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 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

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

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.1). 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, Goldin, and Katz 2012).

Resources are focused on sales and marketing. Deming et al. (2012) cite evidence that at large national for-profit chains, sales and marketing expenditure comprised 24 percent of revenue in 2009, making the average cost of acquiring a new customer $4,000. In contrast, sales and marketing comprises about 10 of revenue in healthcare, and 8 percent in financial services.[3] 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

[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.

[3]See http://deloitte.wsj.com/cmo/2017/01/24/who-has-the-biggest-marketing-budgets/

marketing and recruiting, and cited evidence of large-scale student deception about completion rates, placement rates, and other statistics. The report concluded that the lack of student support "may help to explain why more than half a million students who enrolled in 2008-9 left without a degree or Certificate by mid-2010." A 2010 GAO investigation sent undercover agents to apply to for-profits. They found deceptive marketing at all targeted schools, and applicants "were encouraged by college personnel to falsify their financial aid forms to qualify for federal aid" at 26 percent of schools.[4]

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.[5]

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.

[4] https://www.gao.gov/products/GAO-10-948T

[5] 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

Significant information and market frictions exist in the higher education sector (Bettinger et al. (2012); Wiswall and Zafar (2014)). 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).[6]

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.

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.

[6]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.

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).[7]

The Federal Credit Reform Act of 1990 had changed federal accounting rule and made it possible 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.

[7] See Financial Aid for more information.

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.[8]

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.[9]

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.[10] The average Pell grant is about $3,724 per year,

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

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

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

and the maximum is \$5,775.[11] 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. Beyond changing in the target's capital structure, 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.

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.[12] 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

[11] See theCollege Board for more information.

[12] 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.

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.[13]

Florida Career also illustrates how private equity pressures for rapid growth in operating margins can lead to declines in graduation rates. After TA Associates exited, Florida Career Colleges along with Midwest Career Colleges was acquired by Greenhill Capital Partners and Abrams Capital. Initially, the company took steps to address compliance issues. In an email interview with the authors, however, a high-level manager said: "When presenting annual results to investors, I told Managing Partner of PE firm [sic] that I wanted to address all the compliance and regulatory achievements. He laughed and said 'they don't care about that. All they want to know is how much money you made them.'" In this context, investors again changed the senior management of Florida and Midwest Career in 2012. After these changes in executive leadership, "they started decimating faculty and student services and opening doors to all students regardless of ability" according to the former high-level manager.

Similar changes occurred after private equity buyouts of existing chains such as the KKR acquisition of Laureate. A 3,000 page investigative report by the U.S. Senate Health, Labor, Education, and Pension Committee in 2012 examined complaint data from most of 10 firms for which it published case studies on firm behavior after buyouts. Student complaints consistently point to a heavy reliance on part-time instructors with minimal certification and high instructional staff turnover rates. After the buyout of Concorde Career Colleges by Liberty Partners in 2006, for example, the entire 2010 class of licensed vocational nursing students at one campus filed a complaint with administrators. In their complaint, the students wrote that: "instructors [were] late to start class … [by] 20-40 minutes," lectures were "vague" and "lack[ed] structure," instructors were "ill prepared" and spent time "searching for lost papers or tests or equipment" (Senate,

[13] See the Chronicle for further information.

2012, 374)

A student in a separate March 11, 2010 complaint letter complained that the Concorde's San Bernardino campus had cycled through three Directors of Nursing and two Assistant Directors during the student's first year at the school. Annual faculty turnover across all Concorde campuses was 42 percent in 2008 and 35 percent in the first 9 months of 2009 (Senate, 2012, 374).

With backing from Warburg Pincus, Bridgepoint Education made similar changes after acquiring Ashford University and University of the Rockies. Bridgepoint transformed its schools into exclusively online campuses with 96 percent of faculty working only part-time (Senate, 2012, 310). With 39 percent of its expenditures going to marketing and recruitment, enrollment at Bridgepoint grew to a high of 77,119 students in 2010 (Senate, 2012, 299). Deceptive recruiting practices at Bridgepoint may have in turn harmed graduation rates, after-school earnings, and student debt repayment. Brent Park, a former recruiter for Bridgepoint submitted written testimony to a Department of Education rulemaking process in which he wrote: "If we don't have a degree they want, we are supposed to convince them that one of ours will work for them anyway" (Senate, 2012, 305).Consistent with Park's account of Bridgepoint recruitment practices, four students submitted complaints that they were deceived about financial aid and whether the program in which they enrolled would actually provide adequate certification for teaching or dental licenses (Senate, 2012, 306).

