When Investor Incentives and Consumer Interests Diverge: Private Equity in Higher Education

Online Appendix

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Appendix A: Institutional Context

This Appendix first briefly describes the history and defining characteristics of the for-profit higher education sector. Then, in Section 2, we provide evidence from existing literature that returns to for-profit education are likely worse – and definitely no better than – similarly selective public community colleges. We explain how the federal student loan and grant programs create misaligned incentives in Section 3. Finally, in Section 4, we discuss the role of private equity in for-profit higher education.

A.1 History and defining features of for-profit higher education

For-profit colleges are incentivized to target prospective students whose low incomes qualify them to pay tuition primarily with federal grants and loans. Schools receive federal grants and loans when the student enters school, and revenue is largely disconnected from graduation rates and labor market outcomes. The taxpayer bears the cost of student defaults.[1] An absence of accessible

[1]Legislation proposed in the U.S. Congress in November, 2017 would require schools to repay a portion of defaulted student loans. A Wall Street Journal article noted that "This so called skin-in-the-game proposal has been long

information, the difficulty of assessing returns to education, and long lags between enrollment and job placement impede low product quality from translating into reduced future sales (Arcidiacono et al. 2016, Bettinger et al. 2012, Wiswall and Zafar 2014). Thus government aid and loan guarantees create a potential misalignment of incentives between for-profit school owners and customers.

Proprietary, or for-profit, schools have existed in the U.S since the early 1900s. For much of the 20th century, they offered primarily technical and business skills, such as typing. They were also mostly independent (i.e. single-unit businesses) and privately held. In 1981, for profit enrollment was just 0.2 percent of total enrollment. Consolidation and increases in external equity financing began in the 1980s, with substantial private equity involvement. Substantial growth accompanied these changes; between 1990 and 1995, for-profit enrollment was between 0.35 and 0.82 million, or 2-5 percent of total enrollment. The largest for-profits today are publicly traded, and all had private equity investment at one time (see Table C.2). The sector has continued to grow. Between 2010 and 2016, annual total enrollment at for profit schools has been between 1.5 and 2.7 million students, or between 8 percent and 11 percent of total enrollment in all higher education.

While the sector is heterogenous, compared to their nonprofit and public counterparts, for-profits have smaller and leaner physical plants, have far more students in online learning programs, have few non-instructional services like athletics, typically have no research activities, hire most faculty on short-term contracts, and spend more on career counseling (Lang and Weinstein 2013).[2] In lieu of large humanities programs, for-profits focus on teaching specific, often vocational, skills designed to meet specific job descriptions, such as hair stylist or IT specialist.

To minimize costs, successful for-profits typically offer structured, focused programs of study with few electives. The material is standardized and replicated across a company's campuses and online programs. This approach has been quite successful; chains and online institutions were responsible for almost 90 percent of the growth of the for-profit sector in the 2000s (Deming,

fought by the powerful higher education lobby." See https://www.wsj.com/articles/house-gop-to-propose-sweeping-changes-to-higher-education-1511956800.

[2]While the sector is dominated by a few large chains, such as the University of Phoenix, there are many small schools providing niche vocational certificates for jobs such as dog grooming (Deming et al., 2012). Just over half of the degrees awarded by for-profits are certificates, but for-profits offer undergraduate, doctorate, and many other degrees.

Goldin, and Katz 2012). Resources are focused on sales and marketing. A U.S. Senate staff report found that in 2010, 30 representative for-profit schools employed about one recruiter for every 53 students, ten times the number of career services staff and 2.5 times the number of support services staff (Senate 2012). Recruiters' compensation was closely tied to new enrollments. The report found that public for-profits spend 23 percent of their revenue on marketing and recruiting, and cited evidence of large-scale student deception about completion rates, placement rates, and other statistics.

The student body at for-profit schools is quite different than that at other schools, even the closest comparison, public community colleges. Deming, Goldin, and Katz 2012 compare for-profit schools to community colleges, public, and nonprofit institutions. They note that on average, students at for-profits come from lower-income families and are more likely to be single parents than students in community colleges (two-year public schools). Other evidence that students at for-profit schools are disproportionately less well-prepared, and more likely to be ethnic minorities, is in Chung [2012]. Similarly, Looney and Yannelis [2015] show that for-profit borrowers tend to be poorer, older, and have worse labor post-school market outcomes.[3]

The 2000s saw a dramatic increase in student loan volumes and defaults. After 2008, high rates of student defaults and the new political environment led to increased scrutiny and regulatory oversight of for-profit colleges. Enrollment growth slowed, and the large chains saw substantial declines in new student volumes. The Obama Administration sought to implement tighter controls over eligibility for federal student aid, and together with local law enforcement, began to aggressively pursue for-profit higher education companies for various types of fraud.

[3]For example, among dependent borrowers, median family income of students at for-profit schools was $30,000, compared to $48,000 at 2-year and nonselective 4-year schools. In 2011, only 37 percent of borrowers at for profit schools were dependents, compared to 50 percent(70 percent) at 2-year (nonselective 4-year) institutions. Deming et al. [2012] find that for-profits leave students with higher unemployment, lower earnings, and higher loan default rates than comparable students who graduated from other types of schools. Looney and Yannelis [2015] find that for the cohort of students that left school in 2011, over 20 percent were unemployed two years later, and median earnings were about $20,000. The former is higher, and the latter is lower, than for any other institution type, and furthermore increased (decreased) more relative to 2000 than for any other institution type. The five-year cohort default rate in 2011 was 47 percent, compared to 38 percent (27 percent) at 2-year (nonselective 4-year) institutions.

A.2 Returns to For-Profit Education

With perfect information and competition, labor market returns to education should not vary with institution type. However, both information and market frictions exist. Importantly, students may not be well-informed about which programs are optimal for them, leaving aside deceptive recruiting practices (Lang and Weinstein 2013). Programs are difficult to compare to each other, and prospective students rarely have visibility into previous cohorts' outcomes. Also, students targeted by for-profits are among the most stressed and disadvantaged portions of the population, making them more prone to manipulative advertising than other groups; 29 percent are single parents, compared to 12 percent at community colleges, and their family income is about half that of students at community colleges (Deming, Goldin, and Katz 2012, Schilbach, Schofield, and Mullainathan 2016).

Despite these differences, Cellini, Darolia, and Turner [2017] show that community colleges, which have open enrollment (i.e. are not selective or capacity constrained), are substitutes to for-profit schools. These public institutions devote far fewer resources to advertising as is shown in the main text, and thus do not compete in a meaningful way for students.

There is accumulating causal evidence that relative to their substitutes – public community colleges – the returns to for-profit education are zero or negative. Deming et al. [2016] assess employer perceptions of higher education institutions using an experiment in which they sent resumes with different types of degrees to job openings. They found that applicants with business BAs from large online for-profit schools were roughly 22 percent less likely to be contacted than the same applicants with similar degrees from nonselective public schools. Within health jobs, this discrepancy was 57 percent. Having a for-profit associates degree made a person no more likely to be contacted than the same resume with no postsecondary degree at all. Deming et al. [2016] conclude that "employers appear to view for-profit postsecondary credentials as a negative signal of applicant quality, particularly when objective measures of quality such as a licensing exam are unavailable."

In a similar experiment in which resumes were randomly sent to employers, Darolia et al.

[2015] found that employers did not prefer applicants with a for-profit degree to those with no college at all. Further, they found that employers seemed to slightly prefer (albeit not significantly) applicants with public community college degrees over those with comparable for-profit degrees.

Using administrative data from the National Student Clearinghouse between 2000 and 2012, Liu and Belfield [2014] find large wage penalties when community college students transfer to a for-profit college rather than a nonprofit college. They use transcript and other data to control for selection into for-profits. Cellini and Chaudhary [2014] use data from the NLSY97 to show that for-profit graduates are not more likely to be employed than comparable people with only high school degrees; though they find a positive effect on earnings (of about 4 percent per year), this is contingent on program completion, which many enrollees do not accomplish. The upper bound on their findings are substantially lower than the returns that other studies have calculated to public community colleges (e.g. Jacobson et al. 2005, Jepsen et al. 2014).[4]

Cellini and Turner [2016] address the selection problem by examining within-student wages before and after attending college, using administrative data on about 1.4 million students. They find that despite much higher tuition, for-profit students experience smaller earnings increases than students at comparable public community colleges. The vast majority of for-profit students experience both lower earnings and higher debt after college than they did before college.

Finally, Armona et al. [2017] assess the effect of attending a for-profit college relative to a local public college or university using an instrumental variables strategy. They combine local labor market shocks with local school supply to instrument for enrollment in a for-profit relative to a community college. They find that students at for profits are less likely to be employed, have lower earnings, and have higher debt and higher default rates than students at public counterparts.

[4]In contrast to the above studies, Lang and Weinstein [2013] find no difference in returns to certificate programs across for-profits and non-profits. They compare labor market outcomes for completers and non-completers across institution types, arguing that if this difference is similar, lower earnings for for-profit graduates are likely explained by the more disadvantaged student body at for-profit schools.

A.3 Federal Student Loans and Grants

For-profit higher education companies depend heavily on federal student loans and grants; the largest chains get over 80 percent of their revenue from federal sources. This fraction would be even higher if it were not for the 90-10 rules, and a statutory limit that 90 percent of revenue can come from Title IV loan and grant programs, which exclude veteran and military benefits. When these sources are included, many for-profits exceed the 90 percent threshold (Kelchen 2017). Maintaining Title IV eligibility is crucial for most higher education institutions, and it requires maintaining accreditation with one of a number of private accrediting agencies, and meeting certain standards, notably limits on the share of students that default over a three-year period.

