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Field of study and partner choice☆

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ABSTRACT

There is strong assortative mating by field of study. To examine to which extent this is due to self selection or to a causal effect of access to specific "marriage markets", we use data from participants in admission lotteries of four oversubscribed studies in the Netherlands. For each of the four studies, we find that the winning compliers of an admission lottery are significantly more likely than the losing compliers to have a partner from the lottery study, whereas losing compliers are only marginally more likely to have a partner from the lottery study than would occur under random matching. These results indicate that assortative mating by field of study is largely due to marriage market access and that self selection plays a minor role. *JEL*-codes: I26, J12, J13.

1. Introduction

Recent studies document strong assortative mating by field of study (Bičáková & Jurajda, 2018; Eika, Mogstad, & Zafar, 2019). Fig. 1 illustrates this using data from the Netherlands. It shows that the shares of university graduates who have a partner from the same field of study are much higher than what would be the case under random matching. For example, men who studied in the Education field are around three times (30% vs 10%) more likely to have a partner from the Education field than would be the case under random matching.

What is the reason for such strong assortative mating by field of study? Is it because people who due to innate ability, predetermined preferences or social background are attracted to each other, choose the same field of study? Or is it because a field of study is a place where people meet potential partners which they otherwise would not meet? In other words, is strong assortative mating by field of study mainly due to self selection, or is there a causal effect of study choices on partner choices? Showing a causal effect is challenging because it requires that effects due to self selection into fields of study can be eliminated.

To make progress on this issue, we use data from participants in admission lotteries for oversubscribed studies at Dutch universities. Because compliance with the lottery outcome is imperfect, we use the lottery result as an instrumental variable for completion of (or enrollment in) the lottery study. To identify the causal effect of study choice on assortative mating, we compare the share of winning compliers with a partner from the lottery study with the share of losing compliers with a partner from the lottery study. To identify the self-selection effect, we compare the share of losing compliers with a partner from the lottery study with the share that would do so under random matching.[1]

Information about the causal effect of study choice on partner choice is important so that prospective students know that their study choice does not only affect their future earnings (Altonji, Blom, & Meghir, 2012; Hastings, Neilson, & Zimmerman, 2013; Ketel, Leuven, Oosterbeek, & van der Klaauw, 2016, 2019; Kirkebøen, Leuven, & Mogstad, 2016) but also

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[1] Bičáková & Jurajda (2018) distinguish between preferences and meeting opportunities as mechanisms underlying assortative mating. Admission lotteries are, however, not helpful to disentangle these two factors. The reason is that preferences for partners are likely to be malleable and therefore probably affected by enrollment in a certain study. In our distinction between selection effect and causal effect, partner preferences that are predetermined are part of the first and partner preferences that are affected by enrollment in a certain study are part of the latter.

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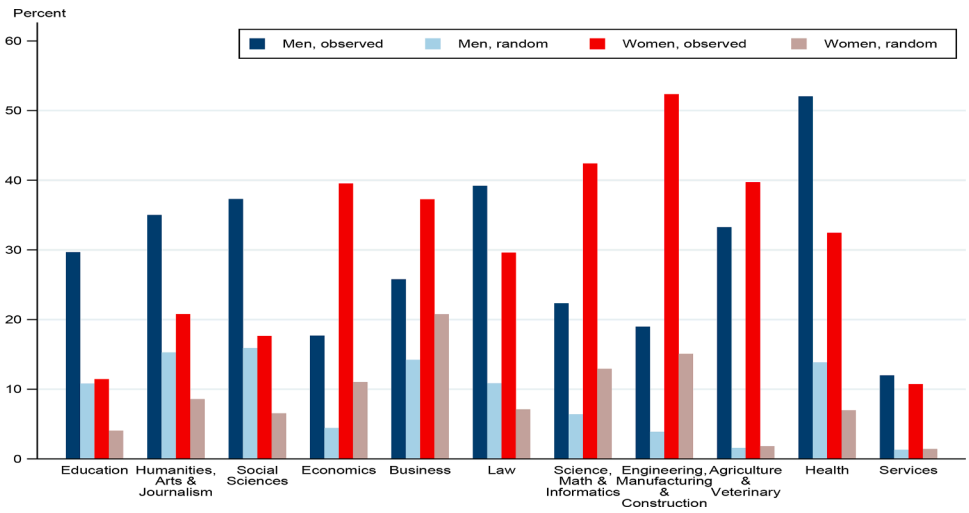

Fig. 1. Assortative mating by field of study.
Notes: The figure shows shares of graduates with a partner from the same field, separately for men and women. Registry data available at Statistics Netherlands describe the cohorts born between 1967 and 1982 (4.3 million individuals) and partnership is measured at age 35. Students in the Netherlands choose their field of study when they enter university, around age 18. To calculate the share of men in a partnership where both partners graduated from the same field of study under random matching, we multiply the share of men who graduated in that field in their birth cohort with the share of women who graduated in that field in the birth cohort of the men's actual partner. Taking the mean of the resulting probabilities gives men's likelihood under random matching of both partners graduating from the same field. The shares for women are computed analogously.