Private equity has played a role in a large fraction of for-profit higher education by enrollment. Since the late 1990s, private equity-owned 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 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: Variable Descriptions

Variable name	**Unit of Analysis**	**Years covered**	**Source**	**Description**
Panel 1: School Type				
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.
Panel 2: Demographics				
Share students white	UnitID	1987-2015	IPEDS	Share of fall semester undergraduates who are white.
Total Pell grant revenue per student (mill 2015$)	UnitID	1987-2015	IPEDS	Total revenue from Pell grants awarded to fulltime first-year students per fulltime first-year student.
Panel 3: Student Outcomes				
Graduation rate, all levels	UnitID	1995-2010	IPEDS	The graduation rate after 150 percent of normal time to degree.$^{\pm\pm}$
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 $1 dollar of principal on their loans 3 years after exiting school either by graduating or dropping out.
Wages 6 years after graduation	OPEID	1998-2007	College Score Card	Average income of exiting student cohort 6 years after the cohort leaves school by either graduating or dropping out.
Panel 4: Operational Outcomes				
Share of employees in sales	UnitID	2012-2015	IPEDS	The share of school employees who are in sales.
Non-instructional share of employees.	UnitID	2012-2015	IPEDS	The share of school employees who are not instructional.
Number of students	UnitID	1987-2015	IPEDS	The number of fall semester fulltime equivalent students.*
Online institution	UnitID	1987-2015	IPEDS	Indicator for whether a school was an online campus.$^{\pm}$
1st law enforcement action	UnitID	1987-2015	Authors	Indicator for the school experiencing its first law enforcement action in year.

		Panel 5: Financial Outcomes		
Profits	UnitID	1987-2015	IPEDS	Gross operarting margins calculated as total revenue minus total education and operating costs.
Net tuition revenue per FTE Student (2015$)	UnitID	1987-2015	IPEDS	Total revenue from tuition, including tuition paid for by federal and state grant aid programs, divided by the number of FTE students
Average loan per borrower (2015$)	UnitID	2000-2015	IPEDS	Dollars borrowed per borrower among fulltime, first-year undergraduate student.
Federal grant revenue per student (mill 2015$)	UnitID	2000-2015	IPEDS	Total revenue from federal grants awarded to fulltime first-year students per fulltime first-year student.
		Panel 6: Educational Inputs		
Faculty per 100 students	UnitID	1987-2015	IPEDS	The number of fulltime faculty per 100 students.
Instruction spending share	UnitID	1987-2015	IPEDS	The share of all expenditures related to instruction.
		Panel 6: 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. $^{\pm}$For-profit institutions are classified as online if they have the word online in their name or if they enroll no more than 33 percent of their students from a single state. This replicates the definition for online institutions used in Deming, Goldin, and Katz (2012). $^{\pm\pm}$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.2: 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**
Total school-year observations	11,508	198,797	210,305
Number of instances in which school experienced its first law enforcement action in years for which it reported enrollments to IPEDS	32	26	58

Note: This table documents the law enforcement actions. *For example, there are regulations limiting incentive compensation to sales force.

Table B.3: Nearest-neighbor matching covariate balance

Panel 1: Balance after matching

	Control			Treated				
	N	Mean	S.d.	N	Mean	S.d.	Diff	2-tailed p-value
Community colleges in CZ	52	8.67	10.21	4623	6.23	7.31	2.44	0.02
Independent for-profits in CZ	52	17.27	22.40	4623	15.30	17.62	1.97	0.43
Log profits	52	14.17	1.48	4623	14.00	1.44	0.17	0.39
Log FTE students in CZ	52	6.33	1.48	4623	6.31	1.15	0.02	0.88
Share students white	52	0.46	0.27	4623	0.59	0.26	-0.14	0.00
IC Level	52	2.17	0.65	4623	1.98	0.71	0.19	0.05