Federal student loan programs were established in the 1960s and 1970s, and were targeted to upper middle class students attending higher tuition private colleges (Shireman, 2017). Government budget rules made it difficult for the federal government to lend directly to students without having to report the loans as adding to the deficit. Congress therefore subsidized the provision of federal loans by private lenders by legislating that the U.S. Department of Education would provide guarantees to private lenders (Berman and Stivers, 2016). That is, the federal government would cover bank losses when students fail to repay loans. The federal government also created the Student Loan Marketing Association, commonly known as Sallie Mae, in 1973. Sallie Mae raised capital to buy and offer student loans by securitizing loans and selling those securities to investors.

The banking industry aggressively lobbied for the expansion of the guaranteed student loan program during the 1980s (Wilson 1987, Berman and Stivers 2016, Shireman, 2017). This was accomplished in 1991, when unsubsidized Stafford loans were introduced. These were unsubsidized because the federal government would not pay interest accrued while the borrower was in school, but would guarantee against non-repayment. The limit for total borrowing with both subsidized and unsubsidized Stafford loans doubled from about $30,000 to over $70,000 (in 2015 dollars).[5]

The Federal Credit Reform Act of 1990 had changed federal accounting rule and made it pos-

[5] See Financial Aid for more information.

sible for the federal government to directly lend to students at a much lower cost (Berman and Stivers 2016). However, the government opted to maintain the more costly guarantee subsidies from the federal government to private lenders, so that Sallie Mae and commercial banks would receive support to provide most of the expanded federal student loan programs.

Private lenders and for-profit colleges receiving the loans now had direct incentives to promote the expansion of student borrowing. This was achieved though regular increases in borrowing caps, higher interest rates, and restrictions on borrowers' ability to discharge debt in bankruptcy. The result was a large increase in federally guaranteed student debt disbursements from about $20 billion per year during the 1980s to $120 billion at the peak in 2011. Per student annual borrowing flows increased more than three-fold from a little less than $2,000 per student in the 1980s to over $7,000 in 2011.[6]

Looney and Yannelis [2015] find evidence that the massive increases in student loan defaults between 2000 and 2011 was concentrated in for-profit schools, and arose in part because of their growth. Federal loans to undergraduate borrowers at for-profit schools increased from $3.6 billion in 2000 to $18 billion in 2011. Borrowers entering repayment at for-profit schools increased from just over 200,000 individuals in 2000 to about 900,000 in 2011.

Today, Title IV programs consist of Stafford loans, Perkins loans, PLUS loans for parents, Pell Grants, and work study programs. The amount of federal aid a student may receive depends on family-specific factors as well as the cost of attendance, of which the most important element is tuition. Cellini and Goldin [2014] point out that this creates an incentive for for-profit schools to increase tuition above cost. They evaluate whether for-profits increase tuition in response to increases in federal loan subsidies, and find some evidence for federal aid capture. Using administrative data from California between 1989 and 2003, Cellini [2010] finds that increases in federal and state grants and loans is strongly correlated with for-profit school entry, particularly in high poverty counties.[7]

[6]Per full time enrolled student. Available at the College Board.

[7]In the aftermath of the 2008 financial crisis, Sallie Mae and the major consumer banks found themselves unable to raise adequate capital from securities markets to fund federal student loans. The Obama administration responded by eliminating the provision of federal student loans through private lenders. Instead, the Department of Education would

Pell Grants are need-based awards that depend on a student's family income, the cost of school attendance, and the length and type of program.[8] The average Pell grant is about $3,724 per year, and the maximum is $5,775.[9] In 2008-09, for-profits enrolled 12 percent of students but accounted for 24 percent of Pell grant disbursement, and 26 percent of federal student loan disbursements (Deming et al. 2012).

A.4 Private Equity in Higher Education

A private equity buyout usually affects the target firm's finances, its operations, or both. The key financial innovation of the typical leveraged buyout is to pay for much of the acquisition with debt issued by the target firm. That is, the acquired company is the borrower, and the borrowed funds pay for its acquisition. Beyond changing in the target's capital structure, usually dramatically increasing its leverage (which theory has suggested can help discipline managers (Bloom et al. [2015]), private equity firms also impose transaction and monitoring fees on the target. Metrick and Yasuda [2010] find that that these fees can represent as much as 90 percent of compensation to the private equity firm, suggesting that they could be material costs to the target firm. They are, however, difficult to observe (Metrick and Yasuda 2011).

In operations, Bloom et al. [2015] directly measure management practices and find that private equity owned firms have better management, equaled only by public firms and family firms run by external CEOs. In manufacturing, Davis et al. [2014] find that private equity owned firms expand productive plants and shutter underperforming ones. Bernstein and Sheen [2016] also find evidence of better operations in private equity owned restaurants, in part through better worker training and incentive alignment.

The left graph in Figure B.2 shows the number of private equity deals in the for-profit education sector over time, while right graphs shows new private equity ownership at the school (UnitID)

provide loans directly to students. It used savings from this change to fund a significant expansion of Pell Grants (Shireman, 2017).

[8]The Department of Education has more information on the Pell grant program.

[9]See theCollege Board for more information.

level. Private equity investments in higher education have generally taken one of two forms. One is the purchase of independent (small, private) colleges, usually with consolidation intent. The second is the large buyout of an existing chain institution; the biggest have taken public companies private. For example, in 2007 KKR and SAC Capital took Laureate Education private for $3.8 billion.[10]

An example of the first type of investment, and which illustrates the broader pattern we find in the data, is TA Associates' buyout of Florida Career College for $53 million in 2004. At the time, Florida Career College had four campuses and 2,500 students. After adding three additional campuses and expanding enrollment to 4,000 students, TA Associates sold its stake in 2007 for $192 million, almost quadrupling its investment. Later in 2007, federal investigators found employees producing fraudulent high school diplomas for applicants, and encouraging students to lie about their high school status.[11]

Private equity has played a role in a large fraction of for-profit higher education by enrollment. Since the late 1990s, private equity schools have contributed to a large portion of the growth in enrollment. Private equity owned schools have also contributed significantly to the increase in defaults. In the late 2000s, despite being only approximately 10 percent of enrollments, for-profits schools accounting approximately 40 percent of student loan defaults. Most of this increase is attributable to the growth in the default share at private equity backed for-profits. The share of defaults has remained relatively flat at non private equity backed for profit schools.

Education-related deals comprise between 2 and 3 percent of total private equity deal volume and number (Appendix Figure B.1). However, other sectors with similar issues of incentive alignment are remarkably large shares of the industry. Appendix Figure B.1 shows that healthcare, infrastructure, and defense have at different times comprised significant shares of total private equity deals. For example, since 2010, health-related deals have comprised about 40 percent of total

[10]For other evidence on publicly traded and privately owned schools, see Eaton et al. [2016]. Other examples include Goldman Sachs taking Education Management Corp (EDMC) private in 2006 for $3.4 billion, and various investors, including Vistria Group, taking Apollo Education Group (University of Phoenix) private in 2017 for $1.1 billion.

[11]See the Chronicle for further information.

private equity deal value and volume, and infrastructure has comprised about 14 percent of deal value, and 23 percent of deal volume. These sectors also feature intensive government subsidy, opaque outcomes that are distant in time from payment for service, and diffuse customers who may not have the ability to "vote with their feet".

Private equity ownership may increase profitability through operational changes, or may yield returns to investors through financial engineering. We do not observe debt, and are in any event interested in student outcomes, so we focus on operations. Profit growth in higher education, as in many industries, comes from increasing scale (enrolling more students) and increasing margins (the gap between costs and revenues). This differs markedly from most nonprofit higher education institutions, which are primarily concerned with increasing prestige and attracting those students most likely to succeed in labor markets (Hentschke 2010). It also differs from public institutions, which are typically capacity constrained by state and local funding limits (Hentschke 2010).

Appendix B: Additional Tables and Figures

Table B.1: Private Equity Deal Data

Panel 1: Private equity deal data (PE firm deal level)

	N	Mean	Std Dev	Min	Median	Max
Total deals (first PE buyout or investment in school or chain)	88					
Bought controlling stake	88	0.78	0.41	0.00	1.00	1.00
Deal value (2016$)	35	38.9	64.4	0.38	10.6	311
Years to liquidity event, if exited	43	6.83	4.42	0.1	6.00	20.01

Panel 2: Private equity deal and exit types

Deal type		**Exit Type**	
Growth/Buyout	34	IPO	7
LBO	28	Sale to other PE firm(s)	22
VC	13	Sale to public company	8
Mezzanine	1	Sale to private company	3
Other/Unknown	10	Still in portfolio (as of 10/2017)	27
		Exit status unknown	20

Panel 3: Top acquirers

Top PE firms (by deal frequency)		**School-Level Acquisitions**	
	N		N
Quad Partners	6	Total acquisitions/investments	205
TA Associates	4	Top PE-owned acquirers (by frequency)	
Significant Federation	5	Corinthian Colleges	36
Summit Partners	2	Education Affiliates	20
TL Ventures	2	Delta Career Education Systems	13
Primus	2	Lincoln Educational Services Corporation	11
Leeds Equity Advisors	2	National Business College	8
Liberty Partners	2	Forefront Education	8

Panel 4: Private equity firm data

	N	Mean	Std. Dev.	Min	Median	Max
Total firms (firms identified as participating in PE event)	118					
Firm age at investment	60	14.4	10.8	0	11.5	43
Firm has other education investment experience*	118	0.35	0.48	0	0	1
Number other education deals*	118	2.1	3.76	0	0	13
Median net multiple of firm's funds†	62	1.59	0.99	0.51	1.52	7.47
Median net multiple of firm's funds divided by fund type benchmark†	60	0.96	0.46	0.3	0.92	2.93
Median net IRR of firm's funds†	59	14.9	22.0	-27.2	14	167
Median net IRR of firm's funds less fund type benchmark†	59	1.53	22.0	-34.7	0.2	154.8
Modal quartile of firm's fund performance†	60	2.55	1.16	1	2	4

Note: *Source for education experience is Mitch Leventhal. †Source for return info is Preqin, so only firms matched to Preqin have returns data. The benchmarks are calculated by Preqin using their whole database, and are by fund type (e.g. VC, buyout).. Panel 5 shows the top private equity-backed acquirers of other schools. There are 205 instances of ownership change to private equity backing. The top acquirers, or private equity-owned school systems that bought new schools within the scope of the data, are summarized.