Table 1
Lottery categories .

Category	GPA	Weight	Share			
			Medicine	Dentistry	Vet. medicine	Int. business
A	$8.5 \leq$ GPA $\leq$ 10	2.00	1.7%	0.3%	1.0%	0.7%
B	$8.0 \leq$ GPA $<$ 8.5	1.50	5.4%	1.9%	2.8%	2.9%
C	$7.5 \leq$ GPA $<$ 8.0	1.25	8.6%	3.4%	6.4%	6.4%
D	$7.0 \leq$ GPA $<$ 7.5	1.00	20.8%	13.8%	18.7%	19.2%
E	$6.5 \leq$ GPA $<$ 7.0	0.80	22.1%	21.4%	24.7%	24.4%
F	$6.0 \leq$ GPA $<$ 6.5	0.67	29.9%	39.8%	33.3%	36.1%
Other	–	1.00	11.5%	19.5%	13.2%	10.4%

Notes: GPA is grade point average on the final exams in high school (scale 1–10). Share is the share of applicants in the different categories that applied for the lotteries in the years 1988 to 1999. Weight indicates the relative probability of being admitted. The category "Other" refers to students who did not participate in the nationwide high school exams, such as foreign students. This category will be excluded from the analysis.

other outcomes they care about. Wiswall & Zafar (2021) present evidence that students at an elite university in the US indeed believe that their choice of major affects whom they marry. Relatedly, Eika et al. (2019) find that assortative mating by field of study contributes to inequality in household income among college graduates in Norway.

The four university studies in the Netherlands that used admission lotteries and have sufficient numbers of admitted and rejected applicants, are medicine, dentistry, veterinary medicine and international business studies. For each of these studies, we find that winning compliers are substantially and significantly more likely to be with a partner from the lottery study than losing compliers. This holds for both men and women. This finding is consistent with a causal marriage market channel. Losers from these lotteries who enroll in another study, are (almost) equally likely to have a partner from the lottery study as would be the case under random matching. This indicates that the self-selection channel is unimportant.

Two other papers find causal effects of higher education choices on the quality of someone's partner. Using data from Chile, Kaufmann, Messner, & Solis (2015) find that admission to a more selective university program has a substantial effect on partner quality for female applicants. Using data from Norway, Kirkebøen, Leuven, & Mogstad (2021) find that colleges operate as marriage markets as a direct result of attending a particular institution at a given time. Neither of these studies uses data from admission lotteries, but instead base causal inference on a regression discontinuity design exploiting admission thresholds. The findings therefore apply primarily to applicants with qualifying scores close to these admission thresholds.

The remainder of this paper is organized as follows. Section 2 provides details about the admission lotteries, Section 3 describes the data and Section 4 introduces the empirical approach. Section 5 presents the estimates of the causal effects of study choice on partner choice. Section 6 summarizes and concludes.

2. The admission lotteries

Secondary-school graduates in the Netherlands who complete the pre-university track are eligible for all university studies. For the large majority of studies, universities have to accept all applicants but some studies have quotas that limit the number of students that are admitted. The quotas were introduced in response to the drastically increasing number of potential students at the end of the 1960s which exceeded the number of available places (see Goudappel (1999) for details on the reasons for introducing quotas).

Until 1999, students who applied to a study program with a quota were admitted on the basis of the results from a (nationwide) centralized lottery.[2] We focus on medicine, dentistry, veterinary medicine and international business, which are the study programs that were substantially oversubscribed for multiple years. The latter is important because rejected applicants are allowed to reapply in the next year. We observe that a substantial fraction of rejected first-time applicants reapply at least once. In a given year, applicants are only allowed to participate in the admission lottery for one study program.[3]

[2] From 2000 onwards, studies with quotas have been allowed to admit (initially) at most 50 percent of the students using their own criteria. Universities have made increasing use of this and by now, the admission lotteries have been completely abandoned. Selection is often based on motivation and previous experience. For this reason we restrict our analysis to students who first applied to a lottery study before this change.

