Gender, Competition and Choices in Higher Education

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ABSTRACT

We examine the choices of male and female students in higher education in a competitive environment. Undergraduate students at a selective French university compete for spots in foreign universities where they will fulfill their mandatory international exchange program requirements. Holding fixed the field of study and accounting for individuals' underlying academic ability, we find that average- and high-ability female students systematically request universities that are worse than their academic standing. We find some evidence that risk-aversion explains part of female students' behavior. The female students with high academic ability shy away from asking for top universities because of the competitive nature of the assignment process. Using simple simulations, we consider the impact of other allocation rules on students' assignments for the international exchange year. We find that both male and female students would be better off on average if female students asked for better-ranked schools. We discuss how students' choices in higher education are likely to affect their career opportunities and future earnings.

Keywords: higher education, competition, gender, educational choices

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1. Introduction

During their college years, students benefit from unique opportunities to explore their academic interests. Yet, higher education is a competitive environment: students compete to get into top academic programs, to benefit from better labor market opportunities. The literature suggests that competitive environments favor men over women (cf. Croson and Gneezy 2009). Men choose more often to enter a competitive setting (such as a tournament) compared to women (Gupta et al. 2005; Niederle and Vesterlund 2007), and tend to exert more effort and perform better in competitive environments (Gneezy et al. 2003; Gneezy and Rustichini 2004).

In this paper, we explore the extent to which a competitive higher educational environment influences male and female students' academic choices. We study the choices of undergraduate students at Sciences Po, an elite public university in France. Sciences Po students are required to spend their third year away from the university, either studying at one of nearly 400 participating foreign institutions or completing an internship. To participate in the exchange, students submit a ranked list of six universities that they would like to attend. Students compete for the limited number of seats offered by each university. Program administrators assign students to universities, giving priority to students' first choices. The allocation mechanism used by Sciences Po is similar to the "Boston" mechanism studied previously in the context of school choice for children, known to generate strategic behaviors from participants (e.g. Ergin and Sönmez 2006; Pathak and Sönmez 2008). In our empirical context, students' requests are likely to reflect their own estimates of the probability that they are assigned to a university of a given rank, itself a function of their assessments of their own and peers' academic abilities.

Holding fixed the field of study, and accounting for individuals' underlying academic ability, we find evidence that male and female college students within the same academic

program make different choices that may lead to disparate future opportunities and labor market outcomes. We identify a statistically and economically significant difference in the way that male and female students vie for academic opportunities. Despite having slightly better course grades on average, we find that female students tend to request lower-ranked placements than their male counterparts. The difference is particularly pronounced among high-achieving students. On average, female students request universities that are worse than their academic standing. Compared to male students, female students refrain from asking for higher ranked schools when there are fewer seats open for exchange students at particular schools. This result suggests that female students are more risk-averse: they ask for higher ranked schools when they anticipate that the risk of not being allocated a slot is lower.

Using simple simulations, we consider the impact of other allocation rules on students' assignments for the international exchange year. We find that male students on average would be better off in terms of school rankings if female students adopted more competitive behavior, because average performing male students would be competing against average-performing female students instead of top-performing female students. Top-performing male students would be worse off, however, since they would start competing against female students with similar academic ability as them. Furthermore, mechanically assigning top-ranked students to better-ranked schools improves female students' placement, since many female students request schools below their potential match in reality.

Our findings contribute to the broader conversation about gender, education, and labor market outcomes by examining students' choices within the constraints of a set educational program. Over the past decades, the educational attainment gap between men and women has narrowed and even reversed in some countries; since the mid-2000s, women have been awarded more undergraduate degrees than men in nearly all OECD countries (Goldin et al. 2006; OECD

2015). However, men and women's labor market outcomes remain substantially different, as the narrowing of the gender pay gap has slowed or even plateaued (Blau and Kahn 2016). Whereas trends in the educational attainment gap and gender differences in labor market outcomes have diverged in recent years, our work suggests a plausible explanation: choices *within* an educational setting may differ between male and female students. Importantly, the choices that we examine do not affect college enrollment or graduation rates and, therefore, would not be captured in educational attainment data.

Our findings therefore add to the existing literature on the persistent gender wage gap. Women may work in lower paying occupations or industries (Groshen 1991; Petersen and Morgan 1995; Bayard et al. 2003; Gupta and Rothstein 2005). Women may expect lower returns to education and therefore make less investment in their own human capital (Mincer and Polachek 1974). Competing demands associated with family responsibilities and maternity may reduce female workers' productivity (Becker 1985; O'Neill 2003; Bertrand et al. 2010).[2] Even when there is little difference in the productivity of men and women, shorter or lower-paid working hours for female workers may explain part of the remaining gender wage gap (Sasser 2005; Goldin 2014). Non-cognitive skill differences can explain part of the wage gap (Mueller and Plug 2006; Fortin 2008; Manning and Swaffield 2008), especially at the top of the wage distribution (Cattan 2014). However, a large gender wage gap remains unexplained even after accounting for workers' non-cognitive skills (Cobb-Clark and Tan 2011).

In this paper, we step back from post-graduation differences in labor market outcomes to examine the choices of male and female students in higher education. Although we study students' choices in a yearlong university program, students' experiences in higher education are

[2] Much of the empirical literature on the gender wage gap has focused on decomposing the disparity in earnings into differences in experience, hours worked, and characteristics of the jobs themselves; unexplained variation is often attributed to discrimination following Oaxaca-Blinder types of decompositions (Blinder 1973; Oaxaca 1973).

likely to affect their academic trajectories, career opportunities and future earnings (Dale and Krueger 2014; Freier et al. 2015; Hoekstra 2009; MacLeod et al. 2015; Zimmerman 2014). The impact of female students' choices on career outcomes may be subtle—a less impressive resume upon graduation or less exposure to cutting-edge teaching and research may reduce a graduate's relative appeal in the labor market. Education is an important driver of employers' perceptions of resume quality (Knouse 1994; Oliphant and Alexander 1982; Thoms et al. 1999), and prestigious college education has been associated with labor market premia (Behrman et al. 1996; Brewer et al. 1999; Monks 2000; Fitzgerald 2000; Zhang 2005; Black and Smith 2004, 2006; Hoekstra 2009). Employers may use education as a signal of individuals' true ability (Spence 1973; Weiss 1995; Altonji and Pierret 2001), and signaling theory may explain, in part, the value-added for labor-market outcomes of more selective schools (Hershbein 2013). Our results suggest that quality signals on graduates' resumes may not be reliable. Some high ability students may appear weaker on the job market than their less-able classmates. An average female student's assignment signals lower than true ability. Noisy signals may explain, in part, the persistent gender wage gap observed right after graduation (Corbett and Hill 2012; Goldin 2014).