Table B.2: Variable Descriptions

Variable name	Unit of Analysis	Years covered	Source	Description
		Panel 1: Operations		
Highest degree offered	UnitID	1987-2015	IPEDS	Indicator for whether the highest degree offered is a 4-year degree or higher, a 2-year degree, or a less-than-2-year certificate or degree.
Selective admissions	UnitID	1987-2015	IPEDS	An indicator for whether the school has any selective admissions requirements.
Number of students	UnitID	1987-2015	IPEDS	The number of fall semester fulltime equivalent students.*
Number of undergraduates	UnitID	1987-2015	IPEDS	The total number of fall semester undergraduate students, both full time and part time
Faculty per 100 students	UnitID	1987-2015	IPEDS	The number of fulltime faculty per 100 students
1st law enforcement action	UnitID	1987-2015	Authors	Indicator for the school experiencing its first law enforcement action in year
		Panel 2: Demographics		
Share students black	UnitID	1987-2015	IPEDS	Share of fall semester undergraduates who are black.
Share students white	UnitID	1987-2015	IPEDS	Share of fall semester undergraduate who are white.
Total Pell grant revenue per student (mill 2015$)	UnitID	2000-2015	IPEDS	Total revenue from Pell grants awarded to fultime first-year students per fulltime first-year student
		Panel 3: Outcomes		
Graduation rate, all levels	UnitID	1995-2010	IPEDS	The graduation rate after 150 percent of normal time to degree.$^{\pm}$
Average loan per borrower (2015$)	UnitID	2000-2015	IPEDS	Dollars borrowed per borrower among fulltime, first-year undergraduate student.
Cohort default rate (2 year)	OPEID	1990-2011	NSLDS	The default rate of the exiting cohort of borrowers 2 years after the cohort leaves school by either graduating or dropping out.
Loan repayment rate (3 year)	OPEID	2007-2011	NSLDS	The share of borrowers who have not defaulted and have repaid at least $1 dollar of principal on their loans 3 years after exiting school either by graduating or dropping out.
Wages 6 years after graduation	OPEID	1998-2007	College Score Card	Average income of exiting student cohort 6 years after the cohort leaves school by either graduating or dropping out.

Panel 4: Financials				
Profits	SystemID	1987-2015	IPEDS	Operating profits calculated as total revenue minus total education and operating costs
Total revenue (mill 2015$)	SystemID	1987-2015	IPEDS	Total revenue
Total expenditure (mill 2015$)	SystemID	1987-2015	IPEDS	Total education and operating costs
Net tuition revenue (mill 2015$)	UnitID	1987-2015	IPEDS	Total revenue from tuition, including tuition paid for by federal and state grant aid programs.
Panel 5: Ownership and identifiers				
PE		1987-2015	Authors	Indicator for whether a parent company of a college or system was under private equity ownership at the beginning of the academic year.
Public		1987-2015	Authors	Indicator for whether a parent company of a college or system was publicly traded at the beginning of the academic year.**
UnitID		1987-2015	IPEDS	Unique identification number assigned to postsecondary institutions surveyed in IPEDS.
SystemID		1987-2015	Authors	A unique identifier created by the authors for the parent system of postsecondary institutions including parent companies of for-profit college chains.
OPEID		1990-2015	NSLDS	Reporting unit in the National Student Loan Data System ††
Year		1987-2015	IPEDS	Year in which the spring term ends. For example, the 2001/2002 academic year is referred to as 2002.

Note: *Each part time student is included in this count as a fraction of a full time based on IPEDS specificied formulas. ±For 4-year, 2-year, and less-than-2-year degrees and certificates. We include this by year of the cohort's first enrollment. **This is not mutually exclusive from private equity ownership such as in cases where private equity owners take a company public or acquire substantial shares in a publicly traded company without taking it private. ††OPEIDs commonly encompass more than one college owned by a for-profit parent company.

Table B.3: Law Enforcement Actions

Total law enforcement actions linked to IPEDS data		125	
Allegation		**Prosecuting Agency**	
Violated rules about recruiting/marketing*	44	State AG	56
Student loan fraud	35	DOJ	24
False Claims	31	DOE	23
Misrepresented job placement statistics	28	FBI	5
Misrepresented credentials/accreditation	23	FTC	4
Embezzlement	7	SEC	4
Fraudulent High School Diplomas	5	CFPB	3
Illegal Funds	4	Other	6
Real estate fraud	1		
	PE-owned	**Not PE-owned**	
Total school-year observations	13,137	309,242	
Number of instances in which school experienced its first law enforcement action	34	24	

Note: *For example, there are regulations limiting incentive compensation to sales force.

Table B.4: Coarse exact matching reporting

Financials		**Outcomes**		**Operations**	
Initial imbalance*	1.00	Initial imbalance*	0.99	Initial imbalance*	0.99
Imbalance after match	0.43	Imbalance after match	0.26	Imbalance after match	0.15
Matched PE:	10	Matched PE:	977	Matched PE:	784
Matched non private equity for-profits:	2500	Matched non PE for-profits:	38869	Matched non PE for-profits:	34558
Loans		**Demographics**			
Initial imbalance*	0.99	Initial imbalance*	0.99		
Imbalance after match	0.53	Imbalance after match	0.27		
Matched PE:	187	Matched PE:	926		
Matched non PE for-profits:	7476	Matched non PE for-profits:	35112		

Note: This table reports the matching statistics from the coarse exact matching exercises. *Multivariate L1 distance. The estimator was developed by Iacus, King, and Porro [2012] and implemented in Stata with the cem package. After matching exactly on year (the year prior to the private equity event), we match on: number of students, the percent of students on federal grants, the share black, the share white, the highest degree type offered, whether the school is primarily online, and whether the school is selective. There are multiple matching exercises in this table because we do not match on the dependent variable, and because the datasets are different at the SystemID level (financials), OPEID level (CDR), and UnitID level (all others).

Table B.5: Effect omitting largest deals and their subsequent acquisitions

Panel 1

Dependent variable	Log profits (mill 2015$)	Log total revenue (mill 2015$)	Log total expenditure (mill 2015$)	Log number of FTE students	Tuition per student (2015$)
	(1)	(2)	(3)	(4)	(5)
PE owned	1.2***	.97***	.91***	.35***	1587***
	(.22)	(.12)	(.14)	(.049)	(567)
Highest degree offered f.e.†	Y	Y	Y	Y	Y
School f.e.	Y	Y	Y	Y	Y
Year f.e.	Y	Y	Y	Y	Y
N	80206	80206	80206	123557	102850
R^2	.83	.97	.97	.97	.82

Note: This table shows regression estimates (OLS) and matching estimates of the effect of private equity ownership, omitting the three largest deals. Observations are at the school (UnitID)-year level. Standard errors are two-way clustered by year and institution/firm (a firm may have multiple "schools", or campuses). †Less than 2-year (certificate), 2-year, or 4-year. Coefficients marked with ∗, ∗∗,∗∗∗ , denote p < .1, p < .05, p < .01, respectively.

Panel 2

Dependent variable	1st law enforcement action	Share students white	Graduation rate	Average loan per borrower (2015$)	Repayment rate (3 year)
	(1)	(2)	(3)	(4)	(5)
PE owned	.0028***	-.048***	-.043***	698***	-.034**
	(.00059)	(.0078)	(.012)	(211)	(.012)
Highest degree offered f.e.†	Y	Y	Y	Y	Y
School f.e.	Y	Y	Y	Y	Y
Year f.e.	Y	Y	Y	Y	Y
N	123557	123557	57024	75517	19647
R^2	.13	.92	.8	.65	.96

Note: This table shows regression estimates (OLS) and matching estimates of the effect of private equity ownership, omitting the three largest deals. Observations are at the school (UnitID)-year level. Standard errors are two-way clustered by year and institution/firm (a firm may have multiple "schools", or campuses). †Less than 2-year (certificate), 2-year, or 4-year. Coefficients marked with ∗, ∗∗,∗∗∗ , denote p < .1, p < .05, p < .01, respectively.

Panel 3

Dependent variable	Log mean wages	Log 10th pctile wages	Log 25th pctile wages	Log median (50th pctile) wages	Log 75th pctile wages	Log 90th pctile wages
	(1)	(2)	(3)	(4)	(5)	(6)
PE owned	-.059**	-.046	-.052*	-.059**	-.057**	-.062**
	(.014)	(.034)	(.021)	(.016)	(.014)	(.014)
Highest degree offered f.e.†	Y	Y	Y	Y	Y	Y
School f.e.	Y	Y	Y	Y	Y	Y
Year f.e.	Y	Y	Y	Y	Y	Y
N	16824	16824	16824	16824	.96	.95
R^2	.97	.91	.95	.96	0.953	0.938

Note: This table shows regression estimates (OLS) and matching estimates of the effect of private equity ownership, omitting the three largest deals. Observations are at the school (UnitID)-year level. Standard errors are two-way clustered by year and institution/firm (a firm may have multiple "schools", or campuses). †Less than 2-year (certificate), 2-year, or 4-year. Coefficients marked with $*$, $**$,$***$, denote p < .1, p < .05, p < .01, respectively.