[3] Around 1% (397 out of 38,810) of the applicants in our data participate in different years in admission lotteries for different fields of study. The most common combinations are medicine and dentistry, and medicine and veterinary medicine.

Table 2
Sample description by gender and result of the first lottery application .

	Men		Women	
	Winners	Losers	Winners	Losers
I. Medicine				
Enrolled in medicine	94.6%	42.9%	93.6%	48.2%
Completion of medicine	81.3%	37.4%	83.9%	44.6%
Enrolled in study program in NL	99.6%	96.5%	99.6%	97.4%
Completion of study program in NL	95.6%	90.6%	98.1%	95.5%
N	4872	5697	6854	7970
II. Dentistry				
Enrolled in dentistry	91.5%	39.7%	91.7%	42.3%
Completion of dentistry	76.9%	34.1%	81.1%	38.8%
Enrolled in study program in NL	99.5%	96.5%	99.5%	98.7%
Completion of study program in NL	96.8%	92.6%	98.6%	96.8%
N	437	511	444	529
III. Veterinary medicine				
Enrolled in veterinary medicine	93.7%	24.9%	93.7%	32.0%
Completion of veterinary medicine	76.8%	22.4%	83.8%	28.2%
Enrolled in study program in NL	98.9%	90.6%	99.4%	93.3%
Completion of study program in NL	94.3%	83.1%	97.9%	88.7%
N	349	960	678	1922
IV. International business				
Enrolled in international business	86.9%	11.5%	83.3%	10.1%
Completion of international business	54.5%	6.4%	60.0%	6.2%
Enrolled in study program in NL	99.1%	98.6%	99.4%	97.6%
Completion of study program in NL	88.6%	86.3%	93.8%	90.4%
N	3001	2492	1396	1091

Table 3
First-stage estimates .

	Men			Women		
	$\widehat{\lambda}$	s.e.	F	$\widehat{\lambda}$	s.e.	F
I. Medicine						
Completion	0.41***	(0.01)	2013.1	0.37***	(0.01)	2363.1
Enrollment	0.50***	(0.01)	3813.4	0.44***	(0.01)	3991.7
II. Dentistry						
Completion	0.43***	(0.03)	189.0	0.43***	(0.03)	193.2
Enrollment	0.53***	(0.03)	362.4	0.50***	(0.03)	307.3
III. Veterinary medicine						
Completion	0.49***	(0.03)	333.5	0.54***	(0.02)	733.8
Enrollment	0.66***	(0.03)	668.0	0.60***	(0.02)	961.4
IV. International business						
Completion	0.47***	(0.01)	1585.6	0.53***	(0.02)	913.2
Enrollment	0.74***	(0.01)	5669.2	0.71***	(0.02)	2197.8

Notes: All specifications include controls for ethnicity, age at the first lottery application, lottery category, year of first lottery and interaction terms of the year of first lottery and lottery category. Levels of statistical significance: * p<0.10, ** p<0.05, *** p<0.01

Lottery participants are assigned to lottery categories. Those with a higher GPA on their high-school exams have a higher chance of being admitted, i.e. they receive a higher weight in the lottery (see Table 1).[4] Applicants in lottery category A with a GPA of at least 8.5 (out of 10) receive a weight of 2.00, whereas applicants with a GPA between 6 and 6.5 are assigned to category F with a weight of 0.67. The last category "Other" includes applicants who did not take the Dutch secondary school exams, e.g. foreign students, and will be excluded from the analysis. The majority of students are in categories D to F. The number of available places per category is determined such that for the total number of available places divided by the number of applicants in a category, the weights given in Table 1 hold.

[4] Graduating from secondary school requires an exam in seven subjects including Dutch and English. Applicants for medicine, dentistry and veterinary medicine should also have passed biology, chemistry, physics and math. Once the exam is passed it cannot be retaken.

Table 4
Instrumental variables estimates of the effects of degree completion on partnership formation and partner choice .