Panel 2: Balance before matching

	Control			Treated				
	N	Mean	S.d.	N	Mean	S.d.	Diff	2-tailed p-value
Community colleges in CZ	45781	9.71	12.87	574	11.98	14.17	-2.27	0.00
Independent for-profits in CZ	45781	30.76	45.86	574	35.95	47.76	-5.19	0.01
Log profits	40440	14.19	2.30	508	14.31	1.72	-0.12	0.25
Log FTE students in CZ	42428	0.54	0.33	513	0.51	0.29	0.03	0.06
Share students white	45774	6.38	1.48	573	6.75	1.21	-0.37	0.00
IC Level	45794	2.36	0.71	574	2.15	0.77	0.21	0.00

Note: This table reports covariate balance after nearest-neighbor matching, using the matching for log FTE students. The sample is limited to for-profit, non-publicly traded schools. Further, among PE targets, the sample is limited to the year prior to the buyout. CZ refers to commuting zone.

Table B.4: Effect of 2007 Loan Limit Increase on Faculty by PE status

	Dependent Variable: FT Faculty per 100 Students		
	(1)	(2)	(3)
PE owned·Post 2007	-1.4*	-.61***	-1
	[.73]	[.15]	[.95]
Controls	N	Y	Y
Sample	All	All	For-Profits
School Fixed Effects	Y	Y	Y
Year Fixed Effects	Y	Y	Y
Observations	41829	37660	8059
R^2	.016	.69	.18

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

Table B.5: Private Equity Ownership and Demographic Outcomes

Dependent variable:	Share students white		Pell grants per FTE student		Percent students on federal grants	
		NNM$^{\pm}$		NNM$^{\pm}$		NNM$^{\pm}$
	(1)	(2)	(3)	(4)	(5)	(6)
PE owned	-.05***	.031	-161	675**	.015	.041*
	[.0073]	[.028]	[269]	[319]	(.013)	[.023]
Composition controls[‡]	N	-	N	-	N	-
School type controls[†]	Y	-	Y	-	Y	-
School Fixed Effects	Y	-	Y	-	Y	-
Year Fixed Effects	Y	-	Y	-	Y	-
N	123053	33610	123053	24503	87739	26197
R^2	.92	-	.61	-	.75	-

Note: This table shows regression estimates (OLS) of the effect of private equity ownership on school operational outcomes. Observations are at the school (UnitID)-year level. [±]Nearest-neighbor matching is done within the sample of independent for-profit schools. The dependent variable is measured the year after the treated school's buyout. Matching is exactly on the year before the treated school's buyout, and then on characteristics (see Section 3.3 in main paper). [‡]We control for the share of students who are white, black, and Hispanic , and the average amount of federal Pell grants per student, a proxy for low-income students. [†]These are indicators for having selective admissions, public ownership, and are fixed effects for highest degree offered. The latter includes less than 2-year (certificate), 2-year, or 4-year. Standard errors two-way clustered by SystemID and year. Coefficients marked with $*$, $**$,$***$, denote p < .1, p < .05, p < .01, respectively.

Table B.6: 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 yerar

Sample:	$\Delta^{Faculty}_{t-1,t} <$ 25 pctile	$\Delta^{Faculty}_{t-1,t} >$ 25 pctile	Interaction between PE and $\Delta^{Faculty}_{t-1,t} < 25$ pctile	$\Delta^{InstructShare}_{t-1,t} <$ 25 pctile	$\Delta^{InstructShare}_{t-1,t} >$ 25 pctile	Interaction between PE and $\Delta^{InstructShare}_{t-1,t} < 25$ 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 $Y_{i,t} = \alpha_i + \alpha_t + \beta_1 PE_{i,t} \cdot \left(\Delta^{EducInput}_{t-1,t} < 25th\ pctile\right) + \beta_2 PE_{i,t} + \beta_3 \left(\Delta^{EducInput}_{t-1,t} < 25th\ pctile\right) + \gamma \mathbf{X}_{it} + \varepsilon_{it}$. Here, $\Delta^{EducInput}_{t-1,t} < 25pctile$ 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.7: Effect of Buyouts on Degree Cuts in First Two Years after Buyout

Dependent Variable: Degree cuts			
	(1)	(2)	(3)
PE owned	.00085	-.012	-.014
	(.071)	(.034)	(.012)
Controls	Y	Y	Y
School Fixed Effects	Y	Y	Y
Year Fixed Effects	Y	Y	Y
R^2	2399	2399	2399
Observations	.37	.39	.42