Our empirical findings are consistent with extant literature on gender and performance in competitive settings. Finally, much of the evidence on the issue of gender differences in competitive educational environments comes from controlled experiments. For instance, in an experiment conducted on Dutch students, Buser et al. (2014) find that male students tend to be more competitive and choose more prestigious academic tracks compared to female students, despite similar levels of academic performance. Using natural experiments, Ors et al. (2013) and Jurajda and Münich (2011) study gender gap in student performance on the admissions exam for a French *Grande école* and the admission to universities in the Czech Republic, respectively.

Section 2 describes the institutional setting, and Section 3 describes the data. We present our results in Section 4. We show the results of two simulations of alternative assignment mechanisms in Section 5, before discussing our results in Section 6. We conclude in Section 7.

2. The Exchange Program

Undergraduate students at Sciences Po must spend their third academic year away from the university. The majority of students choose to attend a foreign university, facilitated by Sciences Po's formal exchange program with nearly 400 institutions outside of France. Between 2012 and 2015, 81% of students studied abroad during their third year.

Sciences Po's undergraduate programs are located on seven campuses across France.[3] Paris is the largest campus with 880 to 955 students per cohort, and satellite campuses serve 46 to 148 students each depending on the year and campus. The intellectual goal of the satellite campuses is to foster exchange between young Europeans and students from other regions of the world—on average, 51% of the students on the satellite campuses do not have a French citizenship. In general, European students spend their third year abroad in a non-European country that matches the geographic theme of their program, whereas non-European students spend their third year in Europe.

Administrators at Sciences Po encourage students to take advantage of the third-year exchange, enumerating three benefits of the program. First, students can open their academic interests to fields and courses that they cannot study at Sciences Po. Second, students may deepen

[3] Between 2012 and 2015, the Sciences Po campuses are: Paris for general studies, dual degree programs with French partner universities, and the Europe-Africa program; Dijon for the Central and Eastern Europe program; Le Havre for the Europe-Asia program; Menton for the Middle East and Mediterranean program; Nancy for the European Franco-German program; Poitiers for the Europe-Latin America program; and Reims for the Europe-North America program.

their knowledge in fields that they have pursued during their first and second years. Third, students can use the year abroad to master a foreign language.[4]

Foreign exchange placements are determined during students' second year of study. Students finalize their ranked requests for six universities in December, the university's Department of International Affairs and Exchanges (DIAE) assigns the seats in January, and the matches are announced in early February. During their first semester, second-year students invest considerable time in developing strategies around exchange selection. Student applications include their six ranked requests, a two-page motivation letter, a CV, high school and Sciences Po transcripts, and official results of the language tests required by the foreign universities on their list.

Early in the semester, the administration informs students on how the selection process works, through organized meetings and its website. The DIAE assigns students to exchanges slots following a review of the applications. Administrators first consider universities for which there is excess demand, and they give priority to first choices. For example, if three students ask for University Y as their top choice and only one spot is available, then one of those three students will get the spot (and not a student who asked for University Y as a second choice). Within a set of requests, students with the highest grades and the most compelling motivation letters and academic trajectories are assigned first.[5] If the DIAE is unable to assign a student to any of his or her six requests, then administrators and the student settle on a university with remaining seats after all other students have been assigned (less than 1% of students end up in this situation).

The students on the Paris campus are the least constrained in their choices for the international exchange; however, students from the satellite campuses have priority for seats in

[4] Examples of how the exchange program is explained to students are available online from Science Po (http://college.sciences-po.fr/orientations).
[5] http://www.international.sciences-po.fr/sites/default/files/pdf/pages/Charte_affectations_3A.pdf

particular regions. For example, a Paris student wishing to attend a university in China competes against non-Asian students from the Europe-Asia campus who study Chinese.

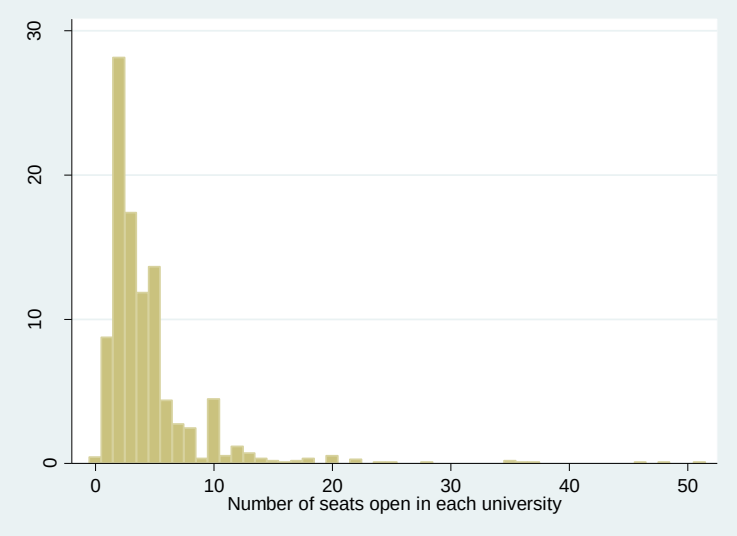
The assignment system resembles a Boston mechanism (Abdulkadiroğlu and Sönmez 2003; Abdulkadiroğlu et al. 2005), designed to maximize the number of first choices that are satisfied. The Boston mechanism is known to generate strategic behaviors from participants (Ergin and Sönmez 2006; Pathak and Sönmez 2008). In this empirical setting, students can be strategic by not requesting their true top choices, given their academic position relative to their classmates. If students anticipate being denied their top choice—because of a lack of confidence about their academic standing and/or because they believe that their top choice is highly demanded—they may request a university that is worse ranked than their true preference. Other students may pursue a riskier strategy, requesting a top-ranked university even if their academic standing is relatively low, particularly if they anticipate an excess supply of seats at a better-ranked university. Attitudes towards competition, risk and confidence of academic standing are therefore likely to play a role in students' stated choices.

Strategies appear to differ across students. If students are maximizing their academic outcome, then students may request better schools first. On the other hand, in order to signal a strong preference for a particular school, students may request better-ranked schools after a worse-ranked first choice. Many students order their requests by school rank; roughly 65% of students request a better-ranked university for Choice 1 than for Choice 2, with no significant difference between how male and female students order their requests by school rank.[6] On average, female students get their first choice more often than male students; the average choice realized by female and male students is 1.5 and 1.7, respectively ($p = 0.05$).