	Men			Women		
	CCM	$\widehat{\delta}$	s.e.	CCM	$\widehat{\delta}$	s.e.
I. Medicine						
Partner	0.82	0.07***	(0.02)	0.86	-0.02	(0.02)
Partner university degree	0.52	0.08***	(0.03)	0.51	0.06**	(0.03)
Partner medical degree	0.06	0.21***	(0.02)	0.05	0.19***	(0.02)
II. Dentistry						
Partner	0.82	0.06	(0.06)	0.89	-0.04	(0.06)
Partner university degree	0.52	0.01	(0.08)	0.52	-0.04	(0.09)
Partner dentistry degree	0.04	0.16***	(0.06)	0.01	0.17***	(0.06)
III. Veterinary medicine						
Partner	0.82	0.09*	(0.05)	0.85	-0.04	(0.04)
Partner university degree	0.44	0.13*	(0.07)	0.43	0.03	(0.05)
Partner veterinary medicine degree	0.03	0.31***	(0.05)	0.01	0.18***	(0.03)
IV. International business						
Partner	0.86	-0.02	(0.02)	0.82	0.04	(0.03)
Partner university degree	0.44	0.05	(0.03)	0.52	0.08*	(0.04)
Partner international business degree	0.01	0.07***	(0.01)	0.01	0.14***	(0.02)

Notes: All specifications include control variables for ethnicity, age at the first lottery application, lottery category, year of first lottery, interaction terms of the year of first lottery and lottery category, and dummy variables for the year when the outcome is observed. CCM stands for control-complier mean. Levels of statistical significance: * p<0.10, ** p<0.05, *** p<0.01

Applicants are allowed to submit a list of at most three most-preferred universities, but their choice of universities has no influence on the outcome of the admission lottery. The admission lottery first decides which students can be admitted to the lottery study. After the result of the lottery is known, admitted students are divided over the universities taking account of their preferences for specific universities as far as possible.

3. Data

Data sources and sample

We use administrative data from different registers available at Statistics Netherlands. The register on the admission lotteries contains information on all applicants for medicine, dentistry, veterinary medicine, and international business, their lottery category and the outcomes of all lotteries. We merge this with information on actual study choices of all applicants and their study progress.

Lottery information is available for the years 1987 to 2004. To make sure that we observe first-time applicants, we exclude applicants who participated in 1987 since we have no information about possible participation in 1986, and we exclude applicants older than 20 when we observe them applying for the first time. Because the lottery system was gradually abandoned after 1999, we also exclude individuals applying for the first time after that year.[5]

To define partnerships we use the Municipal Personal Records Database (GBA). These records contain for each individual, the official address of registration, the household composition at that address, the individual's role in the household and personal identifiers of all household

[5] We also drop applicants from lottery category A and applicants for dentistry in 1988 to 1992 and for international business in 1993, 1994 and 1999 because for these groups admission probabilities are close to one.

members. From this, we are able to derive (cohabiting) partners. The main outcome variable is partnership at age 35, but we also construct the same outcome variable for each age between 25 and 35.

Summary statistics

The lotteries ensure that characteristics of winners and losers of their first lottery are well balanced.[6] Table 2 reports summary statistics on study enrollment and completion separately by gender and result of the first lottery for the four study programs. Around 93% of the applicants admitted to medicine, dentistry and veterinary medicine in their first lottery actually enroll in the program, while these rates are slightly lower for international business. Among the losers of the first lottery, between 11% and 43% of men and 10% to 48% of women enroll in the lottery study after having won a subsequent lottery. Almost all lottery winners enroll in a study program in the Netherlands, while between 90% and 98% of the losers do so. These high shares alleviate potential concerns about lottery losers enrolling in their preferred program abroad (which is not observed in our data). The shares of lottery winners who complete the program are lowest for international business (55% of men and 60% of women) and highest for medicine (81% of men and 84% of women). Between 88% and 98% of lottery winners and between 83% and 97% of lottery losers complete a study in the Netherlands.

Table A5 in the appendix shows for each of the lottery studies the five fields of study that are most often chosen by male and female lottery losers who end up in their next-best study. Many losers enroll in programs that belong to the same educational field as the lottery study program they applied for.

