Ask and You Shall Receive? Gender Difference in Regrades in College

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ASSA Annual Conference, Atlanta, January 4, 2019

Introduction

- Women are less likely than men to negotiate.
  - 57% of male vs 7% of female graduates from professional program negotiated their job offers (Babcock and Laschever, 2003)
  - 23% of men and 2.5% of women asked for a higher payment for study participation (Small et al., 2007)
  - Leibbrandt and List (2014) conduct a field experiment of job advertisements to obser negotiation behaviors among real job applicants, and find
    - when salary not explicitly made negotiable, men still negotiated, but women signals their willingness to accept low offers.
    - when salary is explicitly stated as negotiable, no gender difference is found in negotiation.
- This difference contributes to the gender gap in salaries and career advancement.

Introduction

- Research question: does the gender difference emerge before entering the labor market?
  - Specifically, we examine whether male and female students experience different success rates of grade changes in college.
  - If males are more likely to negotiate, they may be more likely to convince instructors to change their grade upward.
- Why do we care? Employers frequently require transcripts, and many competitive positions require a minimum GPA (Reshwan, 2016)
- Implication: if grades serve as signals to employers, equally capable female students are at a relative disadvantage as a result.

Literature

- Why don't women negotiate more?
  - Women are more likely to be penalized for initiating negotiations (Bowles et al., 2007)
  - Women attain worse returns from negotiation when it is mandatory than when it is optional (Exley et al., 2016).
- Sex of negotiation partners matters
  - Women made more generous offers or demand less when paired with men (Solnick)
  - Women were most likely to reach an agreement when paired with women (Eckel and Grossman, 2001), and less likely to initiate negotiation with men (Bowles et al., 2007)
  - Sutter et al. (2009): bargaining with a partner of the same sex, competition and retaliation intensified.
  - Hernandez-Arenaz and Iriberri (2018) analyze field bargining games from a Spanish TV shows that that women respondents demended lower rewards when negotiated with male proposers, although the opening offers do not vary by sex of the proposers and the respondents.

Data

- CSU is ranked No.129 by U.S. News and World Report in 2016
- Fall 2016 enrollment: 23,768 on campus undergraduate students.
  - CSU – ACT composite: 25.2, SAT critical thinking: 566.5, SAT math: 575.5, female: 56%, minority: 25%
  - National average – ACT composite: 20.8, SAT critical thinking: 494, SAT math: 508, female: 56%, minority: 43%
- Total 1,341,552 records between 2010 and 2016 from 64,857 students taught by 3,726 instructors.
- Grade changes by instructors: 6,225 obs (0.46% of all records).
- Among all grade changes, 5,886 (94.6% of grade changes) are upward corrections.
- Very low downside risk!

Gender Differences

- Women made 53.4% of grade records, but only 49.2% of upward grade changes.
- Conditional on students sex, the rate of upward grade changes initiated by instructors is 0.479 percent (2,991 records) for male students and 0.404 percent (2,895 records) for female students.
- Although grade changes were rare events, the 0.075 percentage points difference represented a 18.6 percent advantage for male students.
- Downward grade change: 339 observations in total. Conditional on student sex, 0.02% women received downward grade changes, and 0.03% men received downward grade changes.

Summary Statistics

	Female	Male	Difference
Grade change	0.00424	0.00509	-0.00085***
	(0.06501)	(0.07119)	(0.00012)
	[716,772]	[624,780]	
Positive grade change	0.00404	0.00479	-0.00075***
	(0.06343)	(0.06904)	(0.00011)
	[716,625]	[624,588]	
Negative grade change	0.00021	0.00031	-0.00010***
	(0.01435)	(0.01757)	(0.00003)
	[713,877]	[621,789]	
Female instructor	0.50026	0.38942	0.11084***
	(0.50000)	(0.48762)	(0.00088)
	[671,276]	[585,026]	
Term GPA	3.14551	2.94470	0.20081***
	(0.72342)	(0.78641)	(0.00130)
	[716,772]	[624,780]	

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses.