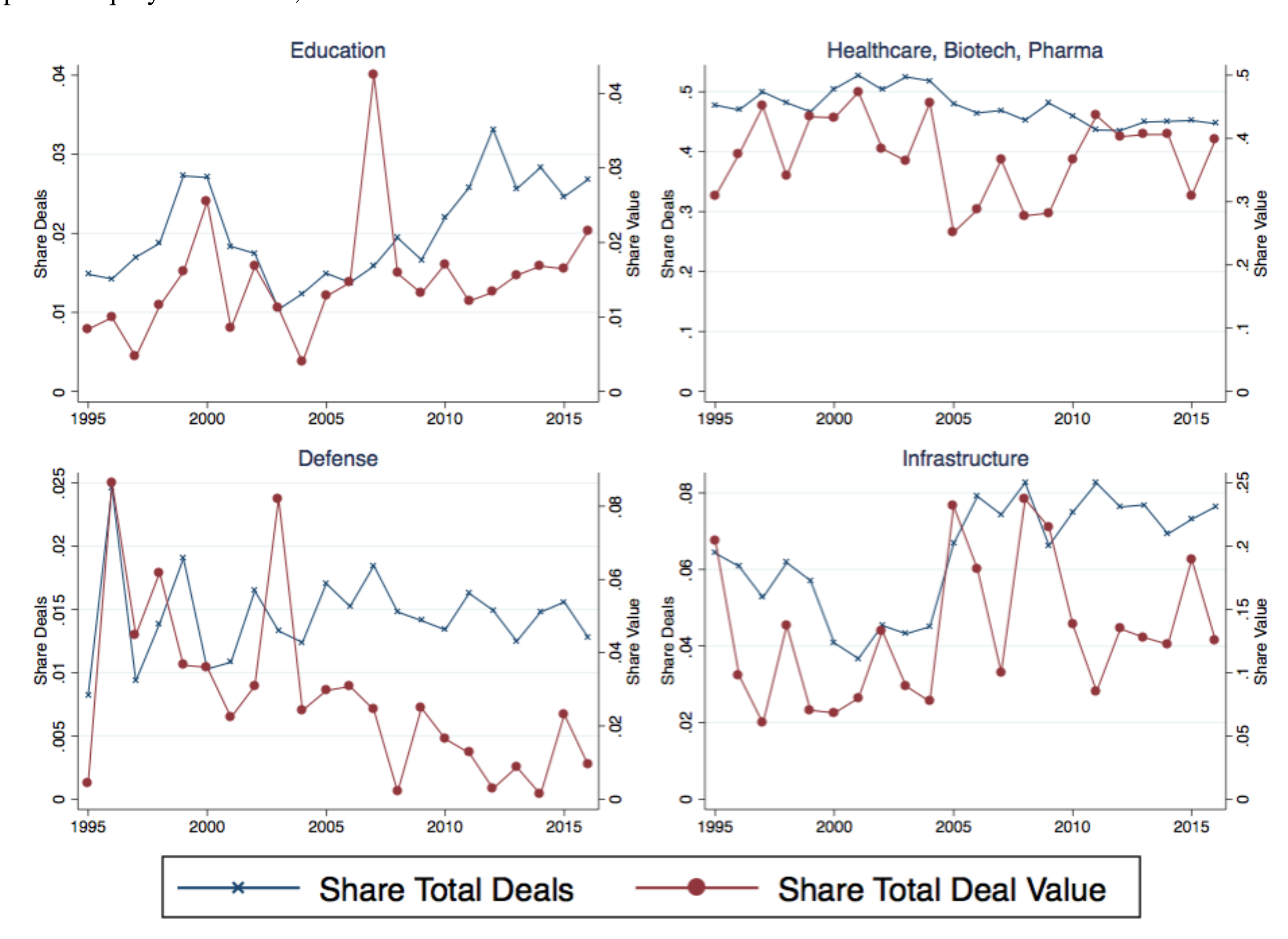
Note: This table shows the relationship between private equity buyouts and degree cuts. A degree cut is the removal of a degree from the school's offerings. There are a total of 230 possible degree offerings. We restrict the sample to PE targets, and to no more than two years after the buyout. Standard errors are double-clustered at the system and year levels. Coefficients marked with $*$, $**$,$***$, denote p < .1, p < .05, p < .01, respectively.