[6] This percentage takes into account students who asked for a university ranked by QS as a first choice.

To guide students' requests, the DIAE provide students with information about the program each year. Exchange universities offer a limited number of seats to Sciences Po students, and students have access to detailed information about the supply of seats in the previous year. Although the number of available seats may change slightly from year to year, students have a rough estimate of the number of seats that are available for each university. On average, there are 4.4 seats open per university. The university with the largest number of seats open had 51 seats open (Figure 1). Students may also schedule appointments with DIAE staff to answer questions about the destinations that tend to have excess demand or excess supply.[7]

Figure 1. Number of seats open in each university



Students have imperfect information about their relative academic standing in their cohort, as no official ranking of students is published. Students on each campus obtain an absolute grade out of 20 points in each course. For each course, they know whether their grade is

[7] Details of Science Po's grading system are available online:
http://www.international.sciences-po.fr/sites/default/files/pdf/pages/Charte_affectations_3A.pdf

in the top 10% of the class, the following 25%, the following 30%, the following 25% or the bottom 10%. Students are ranked by campus, making it hard for students to compare their academic standing across campuses.

Students on the satellite campuses know each other very well, as the cohorts are small, and have a good idea of their classmates' choices for the exchange program. The Paris campus is substantially larger than the satellite campuses, making it impossible for students to know all of their classmates' choices for the exchange program. In first-year, students take all of their courses with their "triplet"—a small subset of students from the larger cohort. Although peers in a triplet may stay in academic or social contact after the first year, they are no longer required to take the same courses or programs.

3. Data

Our data was acquired from Sciences Po administrators. The student data include information on gender, citizenship, admission procedure (international or other), campus, triplet information (for Paris), first-year grades, foreign languages studied, decision to study abroad, as well as students' ranked choices and final exchange assignment. We also know the number of seats available at each exchange university.

The data include the choices of 4,232 students, 63% of whom study on the Paris campus. Over the three years of study, 3,432 students (81% of the all students) chose to study abroad. Table 1 presents exchange participation rates by campus. Participation varies across campuses; for example, 88% of students on the Latin American campus chose to study abroad, whereas only 45% of students on the African campus chose to participate in the exchange. This variation largely reflects differences in the availability of exchange seats in certain regions. Table 1 also

describes students' gender and citizenship by campus. Overall, 57% of Sciences Po students are women.

Table 1. Student body, differences by campus, in percentage

Campus	Choice for 3rd year		Sex		Citizenship	
	Internship or project	Study abroad	Male	Female	Only French	Foreign
Africa	54.88	45.12	30.49	69.51	39.02	60.98
Asia	16.53	83.47	41.10	58.90	48.73	51.27
Eastern Europe	14.61	85.39	35.39	64.61	40.45	59.55
Germany	16.10	83.90	40.25	59.75	42.72	57.28
Latin America	11.98	88.02	36.78	63.22	39.26	60.74
Mediterranean	29.35	70.65	43.28	56.72	26.87	73.13
North America	20.32	79.68	40.63	59.37	49.52	50.48
Paris	18.31	81.69	45.84	54.16	89.38	10.62
Total	18.90	81.10	43.38	56.62	71.72	28.28

Note: French citizens who have dual citizenship are counted as foreign students.

Although there is an excess supply of exchange positions overall, there is more competition for seats in certain regions.[8] Table 2 summarizes the students' first requests by region, and Table 3 summarizes the languages studied, by student gender. Universities in English-speaking countries are among the most requested, particularly by male students. Approximately 25% and 20% of male and female students, respectively, ranked a university in the United States as their first choice. The high level of competition for US universities may discourage female students if they anticipate having only a small chance of obtaining that first choice.

[8] In 2012 there were 1,575 seats open for 1,115 students studying abroad; in 2013 there were 1,707 seats open for 1,187 students; and in 2014 there were 1,725 seats open for 1,130 students.

Table 2: Percentage of choices ranked 1st for third year abroad in terms of geographic area

Geographic area	Male students	Female students	χ^2 test of indep. (*p* value)
Africa	1.63%	1.66%	0.946
Australia and New Zealand	5.69%	6.54%	0.319
Canada	8.67%	8.15%	0.566
Eastern Asia	9.21%	9.91%	0.512
Eastern Europe	3.66%	2.85%	0.181
UK and Ireland	12.87%	13.75%	0.477
Latin America	7.59%	10.74%	0.002***
Middle East	6.64%	5.66%	0.226
Northern Europe	2.78%	2.54%	0.661
South Asia	1.42%	1.92%	0.272
Southeast Asia	2.91%	3.32%	0.509
Southern Europe	3.39%	3.94%	0.404
USA	25.47%	20.50%	0.000***
Western Europe	8.06%	8.51%	0.390

Note: Pearson χ^2 (13) = 25.91, p-value = 0.017.

Table 3: Languages studied during first year, by student gender

Language	Male students	Female students	χ^2 test of indep. (*p* value)
English	88.29%	88.44%	0.894
Spanish	39.03%	43.22%	0.014**
German	29.54%	27.80%	0.263
French	9.56%	10.43%	0.398
Arabic	8.14%	6.78%	0.131
Portuguese	5.92%	7.40%	0.088*
Chinese	5.11%	5.14%	0.974
Italian	4.37%	6.01%	0.034**
Russian	3.23%	4.11%	0.177
Korean	0.07%	0.51%	0.022**
Czech	0.54%	0.82%	0.323
Polish	0.94%	0.62%	0.276
Other	0.93%	1.79%	0.018**
Total	*195.67%*	*203.07%*	

Note: Total exceeds 100% because students generally study two languages.

More than 10% of female students rank a Latin American university as their top choice, significantly more than their male peers (7.59%). This difference may reflect the large share of

female students on the Latin American campus. Moreover, a significantly larger share of female students studies Spanish or Portuguese during their first year at Sciences Po. There is no statistical difference in the choice of male and female students for universities in other geographic areas.

3.1. University Rankings

To assess the competitiveness of students' choices, we matched the exchange universities to the QS World University Rankings for Social Sciences and Management which assigns ranks to the top 400 universities in the world. University rankings—for example, the QS World University Rankings, Times Higher Education ranking and Shanghai Academic Ranking of World Universities—tend to be highly correlated (Aguillo et al. 2010); however, the QS ranking covers more universities and matches Sciences Po's academic fields.[9] Since students make their choices in the year prior to their exchange, we use the previous year's rank of the partner university. After matching universities with their QS rank, we re-ranked the schools to eliminate gaps and assigned the worst rank to all unranked universities (i.e. rank 198 in 2012, 210 in 2013, and 218 in 2014).