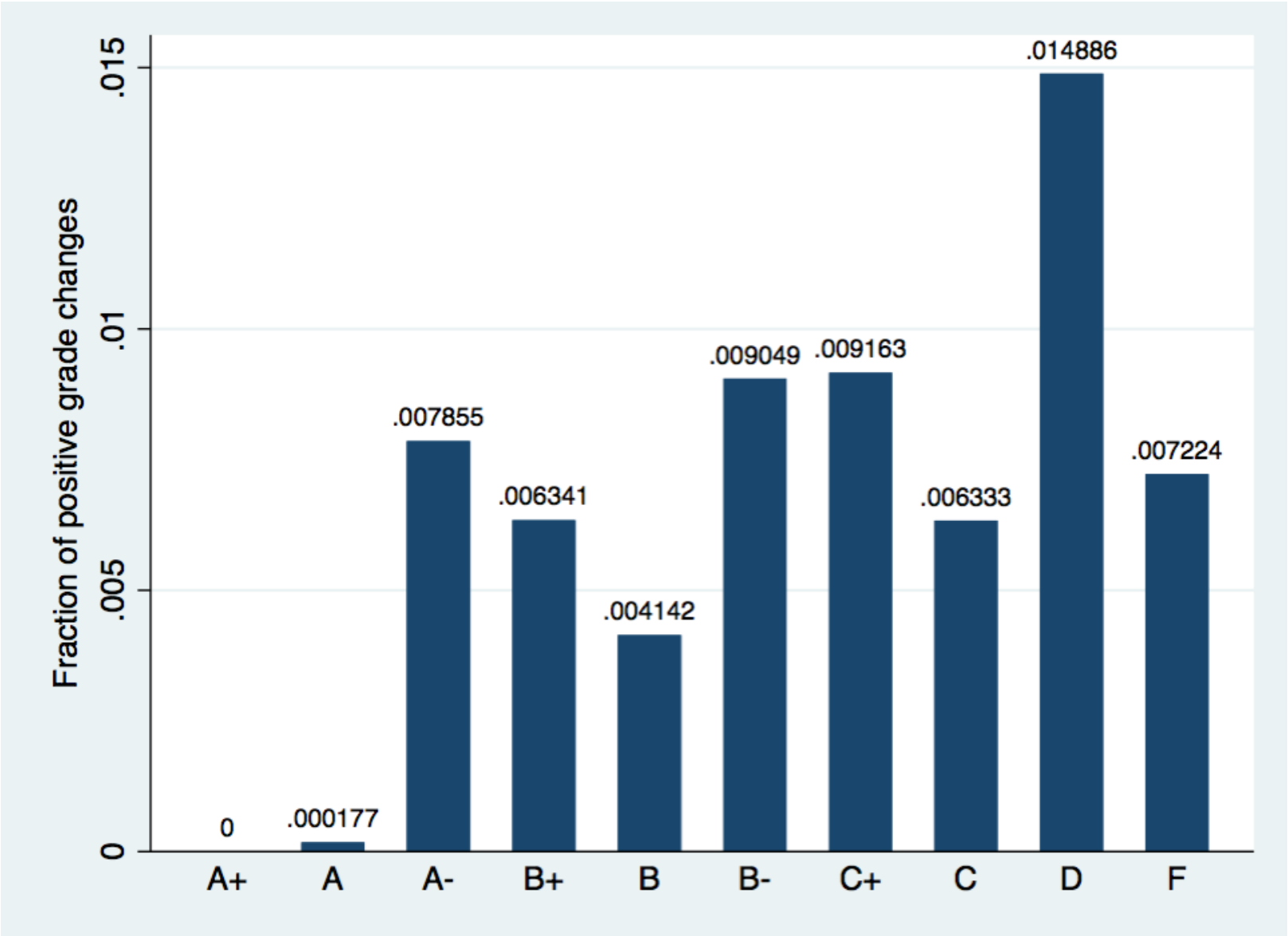
Number of observations in brackets.