Table B.6: Management Changes

Dependent Variable: Change in school CEO within first three years after buyout

	(1)	(2)	(3)	(4)	(5)	(6)
PE	.081***	.029**	.024*	.079***	.044***	.038***
	(.019)	(.014)	(.014)	(.019)	(.014)	(.014)
Composition controls	No	No	Yes	No	No	Yes
School Fixed Effects	No	Yes	Yes	No	Yes	Yes
Year Fixed Effects	No	No	Yes	No	No	Yes
Sample	All	All	All	For-profit	For-profit	For-profit
Observations	201546	201546	180350	74827	74827	71903
R^2	.015	.21	.21	.036	.24	.24

Note: This table shows the effect of a private equity buyout on the chances that the CEO changes. All regressions control for size (number of students). *Standard errors are clustered at the system level. Coefficients marked with $*$, $**$,$***$, denote p < .1, p < .05, p < .01, respectively.

Table B.7: Effect on Graduation Rates by Changes in Education Inputs (Faculty per student, and Instruction Share of Spending)

Dependent Variable: Graduation rate in first year after buyout year

Sample:	$\Delta_{t-1,t}^{Faculty} <$ 25 pctile	$\Delta_{t-1,t}^{Faculty} >$ 25 pctile	Interaction between PE and $\Delta_{t-1,t}^{Faculty} <$ 25 pctile	$\Delta_{t-1,t}^{InstructShare} <$ 25 pctile	$\Delta_{t-1,t}^{InstructShare} >$ 25 pctile	Interaction between PE and $\Delta_{t-1,t}^{InstructShare} <$ 25 pctile
	(1)	(2)	(3)	(4)	(5)	(6)
PE	-.13***	-.089**	-.07**	-.074	-.047	-.047
	(.038)	(.031)	(.029)	(.059)	(.035)	(.032)
1|<25th pctile			-.0036			.00017
			(.0023)			(.0022)
PE·1|<25th pctile			-.019			-.06*
			(.036)			(.033)
School Fixed Effects	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Observations	5596	24021	30894	6638	20778	28215
R^2	.82	.89	.86	.86	.89	.86

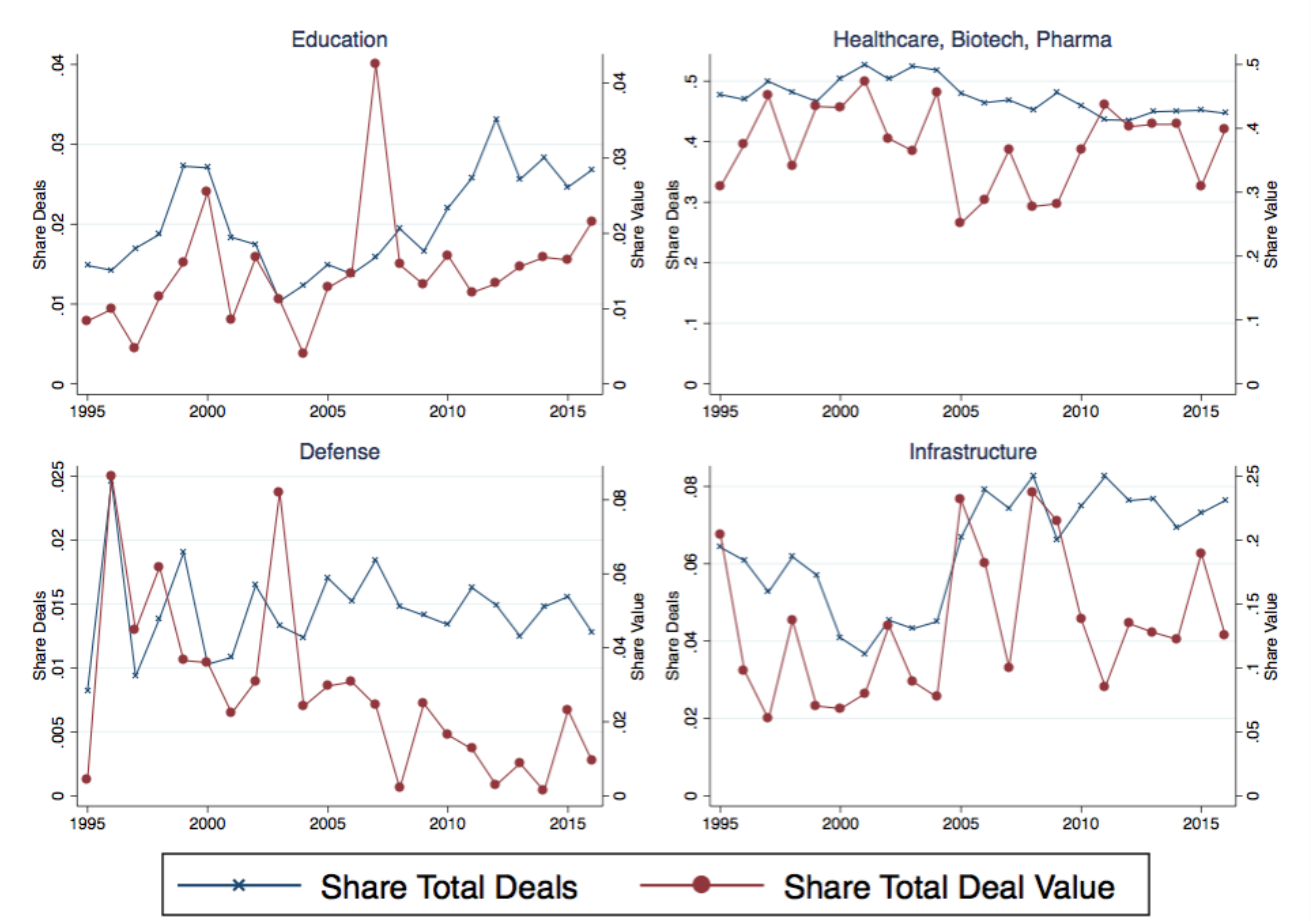
Note: This table shows whether the effect of private equity buyouts on graduation rates in the first year after the buyout (i.e., the immediate effect) is larger among schools where there is a larger immediate decline in education inputs. We consider only the year after the buyout, to focus on drivers of the immediate decline in graduation rates. We use two types of education inputs: FTE faculty per 100 students (columns 1-3) and the instruction share of total spending (columns 4-6). The first two columns for each split the sample below and above the 25th percentile for the change in education input between the year before and the year after the buyout. The third column interacts an indicator for whether the change in education input is below the 25th percentile with the PE indicator. Letting t represent the first affected buyout year, the estimating equation for this interaction model is $Y_{i,t} = \beta_1 PE_{i,t} \cdot \left(\Delta_{t-1,t}^{EducInput} < 25pctile\right) + \gamma \mathbf{X}_{it} + \alpha_i + \alpha_t + \varepsilon_{it}$. Here, $\Delta_{t-1,t}^{EducInput} < 25pctile$ indicates that the change in education input between $t-1$ and t is less than its 25th percentile. The 25th percentile is -.4 for faculty, and -.018 for instruction spending share. *Standard errors are clustered at the system level. Coefficients marked with $*$, $**$,$***$, denote p < .1, p < .05, p < .01, respectively.

Table B.8: Effect of 2007 Loan Limit Increase on Graduation Rates and Faculty by PE status

	Dependent Variable: Graduation Rate			Dependent Variable: FT Faculty per 100 Students		
	(1)	(2)	(3)	(4)	(5)	(6)
PE owned·Post 2007	-0.0376***	-0.0361***	-0.0279**	-2.547	-0.913***	-2.285
	(0.00994)	(0.00990)	(0.0108)	(1.770)	(0.169)	(1.862)
Controls	N	Y	Y	N	Y	Y
Sample	All	All	For-Profits	All	All	For-Profits
School Fixed Effects	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	45,923	45,923	11,319	45,923	45,923	7,550