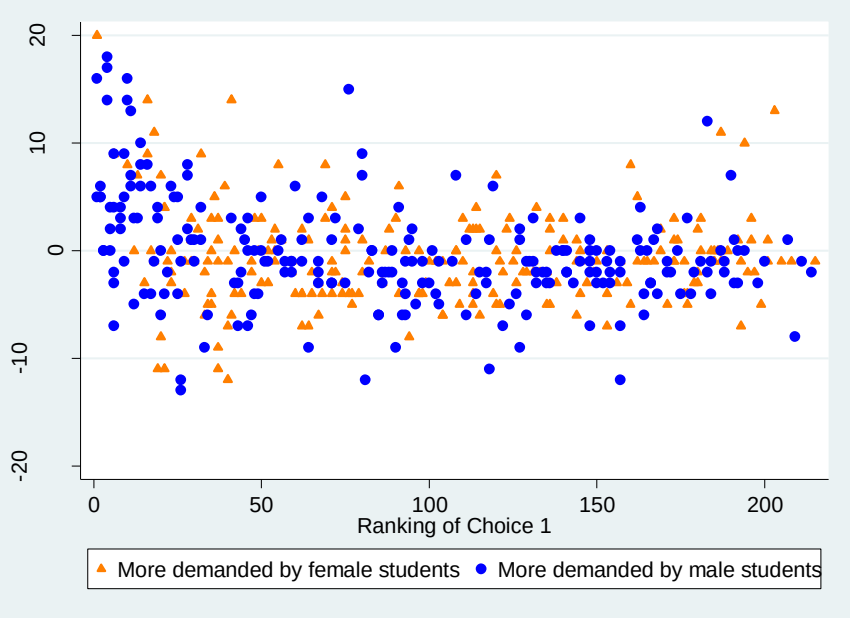
Table 4 summarizes the rank of the universities chosen by male and female students, by the order of their request. On average, female students request worse ranked schools. For example, the average university chosen first by female students has a rank of 102.4, compared to 94.7 for male students ($p < 0.01$). Female students also tend to ask for worse ranked universities for their second and fourth choices ($p < 0.01$)

[9] The QS Rankings assign individual universities to ranks between 1 and 400. In contrast, the Shanghai Rankings assign individual universities to ranks from 1 to 100, then assign universities to broad, 50-place categories (e.g. rank 101-150, 151-200); and the Times Higher Education Rankings assign individual universities to ranks from 1 to 200, then assign universities to 25-place categories (e.g rank 101-125, 126-150).

Table 4: Ranking of universities requested by choice number, by student gender

	Female Students		Male Students		t-test of difference
Choice	Mean	Std. Dev.	Mean	Std. Dev.	*p*-value
1	102.4	79.0	94.7	78.7	0.005***
2	117.6	76.2	108.0	75.6	0.000***
3	125.9	73.5	122.6	72.8	0.196
4	136.6	70.2	126.8	71.5	0.000***
5	136.6	68.2	133.0	69.1	0.135
6	143.6	65.7	141.2	66.4	0.285

Figure 2: Excess demand by university ranking and student gender, all ranked universities



Note: Each observation represents the difference between the number of times a university is requested as a 1st choice and the number of seats open for that university. A positive number shows that more students requested the university as a 1st choice than there were seats available. An observation is marked with a blue circle (orange triangle) if the share of male (female) students requesting this university is greater than the share of male (female) students at Sciences Po.

Figure 2 plots the excess demand for exchange universities (calculated as the difference between the number of the students who requested a university as their top choice and the number of available seats for that university) against university rankings. Universities that

received relatively more requests from male students are represented by blue circles (orange triangles for female students). Excess demand is only weakly correlated with university rankings—some top universities even have an excess supply of seats. However, the excess demand for seats at better-ranked universities (i.e. rank 1 to 25) appears to be driven by male students' requests.

3.2. Student grades and choices

Do female students ask for lower ranked universities because they have lower academic records than male students? On average, female students tend to have higher grades than male students. Figure 3, which depicts the distribution of 1st year grades (scores are out of 20 points) by student gender, shows a statistically significant difference between male and female students' grades (t and k-s tests: $p = 0.001$).

Figure 3: Distribution of 1st year grades, by student gender

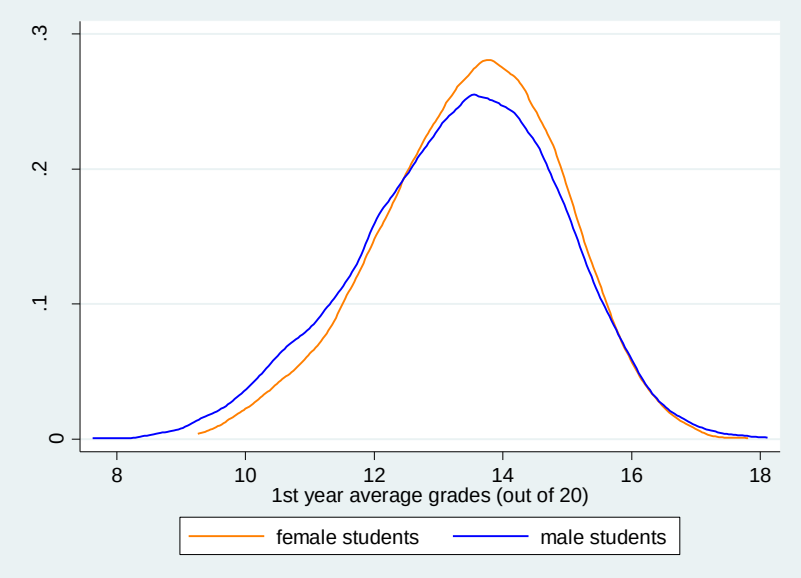
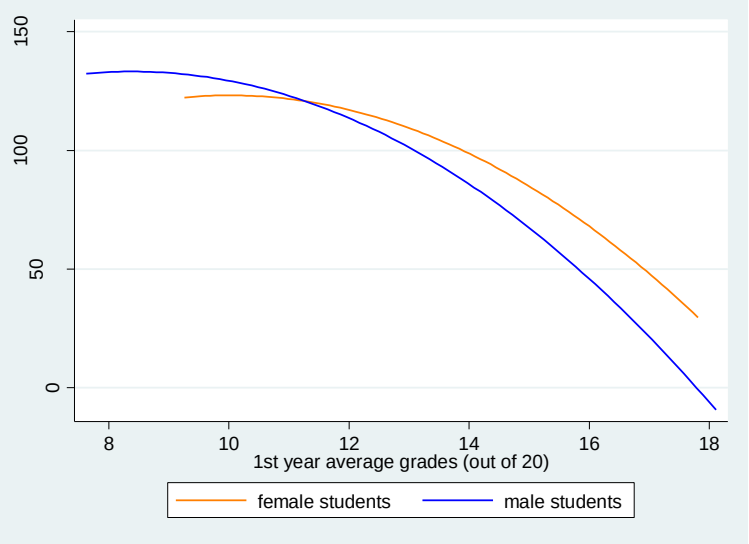


