Appendix A Additional tables and figures

Table A.1: Average cheat rate by project, course and semester in two immediately previous semesters.[1]

	Spring 2018				Fall 2018			
	Fin.	**Mgt.**	**ACC 1**	**ACC 2**	**Fin.**	**Mgt.**	**ACC 1**	**ACC 2**
Project 1	11.7	9.8	3.0	11.8	13.6	7.7	3.1	16.8
Project 2	13.2	20.5	5.1	11.5	16.4	26.7	8.1	16.4
Project 3	15.4	21.5	6.0	11.0	24.8	21.8	8.8	15.8
Project 4	17.3		6.8		28.2		11.5	

[1] These percentages come from a system that records number of confirmed cheating attempts in each project/course and semester.

Table A.2: Characteristics by sanction group[1]

	Sa	Sb	|Diff/S.D.|
Prior School Performance			
GPA	3.2	3.2	0.15
SAT Verbal	497.6	509.4	0.13
SAT Math	595.6	585.7	0.12
School Experience			
Cumulative Credits	35.3	33.0	0.07
Underclass (%)	62.6	66.0	0.07
Attends Part Time (%)	2.6	6.2	0.16
Multiple Exp. Courses(%)[2]	46.1	58.7	0.25
Demographics			
Age	22.5	21.5	0.29
Female (%)	38.3	45.4	0.14
Native English Speaker (%)	16.5	24.7	0.19
Race/Ethnicity			
Asian (%)	73.0	55.8	0.35
Black (%)	9.6	7.8	0.07
Hispanic (%)	14.3	7.0	0.22
White (%)	7.0	19.5	0.33
Other (%)	3.5	2.6	0.05
Cheat rate on first two projects (%)	51.8	41.0	0.44
# of Students	115	421	
Joint χ^2 p-value[4]		0.000	

[1] Sa refers to the group that was sanctioned after submitting their third project and therefore sanctions could have no effect on their cheating outcome for their third project.

[2] Sb refers to the group that was sanctioned before submitting their third project and therefore sanctions may have affected their cheating outcome on their third project.

Table A.3: Effect of sanctions on probability of cheating on the third project by course.[1,2]

	Fin.		Mgt.		All Courses	
	(1)	(2)	(3)	(4)	(5)	(6)
Sanctioned before submission (β_1)[3]	7.0*	5.7*	5.0*	3.6*	5.4*	4.6*
	(1.9)	(1.5)	(2.0)	(2.3)	(1.5)	(1.5)
Sanctioned after submission (β_2)[4]	40.3*	41.9*	60.4*	65.2*	51.9*	53.4*
	(3.3)	(7.3)	(3.8)	(6.8)	(4.5)	(4.8)
Group A unsanctioned (β_3)	0.7	0.6	-1.5	-1.2	-0.3	-0.5
	(1.9)	(1.0)	(1.8)	(1.3)	(0.4)	(0.5)
Difference in third project cheat rate (β_1- β_2)[5]	-33.3*	-36.2*	-55.4*	-61.5*	-46.5*	-48.8*
	(3.6)	(7.8)	(4.1)	(7.1)	(4.9)	(4.9)
Difference of prior cheat rate (θ_1- θ_2)		6.7*		-22.4*		-10.8*
		(2.7)		(2.9)		(4.7)
Difference-in-differences [(β_1-β_2)-(θ_1- θ_2)][6]		-42.9*		-39.1*		-38.1*
		(4.8)		(5.1)		(4.1)
Cheat rate of unsanctioned group B students	1.5	1.5	3.3	3.3	1.7	1.7
Prior cheat rate among sanctioned	46.9	46.9	47.6	47.6	43.4	43.4
# of Obs	1,003	2,992	889	2,541	3,257	9,564
# of Students	1,003	1,003	889	889	2,669	2,669

[1] Estimates for odd columns are of equation (3) in the text and obtained from a linear probability model. Effects are reported as percentage points. The reference category includes students in group B who were not sanctioned on project 1 & project 2. Estimates are adjusted for covariates from table 2 and standard errors adjust for general Huber-White type heteroskedasticity or are clustered by student for column (5). Significance levels of differences are indicated by $* \; p < .05$.

[2] Estimates for even columns are difference-in-differences estimates for the effect of sanctions that include the first and second projects in the regression and account for the possibility that those that submit projects before and after sanction may have different average cheat rates.