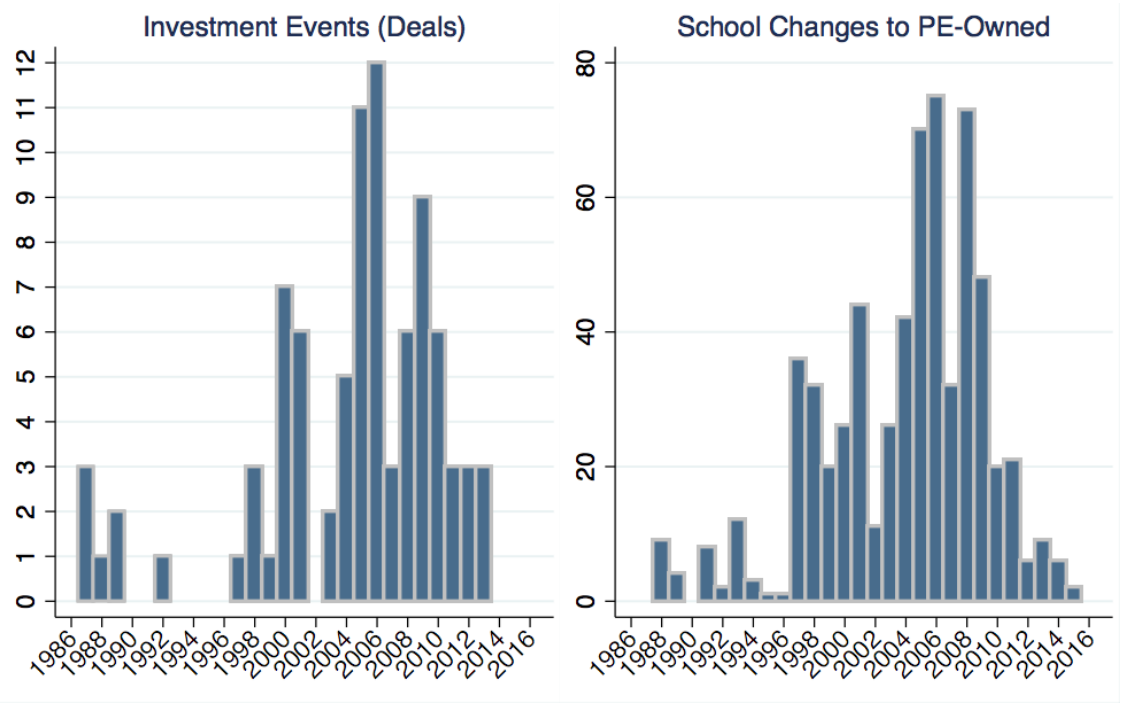
Note: This table shows the difference-in-difference estimate of the effect of the 2007 loan limit increase on graduation and full time faculty. Standard errors are clustered at the system level. Coefficients marked with $*$, $**$,$***$, denote p $< .1$, $p < .05$, $p < .01$, respectively.

Figure B.1: Share of private equity investment in government subsidy-intensive sectors as share of overall private equity investment, 1995-2016



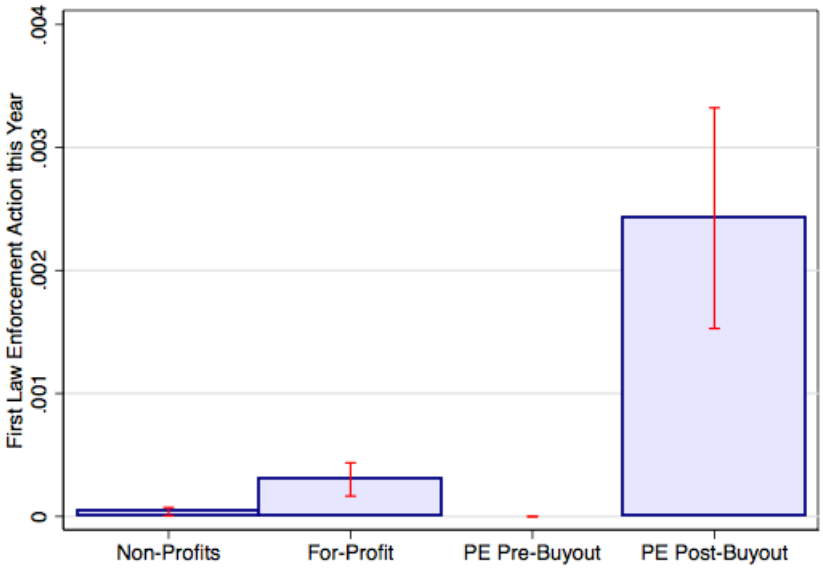
Note: All global private equity transactions included. Total value was $716 billion in 2016, up from just $19 billion in 1995. Source: CIQ.

Figure B.2: Private Equity Deals and School Ownership



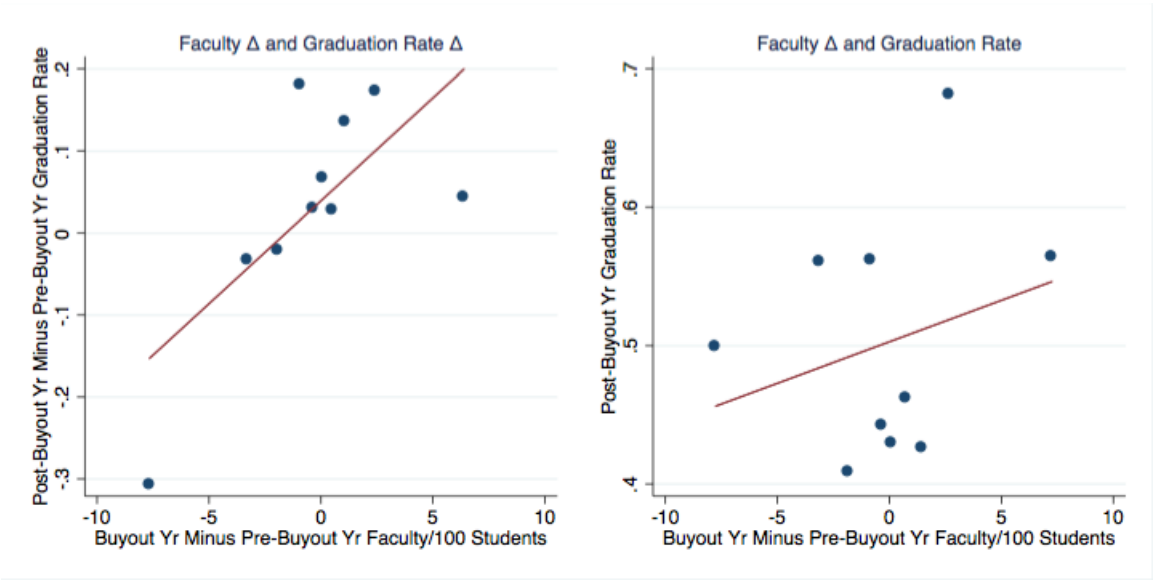
Note: The left-hand figure shows the 88 PE deals (mostly buyouts) in our data; these are PE firm investments in schools or chains of schools. The middle figure shows school (UnitID)-level ownership changes to PE. The right-hand figure shows the total number of schools under PE ownership. Data collected by the authors.

Figure B.3: Law Enforcement Actions by School Type



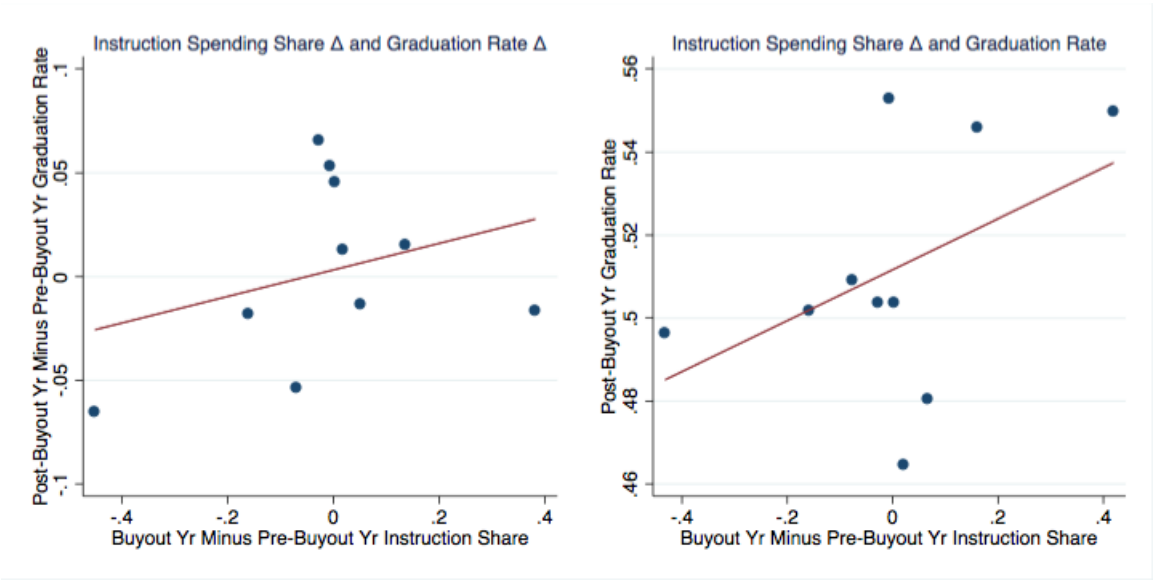
Note: This figure shows the chances in a given year that a school has its first law enforcement action.

Figure B.4: Graduation rates and changes in faculty/student ratio in year following buyout



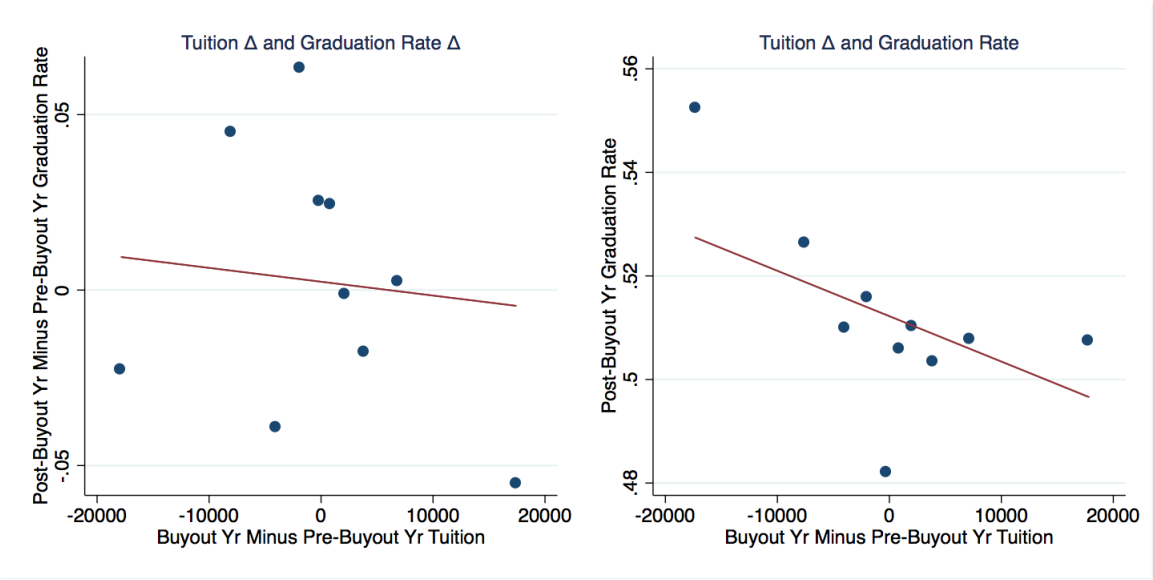
Note: These figures show 10 quantile binscatters relating changes in FTE faculty per 100 students to graduation rates. The x-axis shows the change in faculty-to-student ratio between the year before and the year after the buyout, so a negative number means the school reduced its faculty-to-student ratio. In the left figure, the y-axis shows the change in graduation rates, while in the right figure, the y-axis shows absolute graduation rates.