Figure 4 plots the rank of the exchange school to which students are assigned as a quadratic function of the student's grade. The figure suggests that female students are actually asking for lower ranked universities for a given grade level compared to male students. Female students with high first-year average grades ask for especially lower ranked universities compared to male students with similar grades. Only female students with lower grades tend to ask for slightly better ranked schools than male students with similar low grades.

Figure 4: Quadratic prediction of relationship between grades and school ranking, by student gender



4. Empirical Analysis

In this section, we begin by analyzing students' choices to study abroad versus complete an internship. We then focus on students participating in the exchange year to study differences in the requests of male and female students.

4.1 Exchange versus Internship

Conditioning on grades, we first ask: are women more likely to choose internships or to study abroad, compared to male students? A probit analysis does not suggest that there are any gender differences in the choice to study abroad. Overall, students with lower 1st year grades are the ones who are more likely to choose an internship for their year abroad (Table 5).

Table 5: Probit analysis of choice to study abroad

Dependent Variable:	Choice to study abroad			
	(1)	(2)	(3)	(4)
Female student	-0.059	-0.055	-0.056	-0.063
	(0.045)	(0.045)	(0.046)	(0.052)
Average 1st year grade	0.226***	0.231***	0.222***	0.226***
	(0.037)	(0.037)	(0.047)	(0.046)
Female × Average 1st year grade			0.007	0.011
			(0.033)	(0.033)
International student		0.349***		0.319***
		(0.108)		(0.122)
Female × International student				0.052
				(0.124)
Constant	0.579***	0.576***	0.578***	0.575***
	(0.149)	(0.149)	(0.149)	(0.148)
Fixed Effects				
Campus	Y	Y	Y	Y
Year Abroad	Y	Y	Y	Y
Observations	4,227	4,227	4,227	4,227
R^2	0.124	0.129	0.124	0.129

*Note: Average grade is demeaned with respect to its sample mean before it is interacted with the indicator for female students. Standard errors, adjusted for clustering at the triplet level (Paris) or campus (satellite) level, are reported in parentheses. *** indicates statistical significance at the 1% level.*

Students who studied abroad in high school (the 'international' students) are also more likely to study abroad than to opt for an internship (although adding this explanatory variable does not increase the R^2 much, see columns (2) and (4)). The relatively low R^2 suggests that other

unobservable characteristics and individual preferences of students are likely to be determinants of their choices to study abroad. Finally, the results on the campus fixed effects confirm differences by campus. Students of the African and Mediterranean campuses in particular are less likely to choose to study abroad.

4.2. Determinants of students' choices of universities

We now analyze gender differences in students' choices for universities. Our regression results suggest that female students tend to ask for lower ranked universities, while students with higher 1st year grades are more likely to ask for better ranked universities as a first choice. Depending on the control variables, female students tend to place as a first choice universities that are ranked on average 9.2 to 12.7 ranks lower than male students. The interaction terms in columns (3) and (4) of Table 6 suggest that female students with higher grades tend to ask for lower ranked universities compared to male students with higher grades (4.5-4.6 ranks lower when students are high performers). However, this effect is mainly driven by differences in rankings by country in which students make requests. When we use fixed effects for countries placed as a 1st choice[10], we still find that female students ask for lower ranked schools than male students (on average, 10.6 ranks lower), but the interaction term between being a female students and average 1st year grades becomes statistically insignificant.

We also find that female international students are more ambitious in their choices than female students who completed their high school in France (on the satellite campuses, given that there are no international students on the main campus in Paris). Female international students tend to make choices that are as ambitious as male students. However, the campus fixed effects

[10] We include these country fixed effects to take into account the fact that different countries perform differently in world college rankings: universities in English-speaking countries in particular tend to be over-represented in these rankings.

tend to suggest that French students on the Paris campus asked for better ranked universities on average.

Table 6: OLS Regression Analysis of Students' First Choices

Dependent Variable:	Rank of First-Choice University				
	(1)	(2)	(3)	(4)	(5)
Female student	9.472***	9.235***	8.850***	12.748***	10.673***
	(2.570)	(2.540)	(2.651)	(2.970)	(2.379)
Average 1st year grade	-13.083***	-13.676***	-15.417***	-16.138***	-10.880***
	(0.957)	(0.979)	(1.168)	(1.141)	(0.852)
Female × Average 1st year grade			4.512***	4.632***	1.623
			(1.684)	(1.698)	(1.278)
International student		-39.323***		-29.325***	-9.046**
		(5.701)		(5.529)	(4.088)
Female × International student				-16.071***	-9.526***
				(4.320)	(3.113)
Constant	100.492***	128.232***	100.558***	127.023***	128.741***
	(11.254)	(10.241)	(11.331)	(10.318)	(7.321)
Fixed Effects					
Campus	Y	Y	Y	Y	Y
Year Abroad	Y	Y	Y	Y	Y
Country of Choice 1	N	N	N	N	Y
N	3,401	3,401	3,401	3,401	3,401
R^2	0.104	0.122	0.105	0.125	0.534

*Note: Average grade is demeaned with respect to its sample mean before it is interacted with the indicator for female students. Standard errors, adjusted for clustering at the triplet level (Paris) or campus (satellite) level, are reported in parentheses. ** and *** indicate statistical significance at the 5% and 1% levels, respectively.*