Upward Regrades: Gender Interactions

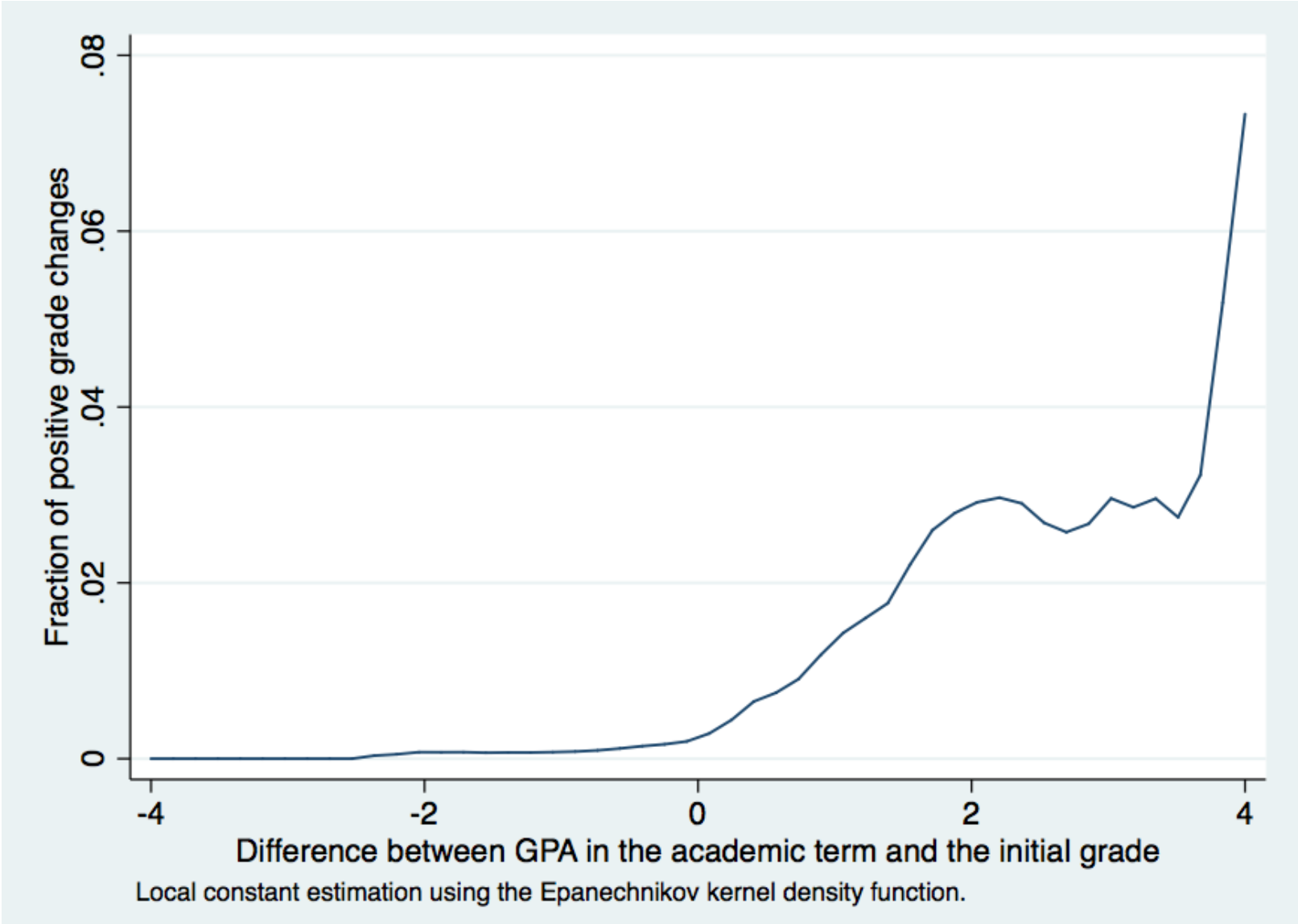
	Female Instructor	Male Instructor	Difference
Female Student	0.00412	0.00408	0.000046
	(0.06407)	(0.06371)	(0.000156)
	[335,738]	[335,394]	
Male Student	0.00451	0.00501	-0.000499***
	(0.06703)	(0.07062)	(0.000186)
	[227,750]	[357,090]	
Difference	-0.000391**	-0.000937***	0.000545**
	(0.000177)	(0.000162)	(0.000241)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. Number of observations in brackets.

Fraction upward grade changes conditional on initial grades



Non-parametric estimate of propensity of upward grade changes by the grade expectation gap



Grade transition matrix conditional of all grade changes (measured in percent)

- 71% regrades are correction by one letter grade up.

	Final Grade									
Initial Grade	A+	A	A-	B+	B	B-	C+	C	D	F
A+	0.00	0.47	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00
A	**0.91**	0.00	0.16	0.13	0.50	0.03	0.00	0.28	0.06	0.06
A-	0.50	**10.12**	0.00	0.00	0.09	0.03	0.00	0.03	0.00	0.00
B+	0.31	2.67	**5.18**	0.00	1.82	0.00	0.16	0.03	0.03	0.00
B	0.22	**12.76**	2.17	**4.59**	0.00	0.09	0.13	0.22	0.06	0.09
B-	0.00	0.31	0.69	0.60	**7.63**	0.00	0.03	0.09	0.00	0.06
C+	0.00	0.16	0.28	0.57	2.20	**3.83**	0.00	0.91	0.00	0.06
C	0.09	1.95	0.31	0.22	**10.49**	1.76	**2.20**	0.00	0.25	0.00
D	0.03	0.44	0.06	0.13	2.04	0.63	0.79	**11.15**	0.00	0.09
F	0.06	0.44	0.00	0.03	0.60	0.06	0.13	1.70	**2.95**	0.00