Figure B.5: Graduation rates and changes in the instruction share of spending in year following buyout



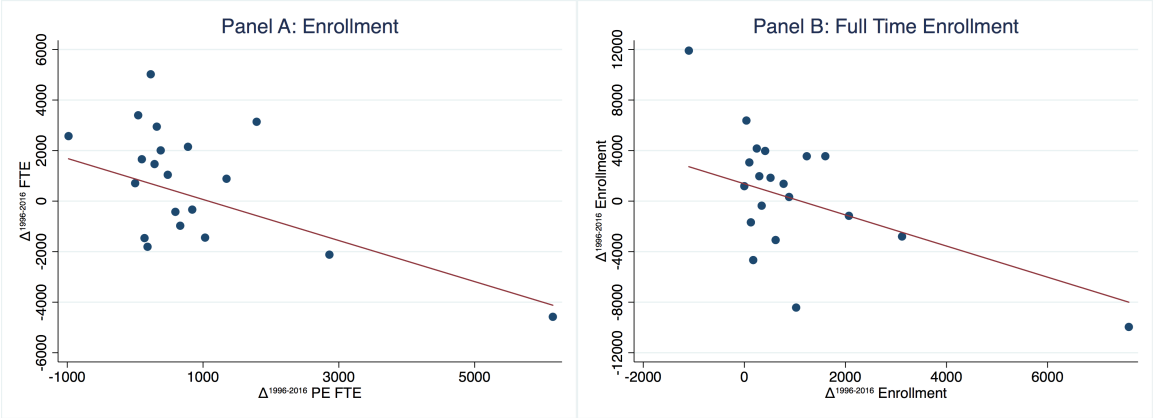
Note: These figures show 10 quantile binscatters relating changes in the instruction share of total spending to graduation rates. The x-axis shows the change in the instruction share of spending between the year before and the year after the buyout, so a negative number means the school reduced its instruction share of spending. In the left figure, the y-axis shows the change in graduation rates, while in the right figure, the y-axis shows absolute graduation rates.

Figure B.6: Graduation rates and changes in tuition in year following buyout



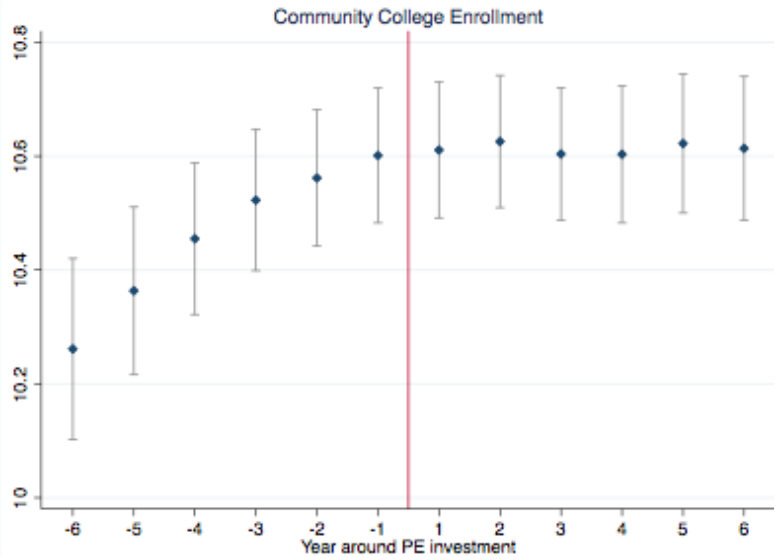
Note: These figures show 10 quantile binscatters relating changes in tuition to graduation rates. The x-axis shows the change in the instruction share of spending between the year before and the year after the buyout, so a negative number means the school reduced its instruction share of spending. In the left figure, the y-axis shows the change in graduation rates, while in the right figure, the y-axis shows absolute graduation rates.

Figure B.7: Private Equity Schools and Community College Enrollment



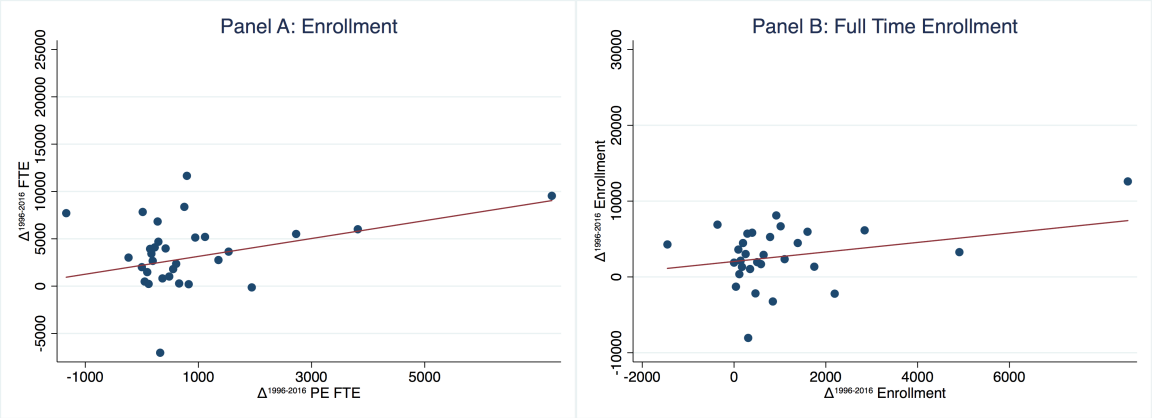
Note: The figure on the left shows the cross sectional relationship between the change in enrollment at community colleges and private equity owned for-profits between 1996 and 2016. The figure on the left shows the cross sectional relationship between the change in full time enrollment at community colleges and private equity owned for-profits between 1996 and 2016. Community colleges are defined as public institutions granting two year or lower degrees.

Figure B.8: Private Equity School Entry and Community College Enrollment



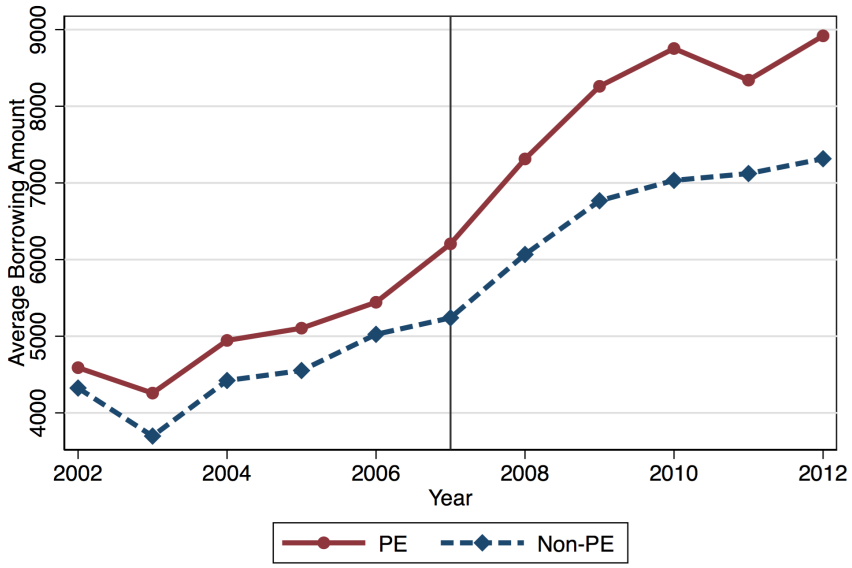
Note: This figure shows log enrollment in community colleges before and after the entry of a private equity backed for-profit college. Community colleges are defined as public institutions that grant two year or lower degrees.