Table 7: OLS Regression Analysis of Students' Second Choices

Dependent Variable:	Rank of Second-Choice University				
	(1)	(2)	(3)	(4)	(5)
Female student	11.041***	10.809***	10.460***	12.051***	10.900***
	(2.716)	(2.727)	(2.724)	(3.113)	(2.452)
Average 1st year grade	-9.738***	-10.195***	-12.039***	-12.486***	-9.707***
	(0.986)	(0.976)	(1.272)	(1.243)	(1.194)
Female × Average 1st year grade			4.412***	4.353***	2.807**
			(1.673)	(1.669)	(1.399)
International student		-29.505***		-24.923***	-7.911
		(6.242)		(6.766)	(5.081)
Female × International student				-7.069	-1.794
				(6.185)	(3.872)
Constant	118.010***	138.866***	118.084***	138.238***	158.466***
	(18.722)	(17.987)	(18.803)	(18.127)	(10.626)
Fixed Effects					
Campus	Y	Y	Y	Y	Y
Year Abroad	Y	Y	Y	Y	Y
Country of Choice 2	N	N	N	N	Y
N	3,377	3,377	3,377	3,377	3,377
R^2	0.080	0.091	0.081	0.093	0.457

*Note: Average grade is demeaned with respect to its sample mean before it is interacted with the indicator for female students. Standard errors, adjusted for clustering at the triplet level (Paris) or campus (satellite) level, are reported in parentheses. ** and *** indicate statistical significance at the 5% and 1% levels, respectively.*

We find similar results regarding students' 2nd choices (Table 7): female students tend to place lower-ranked universities compared to male students (approximately 10 ranks lower). Female students with high first year grades tend to ask on average for universities approximately 3 to 4 ranks lower than male students. Regarding 2nd choices, international female students tend to request lower ranked schools compared to male international students. The gender differences in students' ambition regarding university ranking starts to taper-off for the universities ranked as third choices (Table 8).

Table 8: OLS Regression Analysis of Students' Third Choices

Dependent Variable:	Rank of Third-Choice University				
	(1)	(2)	(3)	(4)	(5)
Female student	4.420*	4.262*	4.137	5.615*	5.247**
	(2.630)	(2.559)	(2.669)	(2.845)	(2.270)
Average 1st year grade	-6.627***	-7.049***	-7.779***	-8.179***	-4.575***
	(0.923)	(0.942)	(1.185)	(1.168)	(1.036)
Female × Average 1st year grade			2.228	2.143	-0.433
			(1.602)	(1.548)	(1.200)
International student		-28.434***		-24.461***	-2.902
		(4.700)		(5.780)	(3.840)
Female × International student				-6.355	-5.453
				(5.778)	(4.904)
Constant	123.556***	143.583***	123.583***	143.105***	162.840***
	(5.277)	(7.559)	(5.242)	(7.504)	(10.029)
Fixed Effects					
Campus	Y	Y	Y	Y	Y
Year Abroad	Y	Y	Y	Y	Y
Country of Choice 3					Y
N	3,366	3,366	3,366	3,366	3,366
R^2	0.049	0.061	0.050	0.061	0.430

*Note: Average grade is demeaned with respect to its sample mean before it is interacted with the indicator for female students. Standard errors, adjusted for clustering at the triplet level (Paris) or campus (satellite) level, are reported in parentheses. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.*

4.3. Choices as a function of the number of seats available

Students' choices as a function of seats available at each university are likely to reveal tastes for risk-taking or competition. For instance, if female students are less competitive or more risk-averse as the literature suggests, then they will be likely to ask more often for better ranked universities when a larger number of seats are open. We find that all students tend to place better ranked schools as a 1st choice when there are more seats open for these schools. However, we find that female students are more likely to ask for better ranked schools when there are more seats open (Table 9).

Table 9: OLS Regression Analysis of Students' First Choices, Controlling for the Number of Seats Open

Dependent Variable:	Rank of First-Choice University				
	(1)	(2)	(3)	(4)	(5)
Female student	5.334**	11.028***	5.257**	14.232***	13.652***
	(2.439)	(3.379)	(2.400)	(3.616)	(2.921)
Average 1st year grade	-13.792***	-13.939***	-14.124***	-14.582***	-10.541***
	(0.991)	(0.993)	(0.991)	(0.968)	(0.737)
Female × Average 1st year grade	4.121***	4.383***	3.747**	4.505***	1.616
	(1.548)	(1.544)	(1.544)	(1.578)	(1.172)
International student			-33.429***	-24.876***	-7.002*
			(4.780)	(4.750)	(3.888)
Female × International student				-13.866***	-10.086***
				(3.980)	(2.959)
Seats open	-3.073***	-2.791***	-3.032***	-2.759***	-2.086***
	(0.103)	(0.120)	(0.096)	(0.115)	(0.089)
Female × Seats open		-0.566***		-0.544***	-0.467***
		(0.143)		(0.141)	(0.112)
Constant	127.620***	124.953***	150.807***	147.180***	132.002***
	(3.969)	(4.162)	(5.932)	(6.133)	(10.240)
Fixed Effects					
Campus	Y	Y	Y	Y	Y
Year Abroad	Y	Y	Y	Y	Y
Country of Choice 3					Y
N	3,388	3,388	3,388	3,388	3,388
R^2	0.283	0.284	0.296	0.299	0.616

*Note: Average grade is demeaned with respect to its sample mean before it is interacted with the indicator for female students. Standard errors, adjusted for clustering at the triplet level (Paris) or campus (satellite) level, are reported in parentheses. ** and *** indicate statistical significance at the 5% and 1% levels, respectively.*

4.4. Robustness checks

A potential bias in our analysis comes from the fact that approximately half of the universities are not ranked by QS and that many countries have few if any ranked universities (20% of the ranked universities are in the US and 13% are in the UK). We therefore run two robustness checks of our results.

Table 10: OLS Regression Analysis of Students' First Choices, Unique Rank

Dependent Variable:	Unique Rank of First-Choice University				
	(1)	(2)	(3)	(4)	(5)
Female student	13.760***	13.455***	12.751***	17.169***	14.538***
	(3.794)	(3.756)	(3.937)	(4.339)	(3.368)
Average 1st year grade	-16.123***	-16.890***	-19.912***	-20.786***	-14.191***
	(1.305)	(1.331)	(1.650)	(1.592)	(1.114)
Female × Average 1st year grade			7.325***	7.391***	3.457*
			(2.473)	(2.503)	(1.871)
International student		-50.886***		-39.308***	-12.970**
		(8.402)		(8.504)	(6.212)
Female × International student				-18.321***	-11.011**
				(6.939)	(4.518)
Constant	128.420***	164.317***	128.527***	162.843***	138.257***
	(15.587)	(14.459)	(15.706)	(14.529)	(9.942)
Fixed Effects					
Campus	Y	Y	Y	Y	Y
Year Abroad	Y	Y	Y	Y	Y
Country of Choice 3					Y
N	3,401	3,401	3,401	3,401	3,401
R^2	0.083	0.099	0.086	0.102	0.532

*Note: Average grade is demeaned with respect to its sample mean before it is interacted with the indicator for female students. Standard errors, adjusted for clustering at the triplet level (Paris) or campus (satellite) level, are reported in parentheses. ** and *** indicate statistical significance at the 5% and 1% levels, respectively.*

We first analyze the ranking of universities when we attribute a random ranking to universities that are not included in the QS official ranking (instead of assigning the lowest rank+1 for all unranked universities). Our results suggest that our first estimates may be underestimating the extent to which female students actually ask for lower ranked universities (Table 10).