Empirical Specifications

$$Y_{ij} = \alpha_0 + \alpha_1 Male_i + \alpha_2 X_i + \alpha_3 Z_j + \epsilon_{ij}, \tag{1}$$

$$\begin{aligned} Y_{ij} =& \beta_0 + \beta_1 Female_i Male_j + \beta_2 Male_i Female_j + \beta_3 Male_i Male_j \\ &+ \beta_4 X_i + \beta_5 Z_j + \eta_{ij}, \end{aligned} \tag{2}$$

- Y_{ij}: binary variable of upward grade change
- X_i: characteristics of student i, such as student's class standing, GPA, and grade
- Z_j: class-specific information, such as instructor's position, department, and colleges.
- $Male_i$: an indicator for male students
- $Female_i Male_j$, $Male_i Female_j$, and $Male_i Male_j$ are gender interaction terms of student i and instructor j

Eq. 1: Updward Grade Change

	Dependent Variable: Upward Grade Change $\in \{0, 1\}$			
Panel A	[1]	[2]	[3]	[4]
$Male_i$	0.000749***	0.000767***	0.000702***	0.000725***
	(0.000118)	(0.000120)	(0.000123)	(0.000118)
N	1,341,213	1,341,213	1,341,213	1,341,213
Control for:				
College		Y		
Department			Y	
Instructor				Y
Rank				

Eq. 1: Updward Grade Change

	Dependent Variable: Upward Grade Change $\in \{0, 1\}$		
Panel A	[5]	[6]	[7]
$Male_i$	0.000743***	0.000706***	0.000805***
	(0.000118)	(0.000117)	(0.000118)
N	1,341,213	1,341,213	1,341,213
Control for:			
Class standing	Y		
Grade Gap		Y	
GPA and grade			Y

Eq 2. Upward Grade Changes

	Dependent Variable: Upward Grade Change $\in \{0, 1\}$ Omitted reference group: $Female_i Female_j$			
Panel B	[1]	[2]	[3]	[4]
$Female_i Male_j$	-0.000046	0.000152	0.000018	-0.000095
	(0.000155)	(0.000155)	(0.000165)	(0.000158)
$Male_i Female_j$	0.000391**	0.000484***	0.000495***	0.000372**
	(0.000181)	(0.000183)	(0.000185)	(0.000181)
$Male_i Male_j$	0.000890***	0.001052***	0.000867***	0.000829***
	(0.000164)	(0.000167)	(0.000181)	(0.000165)
N	1,255,972	1,255,972	1,255,972	1,255,972
F test	13.671	15.068	11.094	12.738
$(p - value)$	0.00000	0.00000	0.00000	0.00000
Control for:				
College		Y		
Department			Y	
Instructor				Y
Rank				

Eq 2. Upward Grade Changes

	Omitted reference group: $Female_i Female_j$		
Panel B	[5]	[6]	[7]
$Female_i Male_j$	-0.000063	-0.000428***	-0.000396**
	(0.000155)	(0.000155)	(0.000155)
$Male_i Female_j$	0.000398**	0.000180	0.000156
	(0.000181)	(0.000181)	(0.000182)
$Male_i Male_j$	0.000870***	0.000605***	0.000635***
	(0.000164)	(0.000163)	(0.000163)
N	1,255,972	1,255,972	1,255,972
F	13.314	13.694	13.443
$(p - value)$	0.00000	0.00000	0.00000
Control for:			
Class standing	Y		
Grade Gap		Y	
GPA and grade			Y

Alternative models and marginal effects

	Dependent Variable: Positive Grade Change $\in \{0, 1\}$		
	OLS	Probit	Logit
Panel A			
$Male_i$	0.000790***	0.0008262***	0.0008516***
	(0.000124)	(0.0001278)	(.0001289)
N	1,341,213	1,294,178	1,294,178
Panel B	Omitted reference group: $Female_i Female_j$		
$Female_i Male_j$	-0.000263	-0.0004601***	-0.0004329**
	(0.000166)	(0.0001769)	(0.0001799)
$Male_i Female_j$	0.000440**	0.0003789*	0.0004184**
	(0.000185)	(0.0002029)	(0.0002069)
$Male_i Male_j$	0.000750***	0.0006347***	0.0006936***
	(0.000183)	(0.0001958)	(0.0002008)
N	1,255,972	1,212,186	1,212,186

All models control for college, department, instructor rankings, student standing, GPA, and initial grade in the class.