4. Empirical approach

We are interested in the effects of completing a study with an admission lottery on the study of the partner (if any).[7] We mainly focus on outcomes measured at age 35, but later repeat the analysis for outcomes measured at all ages between 25 and 35. We assume a linear relationship between outcome variable Y_{it} of individual i observed at age 35 in year t, and degree completion (C_i):

$$Y_{it} = \alpha_t + \delta C_i + X_i\beta + LC_i + U_{it} \quad (1)$$

The effects of degree completion on outcomes are captured by δ, our parameter of interest. The vector of controls X_i includes individual's age at first lottery participation and an indicator for non-western origin. The interaction term between lottery category and year of first participation, LC_i, controls for the fact that individuals' chances of being admitted are only identical conditional on fixed effects for lottery year times category. Lastly, α_t are fixed effects for the year in which the outcome is observed and U_{it} is an individual-specific error term. We estimate equation (1) separately for men and women and for each lottery study.[8]

Compliance with the result of the first lottery is imperfect for all four study programs (see Section 3). Not all winners of the first lottery enroll in the respective program, while some drop out before completing their degree. The fraction of lottery losers who (successfully) reapply in subsequent years differs by program, but ultimately a substantial fraction of first-time lottery losers completes the lottery study program. As degree completion C_i is endogenous, a simple OLS estimate of δ would be biased, so that we use an instrumental variable approach. The result of an individual's first lottery (LR_{1i}) serves as an instrument for degree completion (C_i):

$$C_i = \kappa_t + \lambda LR_{1i} + X_i\theta + LC_i + V_{it} \quad (2)$$

The identifying assumption is that conditional on X_i and LC_i, the result of the first lottery is mean independent of U_{it}: $E[U_{it}|X_i, LC_i, LR_{1i}] = E[U_{it}|X_i, LC_i]$. Since program admission is random conditional on lottery category times year of first participation, the mean conditional independence assumption holds for the first lottery where selective reapplication has not taken place yet. The parameter λ describes the fraction of compliers in the sample, so that δ in equation (1) is to be interpreted as Local Average Treatment Effect (LATE). This describes the effect of graduating for individuals for whom the result of the first lottery determines whether they complete the respective study program.

5. Results

First-stage results

The first-stage regressions show the effects of winning the first lottery on the probability of completing the respective lottery study program. As displayed in the first lines of each panel in Table 3, the first-stage estimates are all highly significant and the F-statistic is always sufficiently large. Winning the first lottery increases the probability to complete medicine by 41 percentage points for men and by 37 percentage points for women, while the probability to complete dentistry rises by 43 percentage points for men and women. Winning the first lottery raises the likelihood to complete veterinary medicine by 49 percentage points for men and by 54 percentage points for women, whereas male and female winners of the first lottery are 47 and 53 percentage points, respectively, more likely to complete international business. Taken together, this means that the outcome of the first admission lottery strongly influences the academic career of lottery applicants.

The second lines in each panel in Table 3 show that redefining the treatment variable as enrollment instead of completion increases the first-stage estimates somewhat, from 0.44 for women participating in the lottery for medicine to 0.74 for men participating in the lottery for international business studies.

Effects on partnership formation and partner choice

Our primary outcome variable is an indicator for having a partner from the lottery study, which equals one in case the applicant has a partner from the lottery study and zero otherwise. This means that the outcome is also equal to zero in case the applicant does not have a partner or does not have a partner with a university degree. To examine whether completion of a lottery study affects partner choice on these (extensive) margins, we also consider the outcomes "having a partner" and "having a partner with a university degree".[9]

Table 4 presents our results. For each outcome the table reports the mean outcome for the losing compliers (control-complier mean; CCM). We see that among the losing compliers between 82% and 89% have a partner at age 35, and between 43% and 52% have a partner with a university degree. The first two rows in each panel report IV estimates of the effect of completion of a lottery study on the probability of having a partner and on the probability to have a partner with a university degree. Men who completed medicine or veterinary medicine are 7 and 9 percentage points more likely to have a partner at age 35, respectively, than men who lost the lottery and ended up in their next-best study. We find no effects for women in these studies and also not for applicants of the other

[6] The balancing tests for the four study programs are reported in Tables A1 to A4 in the appendix.

[7] We cast our discussion in terms of effects of completion of the lottery study. Alternatively, we could cast results in terms of effects of enrollment in the lottery study. As will be discussed below, the first stages for completion and enrollment are quite similar (see Table 3) and therefore, the instrumental variable estimates are also quite similar.

[8] Because we conduct separate analyses for each lottery study, the control variables do not include program fixed effects.

[9] In the working paper version of this paper, we also report effects on fertility and intergenerational effects. We only find a significantly positive effect on fertility of male doctors. For male doctors and female graduates from veterinary medicine and international business studies, we find positive effects on the placement of their children in the highest track in secondary school.