Table B.8: Private Equity Ownership Compared to Chain Acquisitions

Dependent variable:	Graduation rate	Repayment rate	Log mean earnings	Average loan per borrower	Tuition per student (2015$)	Faculty per 100 students	Log number of FTE students
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PE buyout (acquisitions only)†	-.06**	-.037**	-.064*	1032***	3668***	-.31*	.46***
	[.02]	[.011]	[.025]	[229]	[721]	[.15]	[.063]
Non-PE chain*	-.043**	-.019	-.037***	553	-183	-.17	.21***
	[.017]	[.012]	[.009]	[393]	[546]	[.3]	[.055]
School type controls†	Y	Y	Y	Y	Y	Y	Y
School Fixed Effects	Y	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y	Y
N	56965	28201	24652	77497	102355	62432	123053
R^2	.8	.96	.97	.67	.82	.83	.97

Note: This table shows regression estimates (OLS) of the effect of ownership type on primary outcomes. †This is an indicator for an acquisition of an independent school by a private equity-owned school system. *This is an indicator for an independent school being purchased by a non-private equity owned chain. We define a "chain" as any parent company (SystemID) that is neither publicly traded nor private equity-owned and that owns at least two schools (UnitIDs). Observations are at the school (UnitID)-year level. Standard errors two-way clustered by SystemID and year. †Defined as in previous tables. Coefficients marked with *, **,*** , denote p < .1, p < .05, p < .01, respectively.

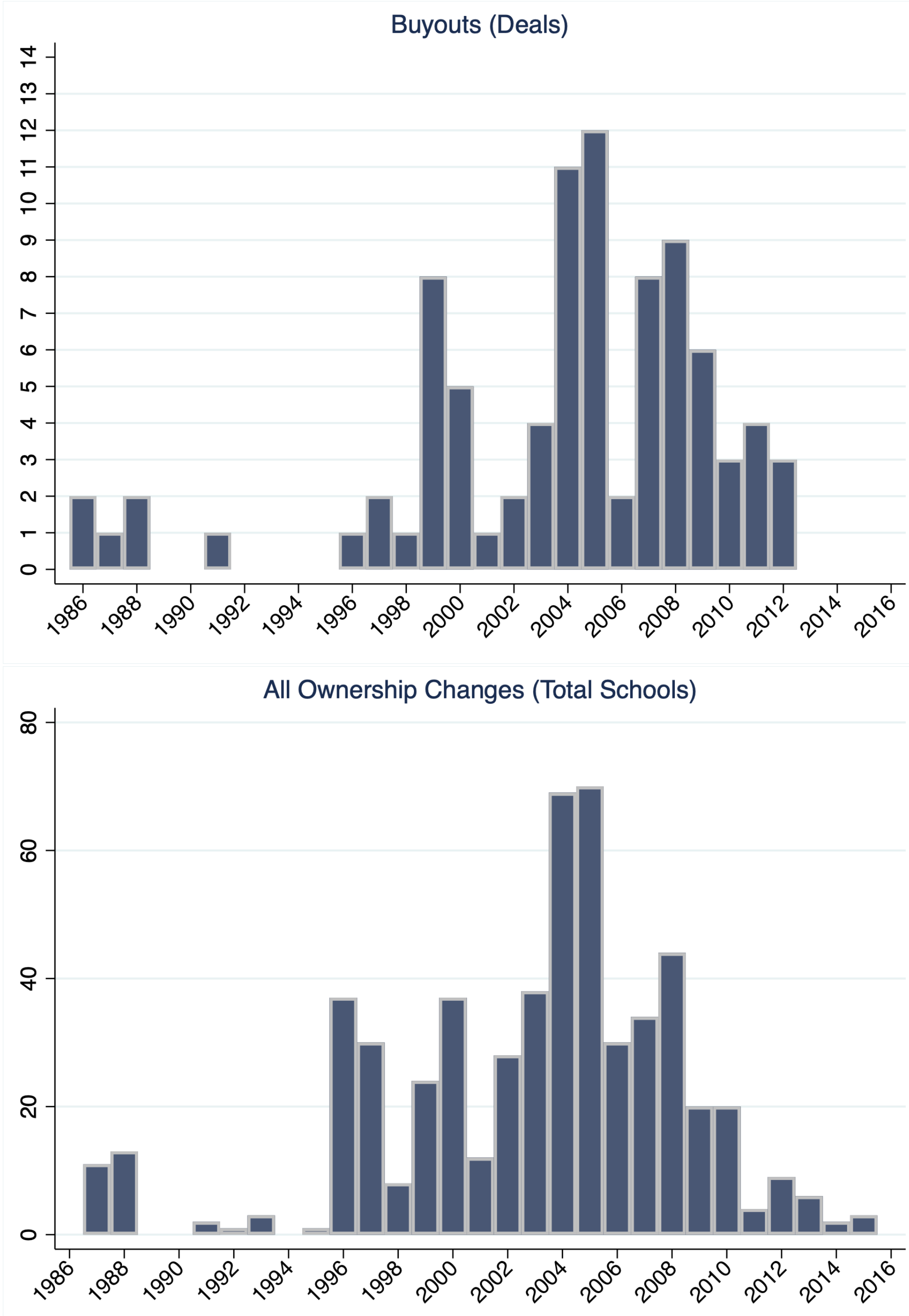
Figure B.1: Share of private equity investment in government subsidy-intensive sectors as share of overall private equity investment, 1995-2016