Partial identification: upper and lower bounds

	Dependent Variable: Positive Grade Change $\in \{0, 1\}$		
Regressor	$Female_i Male_j$	$Male_i Female_j$	$Male_i Male_j$
Upper bound	-0.0001116	0.0005583***	0.0008871***
	(0.0001604)	(.0001706)	(.0001768)
Point estimate	-0.000263	0.000440**	0.00075***
	(0.000166)	(0.000185)	(0.000183)
Lower bound	-0.000572***	0.0004221**	0.0004887***
	(0.0001572)	(0.0001842)	(.0001747)

All models control for college, department, instructor rankings, student standing, GPA, and initial grade in the class.

Sensitivity analysis for upward grade changes

	Dependent Variable: Upward Grade Change $\in \{0, 1\}$				
Panel A	Baseline	Excl. students w/2+ changes	Instructor FE	Exclude A+ and A	Exclude F
$Male_i$	0.000790***	0.000650***	0.000677***	0.001135***	0.000810***
	(0.000124)	(0.000108)	(0.000123)	(0.000184)	(0.000124)
N	1,341,213	1,327,826	1,341,213	876,959	1,293,734
Panel B	Omitted reference group: $Female_i Female_j$				
$Female_i Male_j$	-0.000263	-0.000266*		-0.000407	-0.000331**
	(0.000166)	(0.000156)		(0.000267)	(0.000167)
$Male_i Female_j$	0.000440**	0.000281*	0.000464**	0.000587**	0.000419**
	(0.000185)	(0.000166)	(0.000186)	(0.000275)	(0.000187)
$Male_i Male_j$	0.000750***	0.000643***	0.000843***	0.001110***	0.000743***
	(0.000183)	(0.000167)	(0.000171)	(0.000278)	(0.000185)
N	1,255,972	1,243,458	1,255,972	819,416	1,211,694
F test: Coefficients of all gender pairs $= 0$	13.317	12.858	14.898	12.980	14.668
p-value	0.00000	0.00000	0.00000	0.00000	0.00000

All models control for college, department, instructor rankings, student standing, GPA, and initial grade in the class.

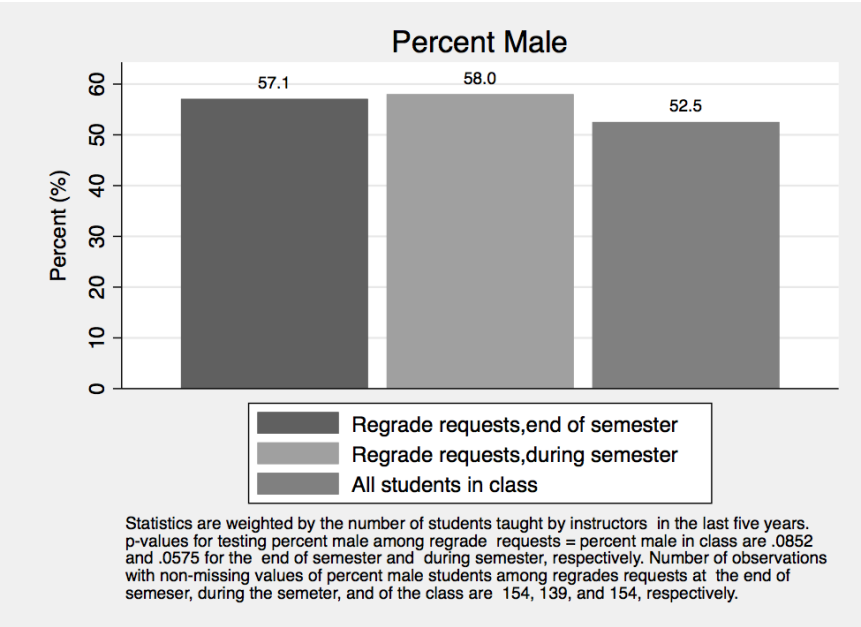
Grade changes by initial grade, all students

Initial Grade	No regrades Grade	Regrades Inital Grade	Regrades Final Grade	Regrades Grade Change
A+,A,A-	3.94300	3.73442	3.88080	0.14638***
	(0.12543)	(0.13388)	(0.41812)	(0.01407)
	[560,052]	[973]	[973]	
B+,B,B-	3.02165	3.01553	3.61094	0.59541***
	(0.18587)	(0.22793)	(0.46662)	(0.01033)
	[461,300]	[2,529]	[2,529]	
C+,C	2.06565	2.09580	2.96151	0.86571***
	(0.13273)	(0.15111)	(0.49148)	(0.01316)
	[210,722]	[1,527]	[1,527]	
D	1.00000	1.00000	2.27555	1.27555***
	(0.00000)	(0.00000)	(0.55130)	(0.01888)
	[56,117]	[853]	[853]	
F	0.00000	0.00000	1.95631	1.95631***
	(0.00000)	(0.00000)	(1.03438)	(0.05585)
	[47,136]	[343]	[343]	