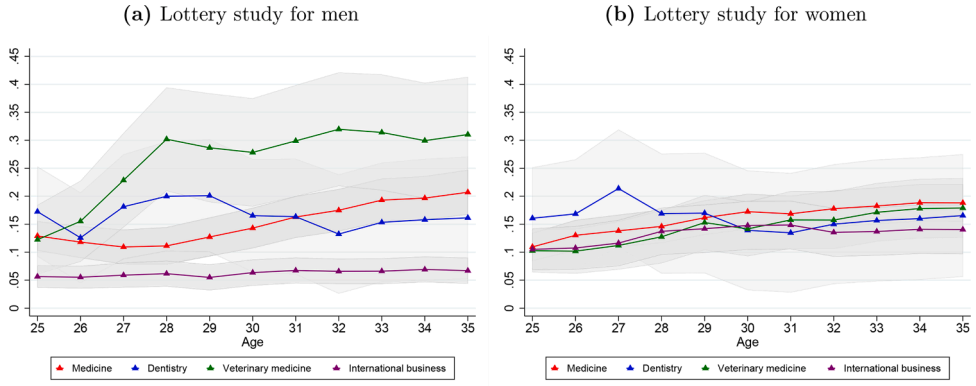

Fig. 2. Instrumental variable estimates at different ages *Notes*: Each point in the graphs is based on a separate regression of equation (1). All specifications include controls for ethnicity, age at the first lottery application, lottery category, year of first lottery, interaction terms of the year of first lottery and lottery category, and dummy variables for the year when the outcome is observed.

lottery studies.[10] Men and women who completed medical school, men who completed veterinary medicine and women who completed international business studies are more likely to have a partner with a university degree than their counterparts who enrolled in other studies.

The third row of each panel reports in columns CCM the shares of losing compliers who have a partner from the lottery field. These shares range from 0.01 to 0.06. This is only slightly higher than would be the case under random matching. Under random matching – keeping the age distribution of partners constant – the shares for men would be 0.033 in medicine, 0.004 in dentistry, 0.004 in veterinary medicine and 0.008 in international business studies. For women these respective shares are 0.020, 0.003, 0.002 and 0.015. That means that those who wanted to study, say, medicine but did not do so because they lost the admission lottery are almost equally likely to have a partner who studied medicine than would occur randomly. We interpret this as evidence that the self-selection effect plays a very minor role. This concurs with the results of Kirkebøen et al. (2021) who also find small differences between homogamy under random matching and the control-complier mean.

The third row in each panel also reports estimates of the effects of completion of a lottery study on the probability to have a partner who also completed this lottery study. For all four studies and for both men and women, these effects are significantly positive and quite substantial. The sizes of the estimated effects range from 7 percentage points for men who completed international business studies, to 31 percentage points for men who completed veterinary medicine. Furthermore, all effects are substantially and significantly larger than the effects for having a partner and having a partner with a university degree. These results indicate the importance of marriage market effects as explanation for assortative mating, i.e. study programs operate as marriage markets.[11]

Above we considered the partner at age 35. We next estimate equation (1) for all ages between 25 and 35 to get more insight in the timing of the matching. At the younger ages, it is most likely that partners met in university instead of at work. Furthermore, we hypothesize that the rate at which individuals find partners at work differs based on the characteristics of the work field. Dentists and veterinarians mostly work in their own practices and are less likely to meet other dentists/veterinarians compared to doctors who work in large hospitals. International business studies is a rather small study program in the much larger business sector. Therefore, graduates of this program are likely to meet individuals from many different studies in their workplace.

The estimation results for different ages are shown in Fig. 2. We see that for both men and women the effect on having a partner from the lottery study is already present at age 25. This suggests that there are marriage market effects in university. For men in medicine and veterinary medicine and women in medicine, veterinary medicine and international business the effects increase with age, which implies that also the workplace may be important, although we cannot rule out that partners already met in university.

6. Conclusion

We have used data from participants in admission lotteries from four university studies in the Netherlands to disentangle the causal effect of access to specific marriage markets from self-selection effects as reason for assortative mating by field of study.

We find that winning compliers have much higher probabilities to have a partner from the lottery study than losing compliers. This is clear evidence that these studies operate as marriage markets. We find very little evidence for self-selection effects; losing compliers are almost equally likely to have a partner from their lottery study as would occur under random matching.

The conclusion that assortative mating by study programs can be mainly attributed to the causal effect of access to specific marriage markets, concurs with the expectations of the students that their study choices will not only affect their career outcomes but also their family outcomes (cf. Wiswall & Zafar, 2021).