Figure B.9: Private Equity Schools and High Quality College Enrollment



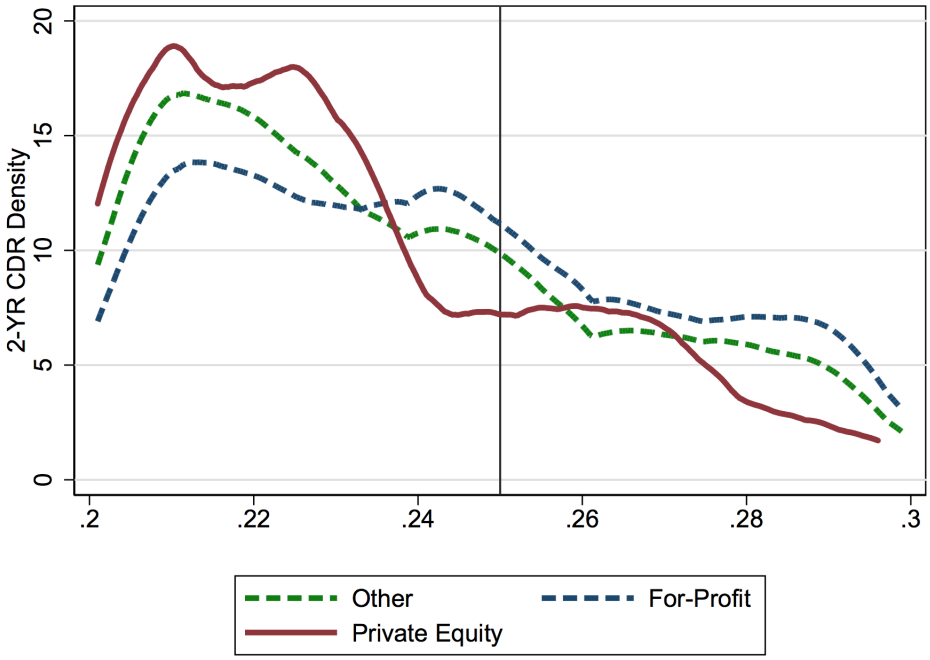
Note: The figure on the left shows the cross sectional relationship between the change in enrollment at high quality colleges and private equity owned for-profits between 1996 and 2016. The figure on the left shows the cross sectional relationship between the change in full time enrollment at high quality colleges and private equity owned for-profits between 1996 and 2016. High quality colleges are defined as institutions where more than half of students graduate within 150% of normal time.

Figure B.10: Borrowing at Private Equity Institutions



Note: This figure shows borrowing at PE-owned schools bought before 2007, and borrowing at other for-profits. The vertical line shows 2007, when student borrowing limits were increased.

Figure B.11: Density of Cohort Default Rates by Institution Type



Note: This figure shows the density of two year cohort default rates, broken down by institution type.

Appendix C: Role of Public Firms and Gainful Employment Analysis

This Appendix contains our tests focusing on publicly traded schools.

C.1 Effect of public ownership on student outcomes

Publicly traded schools may also have high-powered incentives to maximize profits relative to independent for-profit schools. It is also the case that most publicly traded schools were formerly private equity owned. This section explores whether publicly traded schools behave similarly to private equity owned schools, and whether there is a distinction between those publicly traded schools that were and were not formerly private equity owned are different.

We use variants of the following specification:

$$Y_{it} = \beta_1 PE_{it} + \beta_2 Public_{it} + \beta_3 PE_{it} Public_{it} + \gamma \mathbf{X}_{it} + \alpha_i + \alpha_t + \varepsilon_{it} \quad (1)$$

Here, i indexes schools and t indexes years. PE_{it} takes a value of one if the school is private equity owned in year t. $Public_{it}$ takes a value of one if the school is publicly traded in year t. PE_{it} is one for schools that are private equity owned, as well as those that are publicly traded and formerly private equity owned. We examine whether publicly traded firms that were private equity owned behave differently than publicly traded schools that never had private equity ownership through the interaction $PE_{it}Public_{it}$. $\mathbf{X}_{it}$ is a vector of controls, which always includes fixed effects for the highest degree that the school offers and whether the school is selective. We include school fixed effects (α_i) and year fixed effects (α_t). We two-way cluster standard errors by parent company and year.

In Table C1, the base case is all schools that are neither private equity owned nor publicly traded. The total effect of a public, formerly private equity owned school (i.e. PE_{it} and $Public_{it}$ are both one) relative to this base case is the sum of the three coefficients ($\beta_1 + \beta_2 + \beta_3$). For example, public and formerly private equity owned schools have 0.75 less faculty per 100 students (-.41-.64+.31). The coefficient on PE_{it}, β_1, is the effect of a private equity buyout when that school

is not subsequently publicly traded, relative to the base case. Thus private equity owned schools have 0.42 less faculty per 100 students; this is of course very close to the coefficient in our main model where publicly traded schools are all simply part of the control group (0.44).

C.2 Gainful Employment Announcement

In this section, we present evidence that the market value of for-profit postsecondary schools is tightly connected to their ability to access federal aid regardless of student outcomes. We exploit four events comprising the introduction, watering down and eventual end of the Gainful Employment (GE) rule, which aimed to tie a school's access to federal grants and federally guaranteed loans to student labor market performance. Consistent with for-profit schools capturing government aid, we find that the market values of publicly traded for-profits fell sharply when the GE rule was announced. Conversely, affected firms experienced positive abnormal returns when the rules were weakened and ultimately vacated.

This analysis uses data on publicly traded firms. While this approach may seem somewhat disconnected from the paper's focus on private equity, in fact it serves to highlight the role of private equity in building the modern for-profit higher education sector. Currently, the largest purveyors of for-profit higher education are publicly traded, and all of the major public companies has at some point been private equity-owned. We document this in Table C.2. All received private equity investment prior to going public, except for Strayer University, which was taken private in a reverse LBO in 2001. The results in Section 4 revealed that the behavior of these formerly private equity owned, publicly traded schools is more similar to private equity owned, privately held schools than to other for-profits. Therefore, this section is both an extension of the private equity analysis, and also demonstrates the relationship between federal aid access and future cash flows for all for-profits with higher powered incentives than either independent, privately held for profits or community colleges and other nonprofit institutions.

First announced on July 26, 2010, the GE rule would have required graduates to meet debt-

to-earnings requirements in order for the college to remain eligible for federal aid.[12] The goal was to eliminate programs in which students took on debt that was unmanageable relative to their expected labor market outcomes. Following the initial announcement, the rules were revised on June 2, 2011. This change substantially weakened the original rules.[13] In 2017, the rules were suspended altogether.[14]

Cumulative abnormal returns follow Campbell et al. [1997]and Acemoglu et al. [2016]. The abnormal return for stock i at date t is given by

$$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \tag{2}$$

where R_{it} is the return of stock i at date t, and R_{mt} is the market return. The terms $\hat{\alpha_i}$ and $\hat{\beta}_i$ are estimated from the following equation

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \tag{3}$$

Equation 3 is estimated for the 250 day trading period from 270 days prior to the event period.[15] The abnormal return in Equation 2 is calculated for each day of the event window, which encompasses the 20 trading days before to the 20 trading days after the event date. Firms are excluded if they are in the data for fewer than 150 days of the estimation window or fewer than 20 days of the event window.

Cumulative abnormal returns (CAR) are then calculated as

[12]Specifically, to remain Title IV-eligible, all for-profit and certificate programs would have had to pass at least one of three metrics: 1) at least 35 percent of former students must be in active repayment, defined as reducing their loan annually by at least $1; 2) annual loan payments could not exceed 30 percent of a typical graduate's discretionary income; or 3) annual loan payments could not exceed 12 percent of a typical graduate's total earnings. See IFAP and US News for more information.

[13]Under the 2010 rules, if a school failed three tests, the school would immediately lose access to federal grants and loans. Under the new rules, if schools failed three tests three times in a four year span, access to federal grant and loans programs would be cut. The tests are that (1) at least 35 percent of students are paying down their loans, (2) graduates on average are spending less than 12 percent of their total income on loan payments and (3) graduates on average must be spending less than 30 percent of their discretionary income on loan payments. See the announcement for more information.

[14]See the Washington Post for more information.

[15]This estimation period is chosen to prevent the estimation period from influencing market returns and the expected return calculation.

$$CAR[0,n] = \sum_{t=0}^{n} AR_{it}, \tag{4}$$

where n is the day following the start of the analysis period, 20 trading days prior to the event date. We compare fifteen firms that own for-profit institutions with GE data available between 2010 and 2015. Control firms for the event studies are publicly traded firms with the same first three-digit NAICS as those in the treatment sample. Thus, the control firms are those with NAICS codes with 611 (Educational Services) and 812 (Personal Services) as the first three digits, which includes 48 controls firms in total.

Figure C.1 shows the CAR results. Each panel shows CAR values before and after a regulatory event. Time denotes days, and prices are measured at the close of each trading day. The left hand panel shows the announcement of the GE rules on July 26, 2010.[16] There is a sharp drop in CAR for exposed firms. In contrast, we see no discernible pattern for education firms unaffected by the GE rules. The right hand panel in Figure C.1 shows the jump in CAR following the June 2, 2011 rule weakening. Again we see no response for the control group.

Table C.3 presents results analogous to those in Figure C.1. We use variants of the following specification

$$CAR_{it} = \alpha_i + \alpha_t + \delta FP_i * Post_t + \varepsilon_{it}, \tag{5}$$

where CAR_{it} are the cumulative abnormal returns for firm *i* on day *t*. We include firm effects α_i, which absorb time invariant firm specific factors. Trading day fixed effects α_t absorb market-wide factors. The coefficient of interest is δ, which gives us the differential effect of the treatment group, firms owning for-profit colleges, relative to the control group following the announcement.

The first three columns of Table C.3 show results for the initial announcement of GE rules. The first column presents simple difference and difference estimates post and treatment dummies, the second column adds in date fixed effects, while the third column includes both sets of fixed effects.

[16] See the announcement for more information.

Consistent with the graphical evidence, we see a sharp drop in CAR, and the effect is statistically significant at the .05 level or higher in all specifications. Columns (4) through (6) repeats the analysis for the announcement of the new less restrictive GE rules. The estimates regarding the GE rules being softened are consistent with the graphical results in Figure C.1.