We then run OLS regressions on US universities only, since university rankings generally include more US universities[11]. In Table 11, we present the results of OLS regression analyses in which we study the gender differences in the ranking of first choices, including only students

[11] 43 US universities were ranked out of the 71 US universities with seats open in 2012, 48 out of 76 in 2013, and 47 out of 75 in 2014.

who asked for an American university as a first choice. The fact that female students (both French and international backgrounds) ask for lower ranked universities appears to be particularly significant when they compete for seats in the more competitive US universities.

Table 11: OLS Regression Analysis of Students' First Choices, US universities only

Dependent Variable:	Rank of First-Choice University			
	(1)	(2)	(3)	(4)
Female student	20.030***	20.057***	19.974***	20.950***
	(4.654)	(4.655)	(4.611)	(5.382)
Average 1st year grade	-21.861***	-21.947***	-19.926***	-20.094***
	(1.692)	(1.718)	(2.327)	(2.326)
Female × Average 1st year grade			-3.985	-3.926
			(3.235)	(3.253)
International student		-4.862*		-2.764
		(2.722)		(6.085)
Female × International student				-5.065
				(7.790)
Constant	22.410***	26.267***	25.626***	29.793***
	(8.124)	(8.540)	(7.966)	(9.104)
Fixed Effects				
Campus	Y	Y	Y	Y
Year Abroad	Y	Y	Y	Y
N	771	771	771	771
R^2	0.207	0.207	0.208	0.208

*Note: Average grade is demeaned with respect to its sample mean before it is interacted with the indicator for female students. Standard errors, adjusted for clustering at the triplet level (Paris) or campus (satellite) level, are reported in parentheses. * and *** indicate statistical significance at the 10% and 1% levels, respectively.*

Overall, 67.1% of all students get their 1st choice and 18.2% their 2nd choice. By gender, we find that 69.5% of women get their 1st choice vs. 63.9% of men. Our results show that women tend to be assigned their first-choice exchange destination more often because they are requesting lower-ranked schools on average. We find that better students are requesting better schools, but even high-performing women are not asking for as highly rated schools as their male academic

peers. These results are consistent with women avoiding competition, being more risk-averse and/or underestimating their own (relative) ability.

5. Simulations

In this section, we run simulations to model what would have happened to outcomes of both male and female students had female students been allocated to universities following different assignment mechanisms. Would other allocation mechanisms enable female students to obtain better ranked universities? We try two simulations. First, we study what would happen if women requested better-ranked schools as their top choice. Second, we study what would happen if the university assigned students mechanically by grades.

5.1. Simulation 1: assigning better ranked 1st choices for female students

What would have happened had female students aimed higher for their first choice? How would more ambitious first choices by female students impact the allocation of universities for male students? To answer these questions, we run a simulation in which we look at what would have happened if all the female students had put their first choice as a second choice, and had asked for better ranked schools as a first choice.

We first simulate the existing assignment. When we try to recreate the university's assignment system, we look at requests and assign students' first choices when there is no excess demand. If there is excess demand, we use grades to establish students' priorities. We manage to match about 67% of the allocations in the actual data, including 76% of cases where students get their first choice.

We then assign a random "better" first choice to female students and transform their former first choice into an automatic second choice (and discard what used to be their sixth

choice). When we assign seats this time, we find that the rank of women's first choice is mechanically higher, but the simulation also changes the average assigned school rank (Table 12). The actual school rank improves by roughly 27 ranks for women, when female students choose a random better university. The school rank also improves by roughly 3 ranks for men, because the simulation allocates seats to male students that used to be taken by female students. Indeed, female students who could have asked for top universities (but chose not to) were competing for seats against male students who had lower grades. In simulations in which female students ask for a random better university in the same region or the same country as their former first choice, both male and female students are still better off on average.

Table 12. Simulation: results of assigning better ranked 1st choices to female students

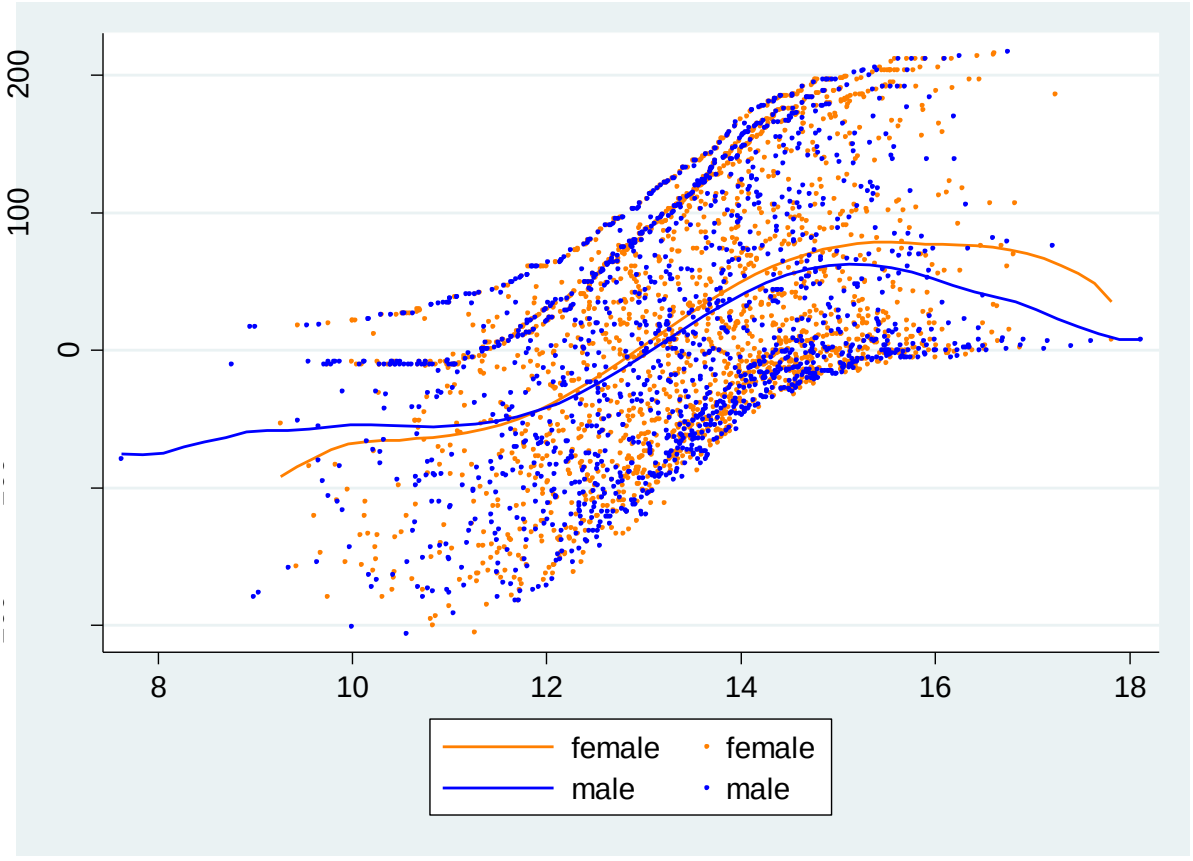
	Average Rank of Choice 1		Average Rank of Allocation		Average Choice Obtained	
Scenario	Female	Male	Female	Male	Female	Male
Panel A. Reality	102.4	94.7	112.9	107.3	1.54	1.72
Panel B. Simulations						
Any Country	52.5	94.7	85.5	104.0	1.59	1.30
Same Region	71.0	94.7	95.8	103.7	1.56	1.30
Same Country	89.9	94.7	106.4	102.5	1.45	1.30