CRediT authorship contribution statement

Elisabeth Artmann: Conceptualization, Methodology, Formal analysis, Writing – review & editing, Data curation. **Nadine Ketel:** Conceptualization, Methodology, Investigation, Writing – original draft. **Hessel Oosterbeek:** Conceptualization, Methodology, Investigation, Writing – original draft. **Bas van der Klaauw:** Conceptualization,

[10] Ketel, Leuven, Oosterbeek, & van der Klaauw, 2016, 2019 report substantial financial returns to winning the admission lottery for medicine and dentistry for both males and females. Only for male doctors we find an increased probability of having a partner. So among our student population financial returns is not a very likely channel for finding a partner.

[11] Table A6 in the Appendix reports the effects on the probability to be married (including registered partnership but not cohabitation) at age 35. We find significant positive (negative) effects for male doctors and dentists (female veterinarians), but none for the remaining graduates. There are only small negative (positive) effects on the probability to be divorced by age 35 for female graduates of international business (veterinary medicine). The table also reports estimates of the effects of degree completion on having a spouse (instead of a partner) with a university degree, and a degree from the lottery study. These estimates show the same patterns but are typically somewhat smaller than those in Table 4.

Methodology, Investigation, Writing – original draft, Funding acquisition, Project administration.

Appendix A. Additional tables

Table A1
Balancing of individual characteristics by outcome of the first medicine lottery application .

	Lottery winners	Lottery losers	p-value
Lottery category B			
Female	60.1%	61.1%	0.67
Age at first application	18.0	17.9	0.64
Non-Western immigrant	5.0%	4.1%	0.60
N	1805		
Lottery category C			
Female	62.2%	63.0%	0.43
Age at first application	18.0	18.0	0.18
Non-Western immigrant	4.2%	4.0%	0.50
N	2721		
Lottery category D			
Female	59.0%	59.5%	0.71
Age at first application	18.2	18.2	0.91
Non-Western immigrant	5.5%	5.5%	0.68
N	6069		
Lottery category E			
Female	57.4%	58.8%	0.25
Age at first application	18.4	18.3	0.71
Non-Western immigrant	7.7%	7.5%	0.31
N	6414		
Lottery category F			
Female	56.0%	56.2%	0.77
Age at first application	18.6	18.5	0.02
Non-Western immigrant	10.7%	10.4%	0.32
N	8384		

Notes: The p-values in the final column are weighted by the admittance probabilities for students in different years of lottery application.

Table A2
Balancing of individual characteristics by outcome of the first dentistry lottery application .

	Lottery winners	Lottery losers	p-value
Lottery categories B & C			
Female	59.0%	55.6%	0.60
Age at first application	18.1	17.9	0.18
Non-Western immigrant	7.0%	6.7%	0.59
N	162		
Lottery category D			
Female	56.5%	54.9%	0.62
Age at first application	18.2	18.2	0.38
Non-Western immigrant	8.4%	7.2%	0.53
N	344		
Lottery category E			
Female	50.0%	49.0%	0.71
Age at first application	18.5	18.5	0.10
Non-Western immigrant	8.1%	6.6%	0.28
N	522		
Lottery category F			
Female	44.2%	50.4%	0.12
Age at first application	18.8	18.7	0.23
Non-Western immigrant	9.1%	12.1%	0.12
N	893		

Notes: The p-values in the final column are weighted by the admittance probabilities for students in different years of lottery application.

Table A3
Balancing of individual characteristics by outcome of the first veterinary medicine lottery application .

	Lottery winners	Lottery losers	p-value
Lottery category B			
Female	69.9%	71.2%	0.91
Age at first application	17.9	17.8	0.27
N	139		
Lottery category C			
Female	65.8%	67.4%	0.77
Age at first application	18.1	18.0	0.09
N	307		
Lottery category D			
Female	61.8%	70.2%	0.03
Age at first application	18.2	18.3	0.08
Non-Western immigrant	1.2%	1.4%	0.98
N	839		
Lottery category E			
Female	69.4%	64.9%	0.16
Age at first application	18.5	18.4	0.49
Non-Western immigrant	3.7%	1.9%	0.08
N	1116		
Lottery category F			
Female	65.6%	65.9%	0.66
Age at first application	18.7	18.7	0.79
Non-Western immigrant	3.4%	1.8%	0.12
N	1508		

Notes: The p-values in the final column are weighted by the admittance probabilities for students in different years of lottery application. In compliance with the data privacy regulations of Statistics Netherlands, we do not report the numbers of non-western immigrants in categories B and C as they are too small.