[3] *Sanctioned before submission* is 1 if a student plagiarized a prior project and was sanctioned one week prior to their submission of the third project, due one week after sanctions went out.

[4] *Sanctioned after submission* is one if a student plagiarized a prior project but submitted the third project before being sanctioned.

[5] β_1- β_2 is the effect of sanctions on the probability of plagiarism on the third project among those who were sanctioned on prior projects if there are no differences between those sanctioned before and after submission of third project in average cheat rates.

[6] *[(β_1-β_2)-(θ_1- θ_2)]* is the effect of sanctions on the probability of plagiarism on the third project among those who plagiarized prior projects if the difference between those that were sanctioned before the third project and those that were sanctioned after would have remained constant if not for the sanction.

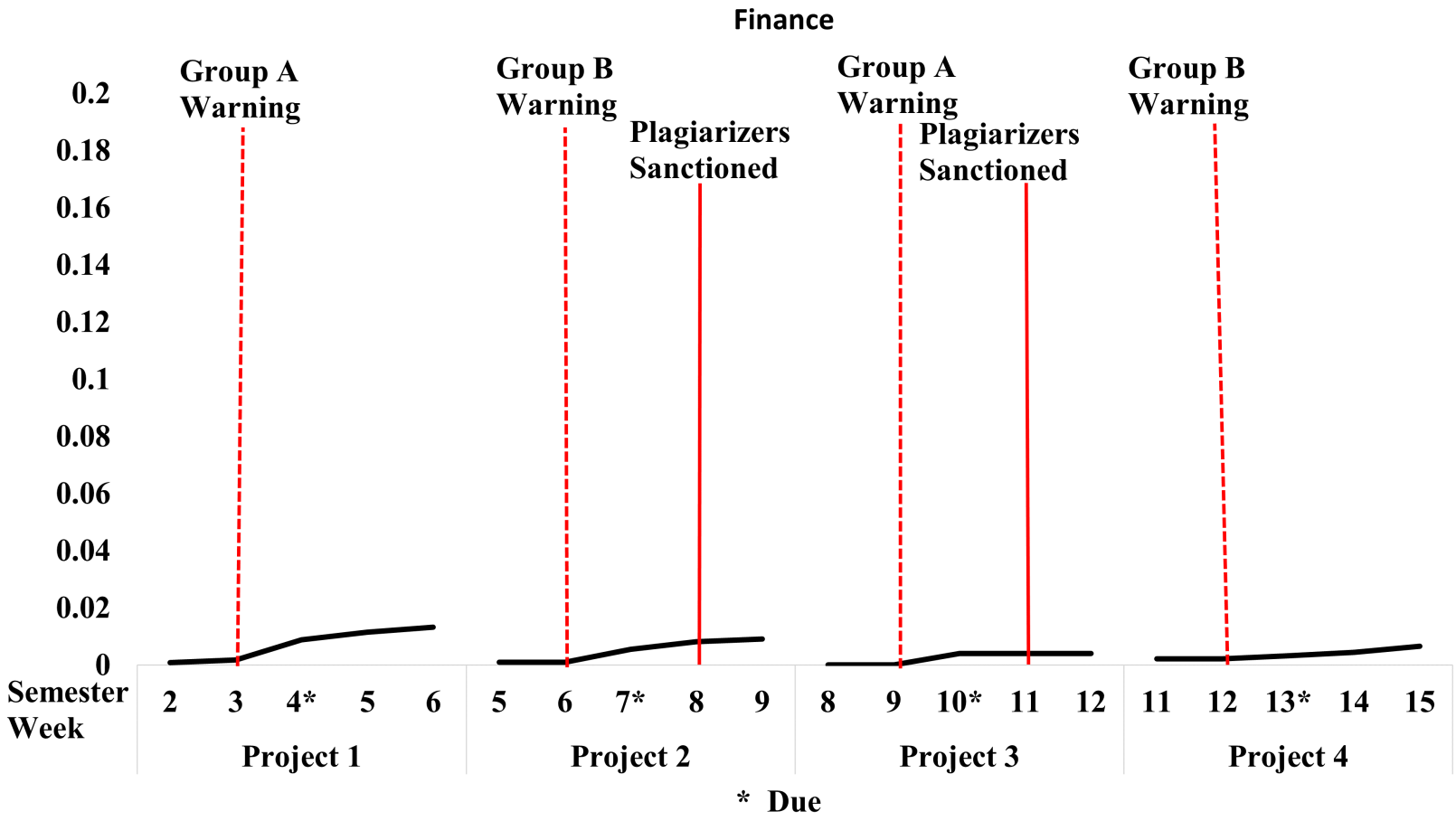

Figure A.1: Cumulative unidentified flagged project percentage in Finance course

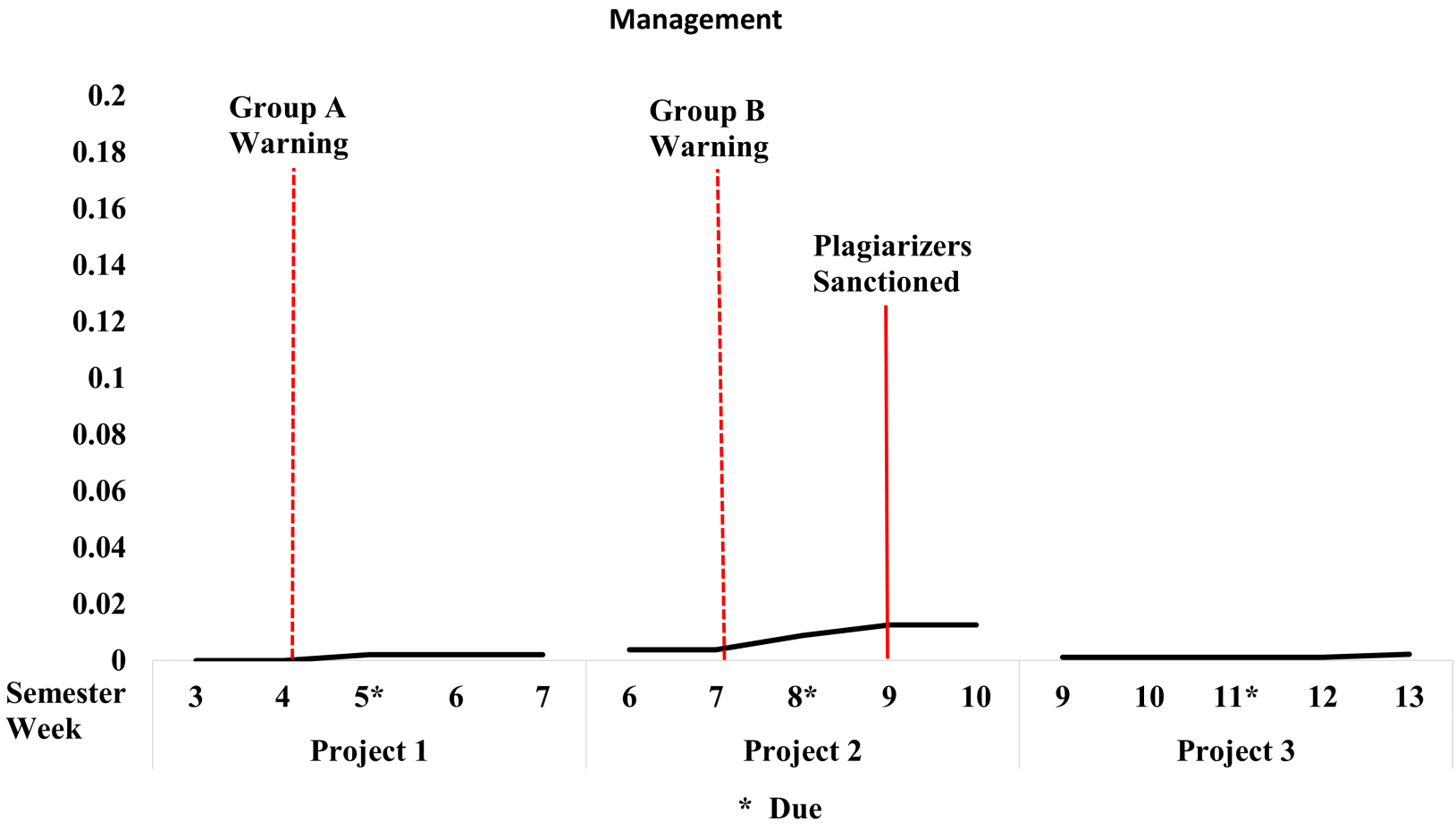

Figure A.2: Cumulative unidentified flagged project percentage in Management course