In sum, this analysis provides additional evidence that a major aspect of for-profit market value is rent-seeking capture of government aid, which is unambiguously not in students' or taxpayers' interests. We focus here on publicly traded for-profits, which likely have higher-powered incentives than independent, privately held for-profit schools. Also, the largest of these public firms were once private equity owned. Our result does not in itself imply that private equity buyouts do not improve education quality. However, in combination with the other evidence in Section 5 (loan limit increase and CDR bunching), it indicates that superior rent-seeking federal aid capture is an important channel through which high-powered incentives translate to higher profits.

Table C.1: Role of Public, Formerly Private Equity Owned Firms

Panel 1

Dependent variable:	Log profits (mill 2015$)	Log total revenue (mill 2015$)	Log total expenditure (mill 2015$)	Log number of FTE students	Faculty per 100 students	1st law enforcement action	Tuition per student (2015$)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PE owned	1.2***	1***	.96***	.37***	-.42*	.0026***	1745***
	(.22)	(.13)	(.15)	(.066)	(.21)	(.00056)	(498)
Public	1.8***	1.5***	1.4***	.4***	-.64**	.00093	1491*
	(.35)	(.36)	(.37)	(.088)	(.27)	(.00074)	(727)
PE owned·Public	-.63	-.44	-.36	-.29***	.31	.000082	-1225
	(.57)	(.49)	(.5)	(.1)	(.33)	(.0014)	(1009)
Highest degree offered f.e.†	Y	Y	Y	Y	Y	Y	Y
Selective admissions f.e.	Y	Y	Y	Y	Y	Y	Y
School f.e.	Y	Y	Y	Y	Y	Y	Y
Year f.e.	Y	Y	Y	Y	Y	Y	Y
N	80260	80260	80260	104795	58752	127180	104795
R^2	.83	.97	.97	.97	.82	.14	.82

Note: This table shows regression estimates (OLS) and matching estimates of the effect of private equity ownership on firm (highest level of school or chain) financials. ±Coarse-exact matching is done first exactly on the year before the treated school's buyout, among for-profit schools, and then on characteristics. The dependent variables are measured 2 years after the treated school's buyout. Observations are at the firm (SystemID)-year level. Standard errors are two-way clustered by year and institution/firm (a firm may have multiple "schools", or campuses). †Less than 2-year (certificate), 2-year, or 4-year. Coefficients marked with ∗, ∗∗,∗∗∗ , denote p < .1, p < .05, p < .01, respectively.

Panel 2

Dependent variable:	Share students white	Pell grants per student (2015$)	Share students graduating in 150% normal time	Average loan per borrower (2015$)	Cohort default rate (2 year)	Repayment rate (3 year)	Graduation rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PE owned	-.053***	-31	-.064***	1095***	.0043	-.029*	-.078***
	(.0066)	(303)	(.014)	(295)	(.0051)	(.011)	(.017)
Public	-.1***	521	-.062***	593	.02***	-.026*	-.069***
	(.023)	(314)	(.017)	(862)	(.0063)	(.012)	(.019)
PE owned·Public	.069**	-339	.059*	-1189	-.021**	-.013	.074**
	(.026)	(431)	(.03)	(1088)	(.0092)	(.0094)	(.03)
Highest degree offered f.e.†	Y	Y	Y	Y	Y	Y	Y
Selective admissions f.e.	Y	Y	Y	Y	Y	Y	Y
School f.e.	Y	Y	Y	Y	Y	Y	Y
Year f.e.	Y	Y	Y	Y	Y	Y	Y
N	127180	127180	58199	78869	83002	20357	56405
R^2	.92	.61	.8	.65	.61	.96	.8

Note: This table shows regression estimates (OLS) and matching estimates of the effect of private equity ownership on firm (highest level of school or chain) financials. ±Coarse-exact matching is done first exactly on the year before the treated school's buyout, among for-profit schools, and then on characteristics. The dependent variables are measured 2 years after the treated school's buyout. Observations are at the firm (SystemID)-year level. Standard errors are two-way clustered by year and institution/firm (a firm may have multiple "schools", or campuses). †Less than 2-year (certificate), 2-year, or 4-year. Coefficients marked with $*$, $**$,$***$, denote p < .1, p < .05, p < .01, respectively.

Panel 3

Dependent variable:	Log mean wages	Log 10th pctile wages	Log 25th pctile wages	Log median (50th pctile) wages	Log 75th pctile wages	Log 90th pctile wages
	(1)	(2)	(3)	(4)	(5)	(6)
PE owned	-.043**	-.031	-.039*	-.038**	-.042**	-.045**
	(.011)	(.024)	(.016)	(.013)	(.011)	(.012)
Public	-.089**	-.18**	-.11*	-.092**	-.084**	-.081**
	(.022)	(.056)	(.041)	(.025)	(.019)	(.018)
PE owned·Public	.069***	.13*	.093**	.073***	.065***	.063**
	(.015)	(.055)	(.032)	(.015)	(.012)	(.014)
Highest degree offered f.e.†	Y	Y	Y	Y	Y	Y
Selective admissions f.e.	Y	Y	Y	Y	Y	Y
School f.e.	Y	Y	Y	Y	Y	Y
Year f.e.	Y	Y	Y	Y	Y	Y
N	17238	17238	17238	17238	17238	17238
R^2	.97	.92	.95	.97	.97	.96

Note: This table shows regression estimates (OLS) and matching estimates of the effect of private equity ownership on firm (highest level of school or chain) financials. ±Coarse-exact matching is done first exactly on the year before the treated school's buyout, among for-profit schools, and then on characteristics. The dependent variables are measured 2 years after the treated school's buyout. Observations are at the firm (SystemID)-year level. Standard errors are two-way clustered by year and institution/firm (a firm may have multiple "schools", or campuses). †Less than 2-year (certificate), 2-year, or 4-year. Coefficients marked with $*$, $**$,$***$, denote p < .1, p < .05, p < .01, respectively.

Table C.2: Major Publicly Traded Higher Education Institutions

	First private equity investment/buyout	IPO date	Private equity reverse LBO date (public to private)	Second IPO date	Share of for-profit enrollment in 2010
EDMC	1986	1996	2006	2009	2.7%
Devry	1987	1991			2.8%
Corinthian	1995†	1999			2.1%
Capella	1995	2006			1.6%
Strayer		1996	2001		2.2%
Apollo (U. of Phoenix)		2000	2017		20.2%
Grand Canyon	2004	2008			1.4%
Laureate	2007	2017			1.8%

Note: This table lists the largest for profit higher education institutions ever publicly traded. †PE-financed acquisition of 15 campuses.

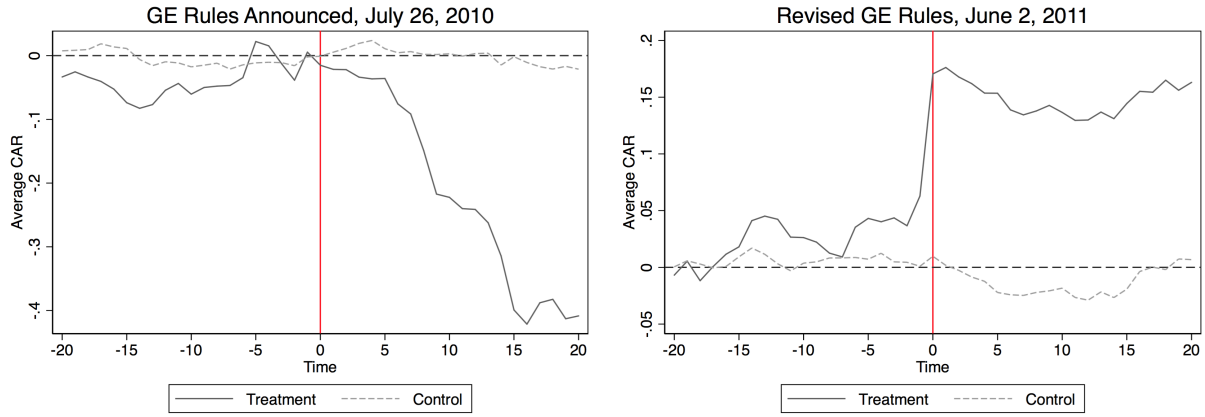
Table C.3: Gainful Employment Event Studies

Panel 1

Event:	GE Rules Announced			GE Rules Held		
Dependent Variable: Cumulative Abnormal Returns						
	(1)	(2)	(3)	(4)	(5)	(6)
FP X Post	-0.186***	-0.186***	-0.186***	0.135***	0.135***	0.135***
	(0.0340)	(0.0344)	(0.0348)	(0.0245)	(0.0248)	(0.0251)
FP	-0.0321**	-0.0321**		0.0264	0.0264	
	(0.0146)	(0.0148)		(0.0198)	(0.0200)	
Post	0.00455			-0.0192		
	(0.0181)			(0.0134)		
Firm Fixed Effects	No	No	Yes	No	No	Yes
Date Fixed Effects	No	Yes	Yes	No	Yes	Yes
Observations	1845	1845	1845	2050	2050	2050

Note: *Average Cumulative Abnormal Returns for the stocks are calculated around 60-day event windows, $CAR[0,n] = \sum_{t=0}^{n} AR_{it}$. Standard errors are clustered at the firm level. Coefficients marked with $*$, $**$,$***$, denote p < .1, p < .05, p < .01, respectively.

Figure C.1: Gainful Employment Rules and Cumulative Abnormal Returns



Note: The figure above shows cumulative abnormal returns for treatment and control schools. Average Cumulative Abnormal Returns for the stocks are calculated around 60-day event windows.

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