Table A4
Balancing of individual characteristics by outcome of the first international business lottery application .

	Lottery winners	Lottery losers	p-value
Lottery categories B & C			
Female	37.7%	37.3%	0.61
Age at first application	18.1	18.1	0.50
Non-Western immigrant	4.4%	2.5%	0.16
N	860		
Lottery category D			
Female	32.9%	34.0%	0.70
Age at first application	18.3	18.4	0.22
Non-Western immigrant	3.7%	2.6%	0.74
N	1765		
Lottery category E			
Female	31.5%	28.9%	0.20
Age at first application	18.6	18.6	0.60
Non-Western immigrant	5.6%	3.3%	0.02
N	2183		
Lottery category F			
Female	28.4%	29.3%	0.58
Age at first application	18.7	18.7	0.55
Non-Western immigrant	6.1%	5.3%	0.60
N	3172		

Notes: The p-values in the final column are weighted by the admittance probabilities for students in different years of lottery application.

Table A5
Most popular study fields of lottery losers enrolling in other programs .

Men		Women	
	I. Medicine		
Health	23.0%	Health	31.2%
Science, Mathematics, Informatics	19.5%	Social sciences	16.6%
Business	13.6%	Science, Mathematics, Informatics	13.8%
Engineering, Manufacturing, Construction	9.9%	Business	8.3%
Law	9.2%	Education	7.9%
	II. Dentistry		
Health	27.6%	Health	34.7%
Business	19.8%	Science, Mathematics, Informatics	12.0%
Engineering, Manufacturing, Construction	13.8%	Law	10.7%
Science, Mathematics, Informatics	11.6%	Business	10.4%
Law	7.2%	Social sciences	8.5%
	III. Veterinary medicine		
Agriculture, Veterinary	23.2%	Science, Mathematics, Informatics	21.3%
Science, Mathematics, Informatics	22.0%	Health	19.7%
Health	12.2%	Agriculture, Veterinary	18.9%
Engineering, Manufacturing, Construction	12.2%	Education	7.8%
Business	9.3%	Social sciences	7.1%
	IV. International business		
Economics	34.7%	Business	33.0%
Business	32.9%	Economics	26.1%
Law	10.1%	Law	14.0%
Social sciences	4.1%	Social sciences	7.5%
Engineering, Manufacturing, Construction	3.2%	Humanities, Arts, Journalism	5.7%

Table A6
Instrumental variables estimates of the effects of degree completion on marital status and choice of spouse .

	Men			Women		
	CCM	$\widehat{\delta}$	s.e.	CCM	$\widehat{\delta}$	s.e.
I. Medicine						
Married	0.47	0.13***	(0.03)	0.55	0.002	(0.02)
Spouse university degree	0.31	0.12***	(0.03)	0.35	0.03	(0.02)
Spouse medical degree	0.04	0.14***	(0.02)	0.03	0.13***	(0.01)
Divorced	0.02	0.01	(0.01)	0.03	-0.0002	(0.01)
II. Dentistry						
Married	0.44	0.15*	(0.08)	0.59	-0.04	(0.08)
Spouse university degree	0.38	-0.01	(0.08)	0.34	-0.04	(0.08)
Spouse dentistry degree	0.02	0.12**	(0.05)	0.01	0.09*	(0.05)
Divorced	0.02	0.02	(0.02)	0.02	0.004	(0.02)
III. Veterinary medicine						
Married	0.50	0.03	(0.07)	0.52	-0.10**	(0.04)
Spouse university degree	0.31	0.03	(0.07)	0.30	-0.02	(0.04)
Spouse veterinary medicine degree	0.02	0.20***	(0.04)	0.0002	0.11***	(0.02)
Divorced	0.01	0.003	(0.02)	0.02	0.03*	(0.01)
IV. International business						
Married	0.52	0.03	(0.03)	0.59	-0.01	(0.04)
Spouse university degree	0.27	0.06**	(0.03)	0.37	0.07	(0.04)
Spouse international business degree	0.01	0.04***	(0.01)	-0.01	0.11***	(0.02)
Divorced	0.05	-0.02	(0.01)	0.05	-0.03*	(0.01)

Notes: All specifications include controls for ethnicity, age at the first lottery application, lottery category, year of first lottery, interaction terms of the year of first lottery and lottery category, and dummy variables for the year when the outcome is observed. CCM stands for control-complier mean. Levels of statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$

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