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

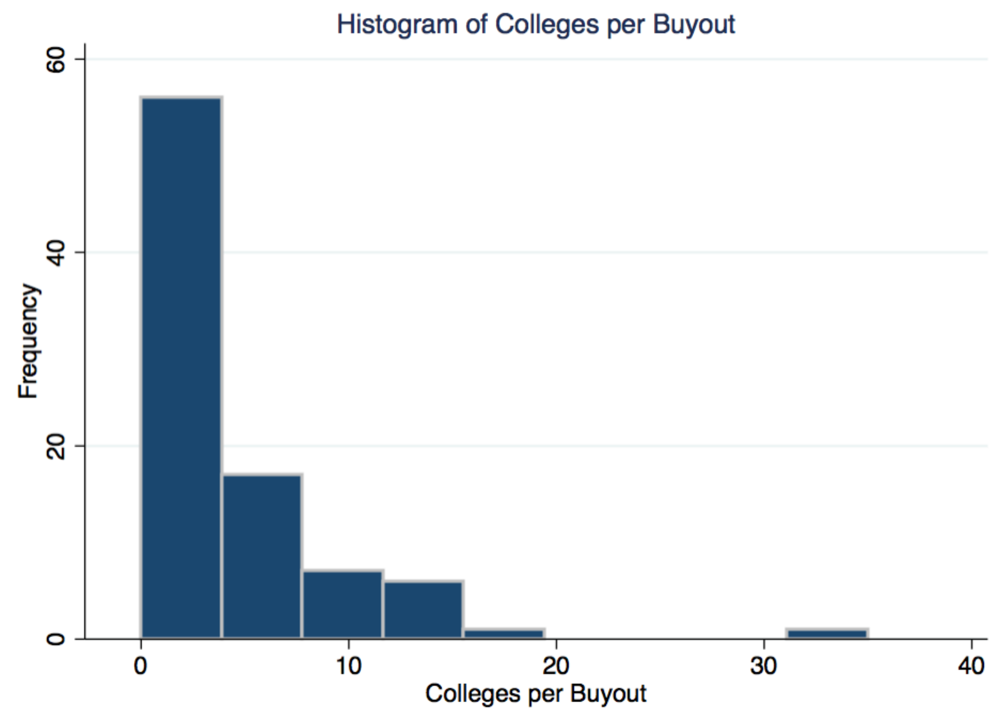
Figure B.2: Private Equity Deals and School Ownership