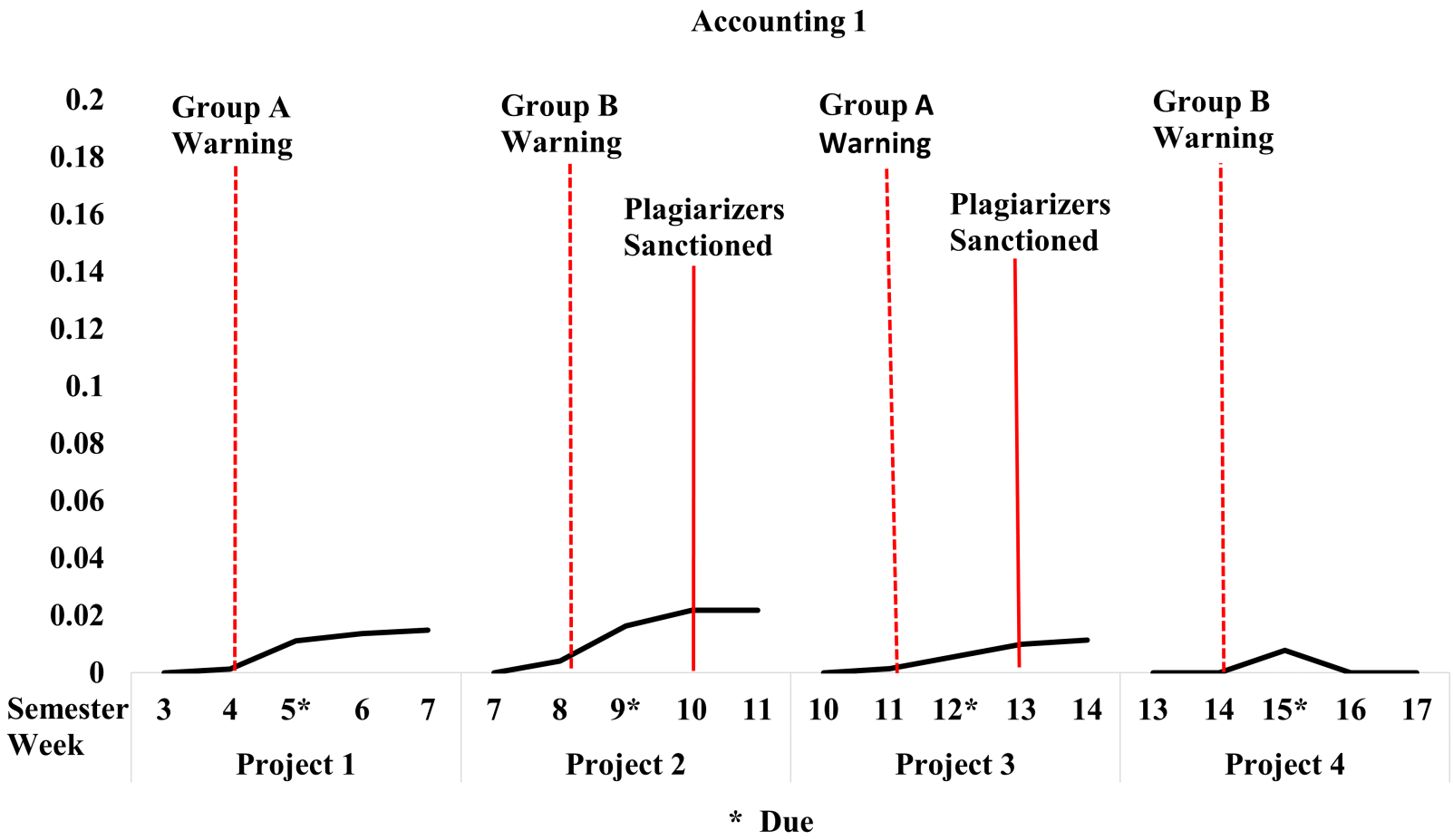

Figure A.3: Cumulative unidentified flagged project percentage in Accounting 1 course

