Yes (2)
R2	0.04	0.13	0.18	0.11	0.11	0.27
Sample	All	Active student	Active student	All	Active student	Active student
N	698	593	593	453	399	392
Mean outcome	0.85	109.22	0	0.88	115.32	0
SD outcome		16.97	1		12.42	1

Table reports results from separate regression for each outcome. Model 3 includes age points linearly, while Model 4 includes age points as indicator variables. Both models also include grade points, gender, study location FE and quota FE. Sample includes all students starting the study program in the fall of 2017. Grade points are standardized with mean 0 and standard deviation 1 for the law or medicine sample. Active student is an indicator variable for whether the student has obtained credits during the first two years of the study program. Credits measures number of credits achieved during the first two years of the study program. HE GPA measures average GPA from the first two years of the study program, standardized with mean 0 and standard deviation 1. Regressions for credits and HE GPA include only active students. Standard errors reported in parentheses

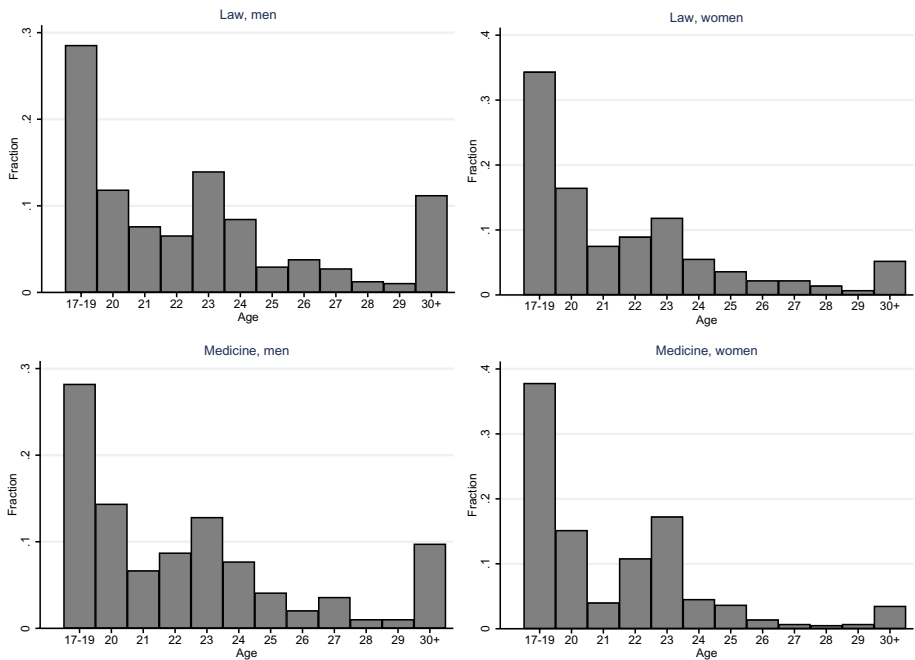* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Appendix

Fig. 3 Age distribution for applicants receiving an offer—by gender

The figure displays the number of applicants accepted to either law or medicine in each age group in 2019/2020 by gender. Applicants in the regular quota receive 2 age points per year from age 20-23, such that all applicants 23 and older have the maximal amount of age points, 8

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