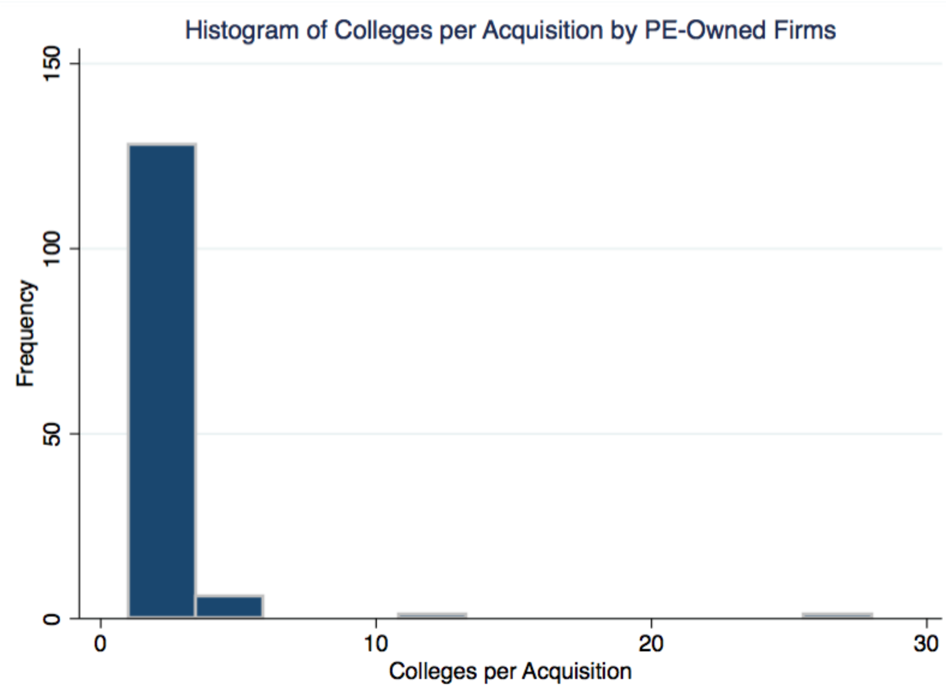
Panel A: Bar Charts of Buyout Deals and School Ownership Changes by Year



Note: The top graph shows the number of private equity buyouts of independent schools or chains of schools by year. The total is 88. The bottom graph shows school (UnitID)-level changes to private equity ownership. The total is 557.

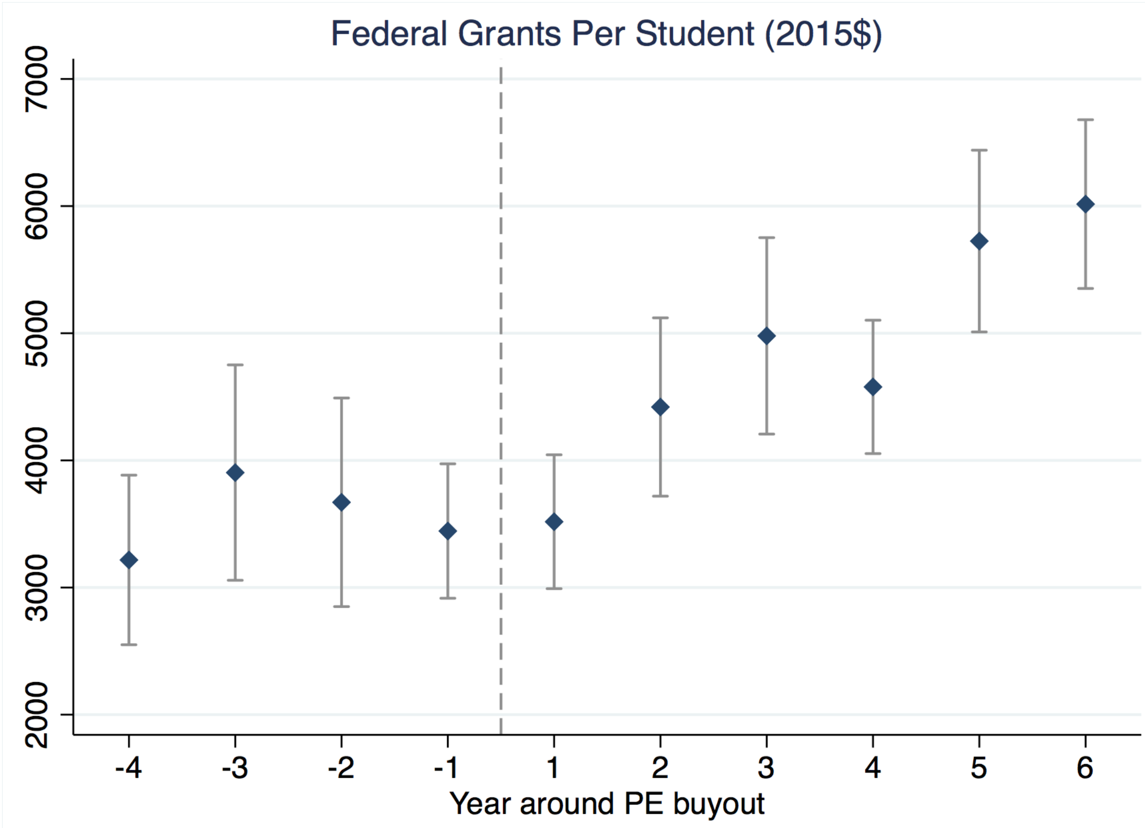
Panel B: Histograms of Colleges Purchased in Buyout Deals and Subsequent Acquisitions