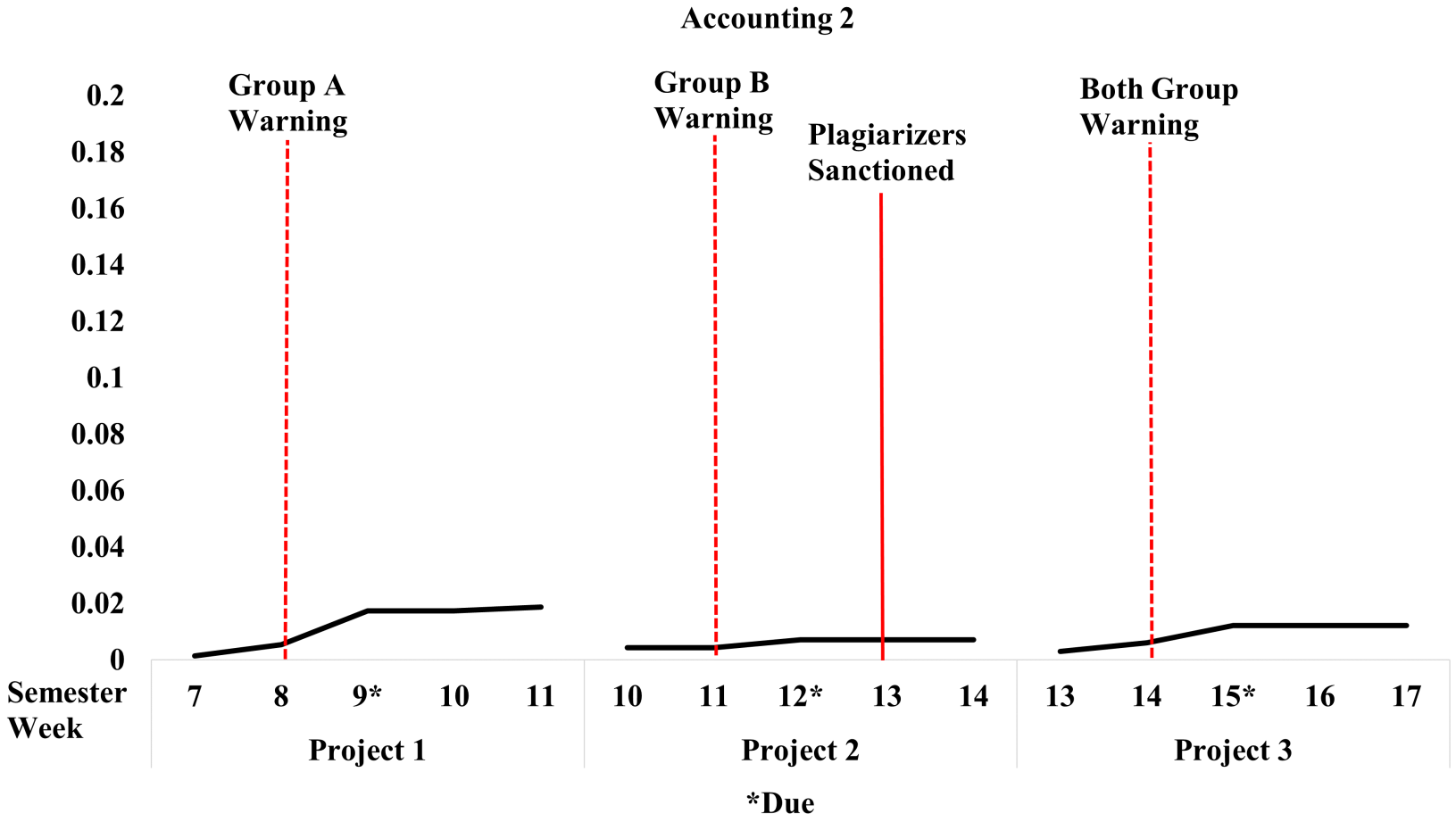

Figure A.4: Cumulative unidentified flagged project percentage in Accounting 2 course

Appendix B: Peer effects

In this Appendix we describe our attempt to estimate peer effects.

We focus on the second project in each class and asked whether the probability that student (i) in section (j) cheats on the second project (t) (c^2_{ijt}) is affected by the proportion of the student's classmates (j(-i)) in section (j) who cheat on the first project ($\bar{c}^1_{(-i)j1}$). [15]

$$c^2_{ijt} = \gamma_0 + \gamma_1 c^1_{ij} + \gamma_2 \bar{c}^1_{(-i)j} + X_i\Gamma + \psi_t + \mu_{ijt}. \tag{B.1}$$

Equation (B.1) captures the linear-in-means spillover effects adjusted for individual characteristics (X_i) and for a student's own cheating on the first project (c^1_{ij}). As Angrist (2014) notes, $\bar{c}^1_{(-i)j}$ is best interpreted as a jackknife instrumental variable estimate in which the first stage is individual cheating outcomes on the first project regressed on dummies for the section of each class. However, OLS and two-stage least squares estimates will tend to be equal given a weak first-stage based on many groups.[16]