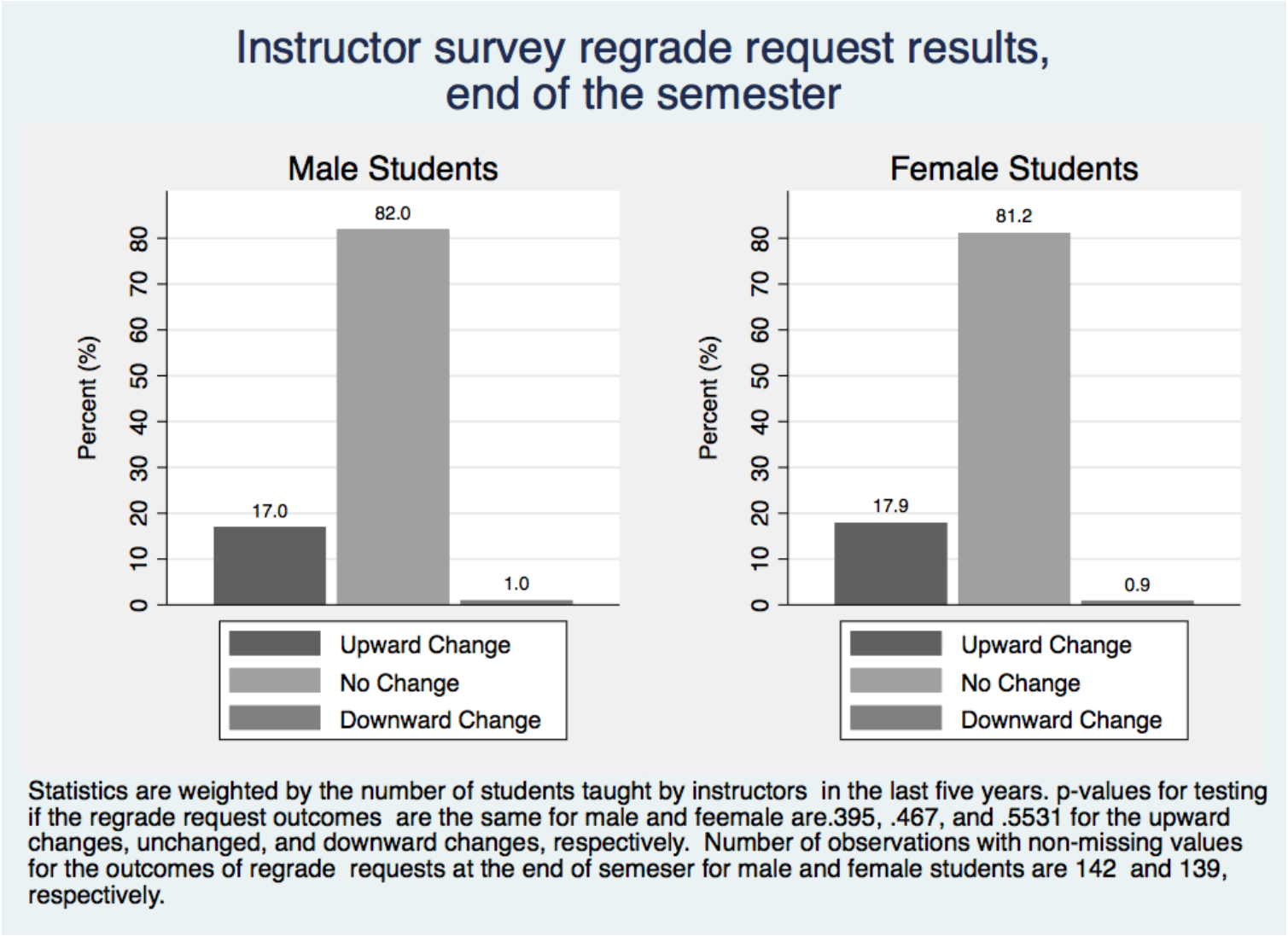
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. Number of observations in brackets.