Note: simulation results average results of 500 simulations of random better 1st choices.

5.2. Simulation 2: assigning students according to academic standing only

In a second simulation, we code a mechanical process by which students are assigned only according to their first year grades. In this simulation, both men and women could be made better off, on average, but female students' assignments improve by much more (Figure 5). Female students' assignments improve by roughly 29 ranks on average, whereas male students' assignments improve by roughly 17 ranks on average.

Figure 5. Comparing students' actual assignments with an assignment based only on grades



Note: Each observation shows the difference between the ranking of the school obtained in realty and in the simulation. A positive number here means that reality was worse than simulated allocations. The more positive the number, the worse reality turned out relative to the simulation.

Students with higher first year grades would be much better off being assigned seats according to the simulation, whereas lower-performing male and female students would be worse off. We find that some male students would do better in the simulation because in reality there are unfilled better-ranked spots and because they would not be competing against better performing female students anymore. Female students would do better according to the

simulation, because they are assigned to seats at higher ranked schools that would otherwise go to lower-performing male students.

6. Discussion

Our results show that top female students do not ask for prestigious universities despite the fact that they could obtain spots if they asked for them. The students' gender differences in competitive behavior and attitudes towards risk are consistent with findings from related research (Vandegrift and Brown 2005; Bertrand 2011; Charness and Gneezy 2012). The literature suggests that, on average, women are more risk-averse, less competitive, less confident, and less likely to ask for resources (Babcock and Laschever 2009; Barber and Odean 2001; Buser et al. 2014; Croson and Gneezy 2009; Niederle and Vesterlund 2007). Men tend to be more overconfident and less risk averse than women, including in educational settings (Bengtsson et al. 2005; Reuben et al. 2015). Recent research suggests that differences in overconfidence and risk aversion largely explain the observed differences in competitive behavior (van Veldhuizen 2016). Women, in the context of our research, may be expressing under-confidence, leading to self-censorship. If students' requests reflect their assessment of their own academic ability, then male students appear to overestimate their ability, whereas female students seem to underestimate their own ability. If students' requests reflect their anticipation of competition for seats, then female students' choices seem to reflect a lower risk strategy. Female students may not ask for spots in highly ranked universities, because they may think that they have low chances of obtaining them.

Other behaviors, unrelated to attitudes towards confidence, risk or competition, may also explain our results.[12] Indeed, another explanation, which the psychology literature has extensively studied, relates to the social sanctions that women may face when their actions are perceived to be in opposition with the female stereotypical expectations to "act nice" (Rudman and Glick 2001). Female students may be applying the gender stereotype that they are communal, while men are agentic (Eagly and Steffen 1984). Here, female students may choose to be perceived as more altruistic than male students, letting male students who have similar grades as them get their first choices to conform to societal expectations. Female students may prefer not to distinguish themselves individually from others if they feel that this behavior is incompatible with the prescriptive definition of their gender identity.

Feedback-aversion or a desire to protect self-esteem could also drive women's choices to play safe. Indeed, not getting the top choice could generate a negative self-perception, with which female students may have a harder time coping. Stronger regret-aversion (Zeelenberg et al. 1996) in female students may also be driving their decisions: they may fear regretting having tried to target a better first choice if they do not get it. Loss-aversion (Gächter et al. 2007) may also be driving the female students' safer strategies, especially if women think they have low chances of obtaining their actual preferred choice.

Female students may have different utility functions altogether, and care less about academic prestige. More female students may be using this third year abroad as a unique opportunity to discover a part of the world, which they feel they might not have the chance to explore in the future, especially if they feel that their career opportunities may be constrained compared to those of their fellow male students. In an alternative explanation, female students

[12] Recent research also suggests that gender differences in risk-aversion are small (Nelson 2016).

may care more about cultural experiences, compared to male students. Female students may have different employment perspectives, for which university prestige matters less.

7. Conclusion

The data set does not enable us to understand the reasons behind the gender differences in student behavior, which could generate from gender differences in preferences (such as differences in the weight of university prestige in student utility functions, taste for risk or competition) or cognitive biases (overconfidence). We are extending this research with a survey designed to analyze the students' preferences and subjective expectations.

Our results have broad policy implications for universities. First, our work highlights the potential impact of institutional frameworks on individual student outcomes, and the need for careful administration. Second, to promote students' success in the labor market, universities may wish to reduce mechanisms that foster strategic behavior and obfuscate students' true quality. Third, universities may be able to provide information to improve students' choices in higher education. This research highlights the importance of institutions as choice architects (Thaler et al. 2014).

Whatever the reasons driving female students' lesser ambitious choices, universities should take into account the fact that different groups of students are likely to respond in very different ways to institutional settings. In the case of this university, female students may be missing-out on higher education opportunities and sending lower quality signals on their CVs. Simulations suggest that women (and some men) could place higher if the university assigned students mechanically by grades or if women requested better-ranked schools as their top choice.

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