The results are shown in table B.4. A student who cheats on the first project is 60 to 65 percentage points more likely to cheat on the second project relative to students who do not cheat on the first project (Table B.4 Panel A, columns (1), (4) and (7). Similarly, in columns (2), (5), and (8) we present the effect of the leave-one-out mean cheat rate of the first project on an individual's likelihood of cheating on the second project. The group effect differs little from the effect of own cheating, a result consistent with Angrist's (2014) suggestion of a weak first stage. Indeed, the partial R^2 on the set of course section dummies in the first stage is never greater than 0.04 (Table B.4, Panel A). Controlling for both own cheating and group cheating decreases the estimated peer effect by one third to a half (Table B.4 Panel A, columns (3), (6) and (9).

As further exploration of peer effects, we estimate equation (3) for the third project and used own and the section cheating rate on the second project as regressors (Table B.4, Panel B). The

[15] We suppress the class (k) subscript as j is a subset of k.

[16] In our context, the OLS estimate is $c^2_{ijt} = \gamma_0 + \gamma_1 c^1_{ij} + X_i\Gamma + \psi_t + \nu_{ijt}$ or cheating on project 2 regressed on an individual's cheating on project 1 while the approximate 2SLS would substitute the group cheating on project 1 for the individual cheating, $c^1_{ij} = \eta_0 + \eta_1 \bar{c}^1_{(-i)j} + X_i\Gamma + \nu_{ijt}$.

results in table B.4 Panel B shows the diminished effect of own cheating in comparison to previous projects ranging from 27-35 points. This reflects a combination of students who submit their project before sanctions and thus are untreated and students who submit projects after being sanctioned and thus drastically curtail their cheating as a result of sanctions. The estimated group effects, however, are much smaller than the effect of own cheating and flip sign and become statistically insignificant when included with own cheating (Table B.4 Panel B, columns (3), (6) and (9)).

In the end, we can not rule out significant peer effects. Sharing work with other students involves interactions. However, we remain skeptical that the coefficient on the mean cheat rate captures a causal peer effect distinct from or in addition to a student's own propensity to cheat. From an administrative perspective, the separate identification of individual from peer effects may be irrelevant to the goal of reducing cheating. The more unambiguous result is that appeals to academic integrity unsupported by credible identification of plagiarism are ineffective at curbing cheating in this context.

Table B.4: Probability of cheating on project given prior project own cheating and mean peer cheating by course[1]

	Finance			Management			All Courses		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Panel A: Peer effects on project 2[2]									
Own cheat proj. 1	64.6*		63.5*	61.2*		60.5*	60.4*		59.5*
	(5.4)		(5.1)	(5.5)		(5.5)	(3.8)		(3.7)
Sect. mean cheat proj. 1		73.0*	38.9*		87.4*	70.2*		78.0*	52.7*
		(13.0)	(10.0)		(37.0)	(33.2)		(12.4)	(11.7)
Sect. Partial R^2		0.037			0.033			0.030	
# of Obs		1,081			791			3,282	
Panel B: Peer effects on project 3[3]									
Own cheat proj. 2	27.6*		27.9*	34.8*		35.2*	34.2*		34.6*
	(5.0)		(5.0)	(3.7)		(3.5)	(3.3)		(3.3)
Sect. mean cheat proj. 2		11.6	-6.7		7.9	-11.3		12.0	-9.1
		(7.1)	(7.6)		(8.6)	(9.8)		(5.2)	(6.1)
Sect. Partial R^2		0.056			0.065			0.055	
# of Obs		997			770			3,100	

[1] Estimates are of equation (4) in the text and obtained from from a linear probability model. Effects are reported as percentage points. Estimates are adjusted for covariates in Table 1. Group cheating rates are the the number of students who cheated on the immediately prior project in section (j) of course (k) less student (i) divided by the number of students in section (j) of course (k) less student (i). Sect. Partial R^2 refers to the additional variation explained by section fixed effects out of variation leftover after controlling for student fixed effects. Standard errors are adjusted for a general form of heteroskedasticity. Significance levels of differences are indicated by $*$ $p < .05$.

[2] Panel A looks at the effect that own and peer cheating from project 1 has on whether students cheat on project 2, which was due before any sanctions were sent out.

[3] Panel B looks at the effect that own and peer cheating on project 2 has on students on project 3, which was due after sanctions were sent out.