Instructor Survey

- Oct - Dec, 2018
- 154 instructors who experienced regrade requests at the end of previous semesters completed the survey.
- 5.94 % of students requested regrades at the *end* of semester (154 obs).
- 11.2 % of students requested regrades *during* the semester (139 obs).
- Percent male among regrade requests and in class:

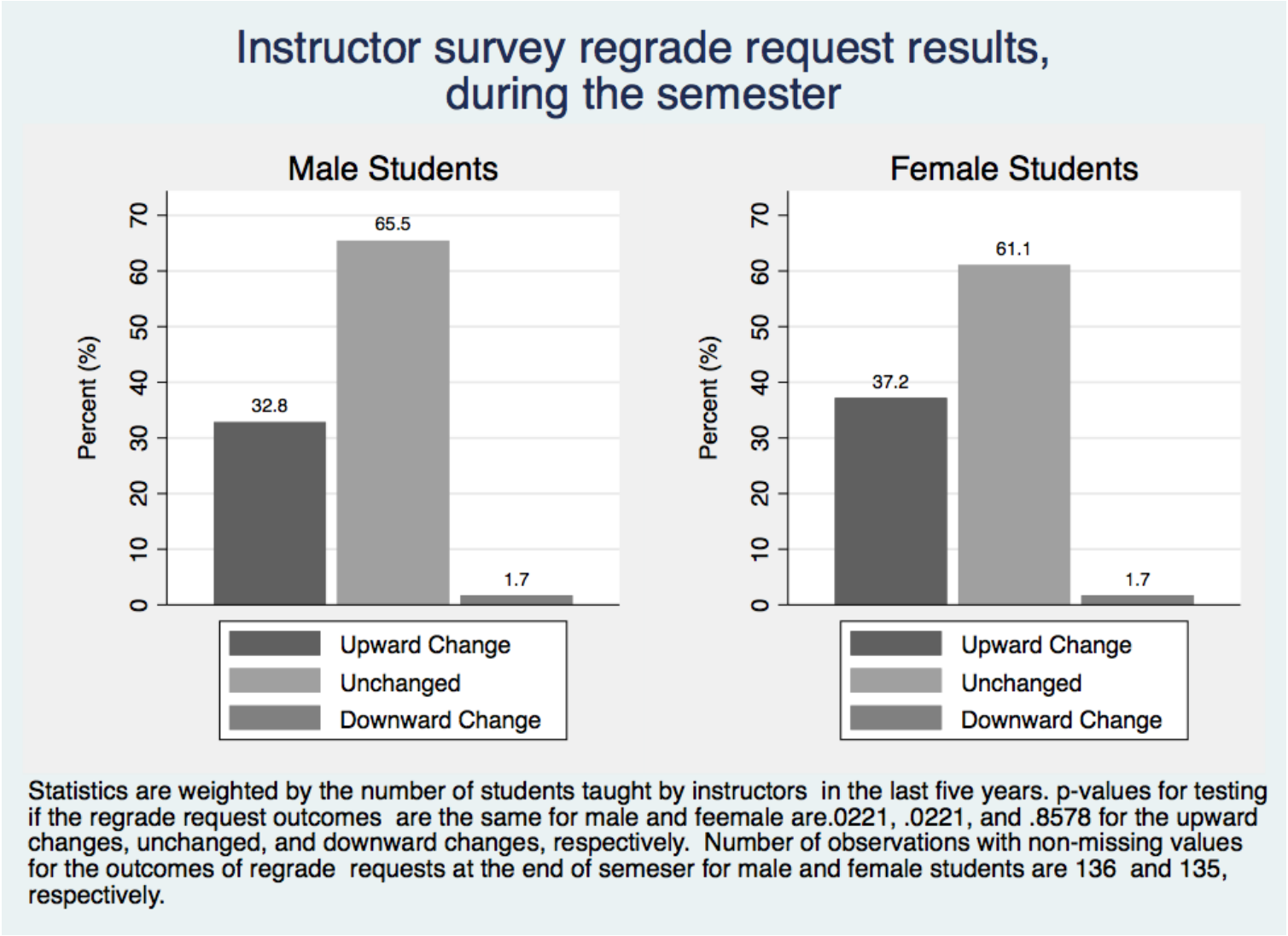


Instructor Survey: Results of Regrade Requests by Student Sex, End of Semester



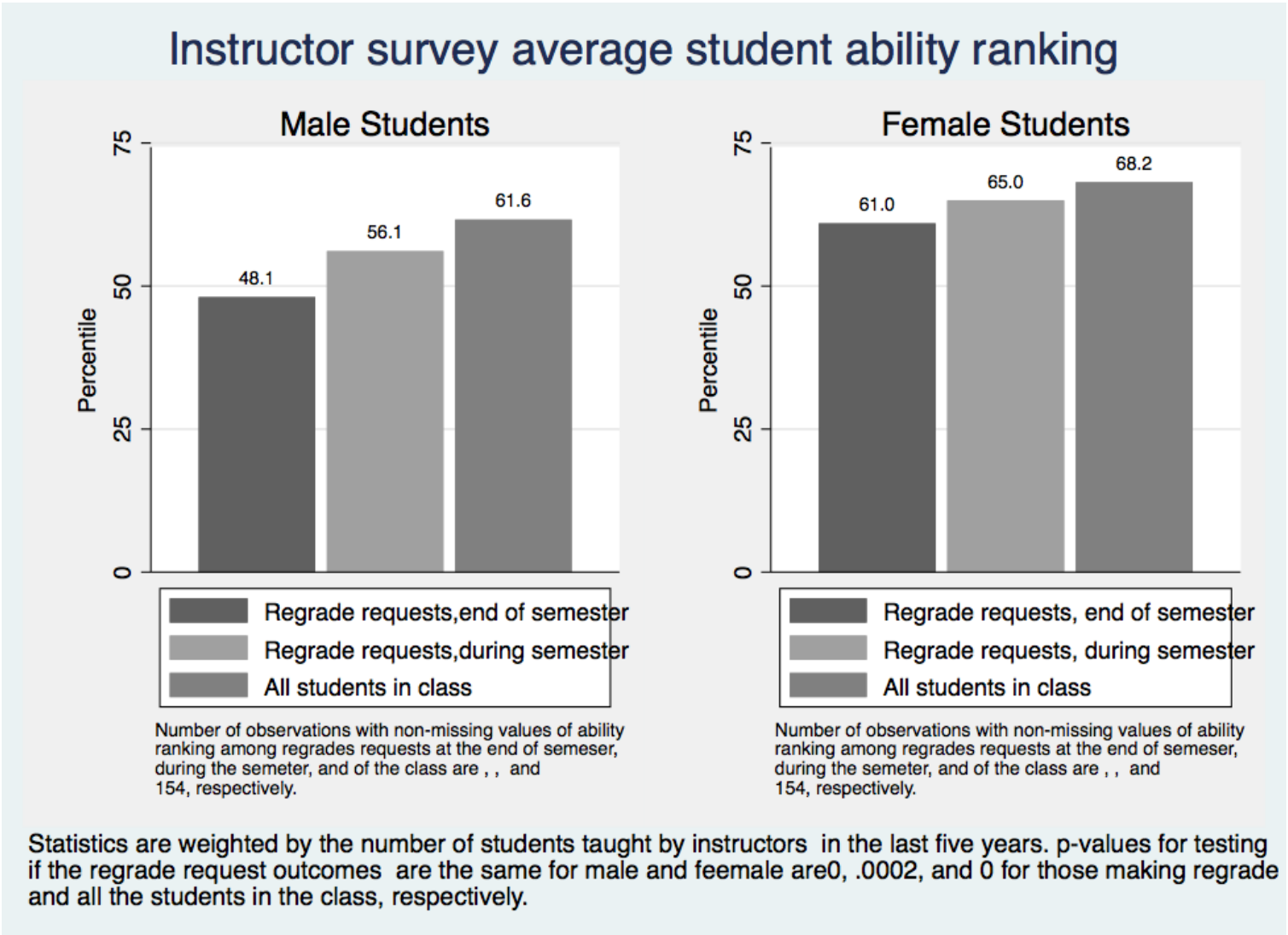
Statistics are weighted by the number of students taught by instructors in the last five years. p-values for testing if the regrade request outcomes are the same for male and feemale are.395, .467, and .5531 for the upward changes, unchanged, and downward changes, respectively. Number of observations with non-missing values for the outcomes of regrade requests at the end of semeser for male and female students are 142 and 139, respectively.

Instructor Survey: Results of Regrade Requests by Student Sex, During Semester



Statistics are weighted by the number of students taught by instructors in the last five years. p-values for testing if the regrade request outcomes are the same for male and feemale are.0221, .0221, and .8578 for the upward changes, unchanged, and downward changes, respectively. Number of observations with non-missing values for the outcomes of regrade requests at the end of semeser for male and female students are 136 and 135, respectively.

Instructor Survey: Ranking of Student Ability by Student Sex



Conclusion

- Male students are 18.6 percent more likely than female students to receive favorable grade changes initiated by instructors.
- Gender difference cannot be explained by observable characteristics of the students, instructors, and the classes.
- From instructor survey, it reveals that
  - male students did ask for grade change more often,
  - regrade results do not vary by student sex,
  - male students are also more likely to ask *during* the semester, and
  - female students tend to be of higher ability than male students.
- Next phase, 1) class records on regrade requests in selected econ classes in fall 2018; 2) student survey and lab experiments.