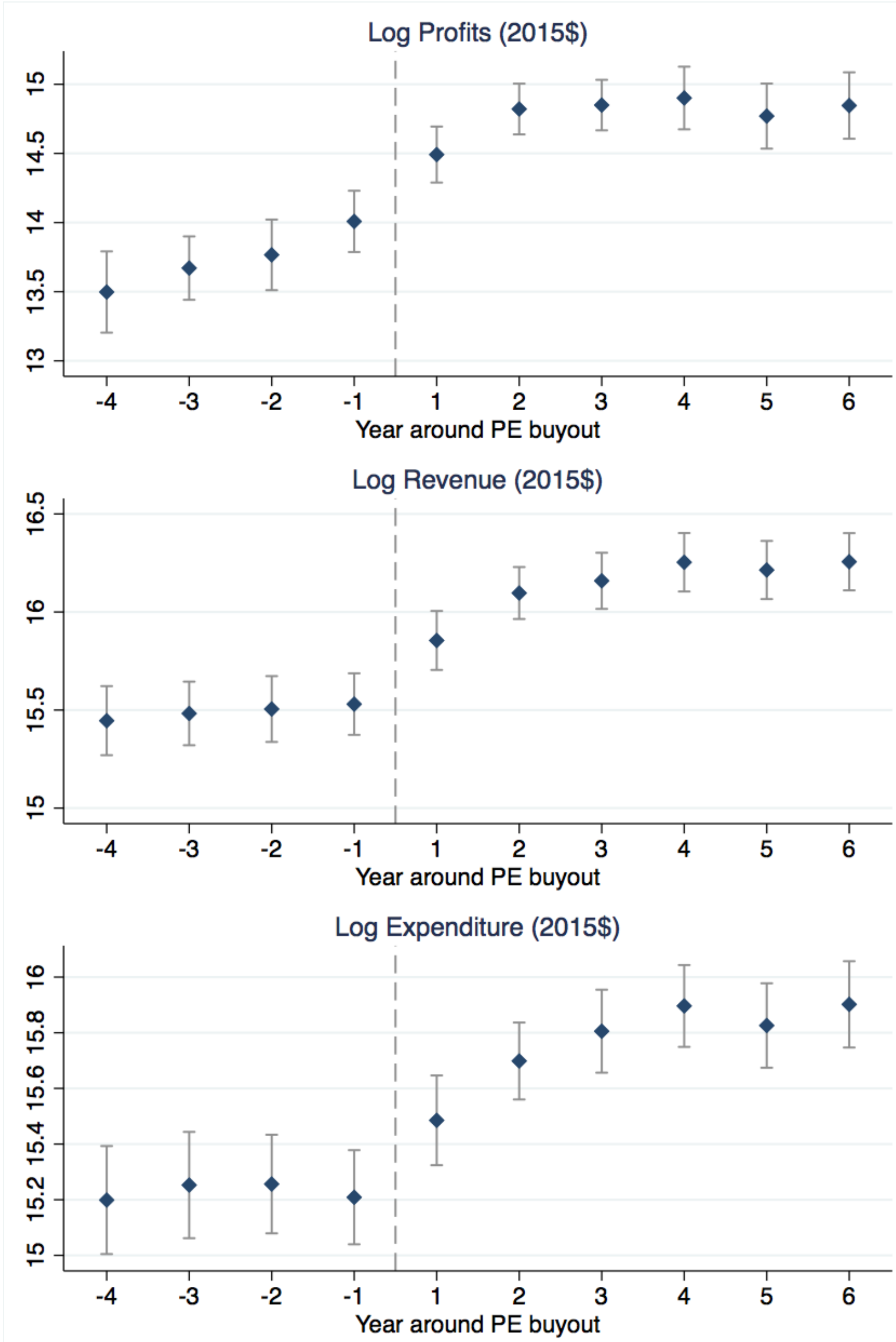
Note: The top graph shows the concentration of colleges per buyout, and the bottom graph shows the concentration in subsequent acquisitions. These demonstrate that most deals involve a single school, but some involve more than one.

Figure B.3: Federal Grants Event Study



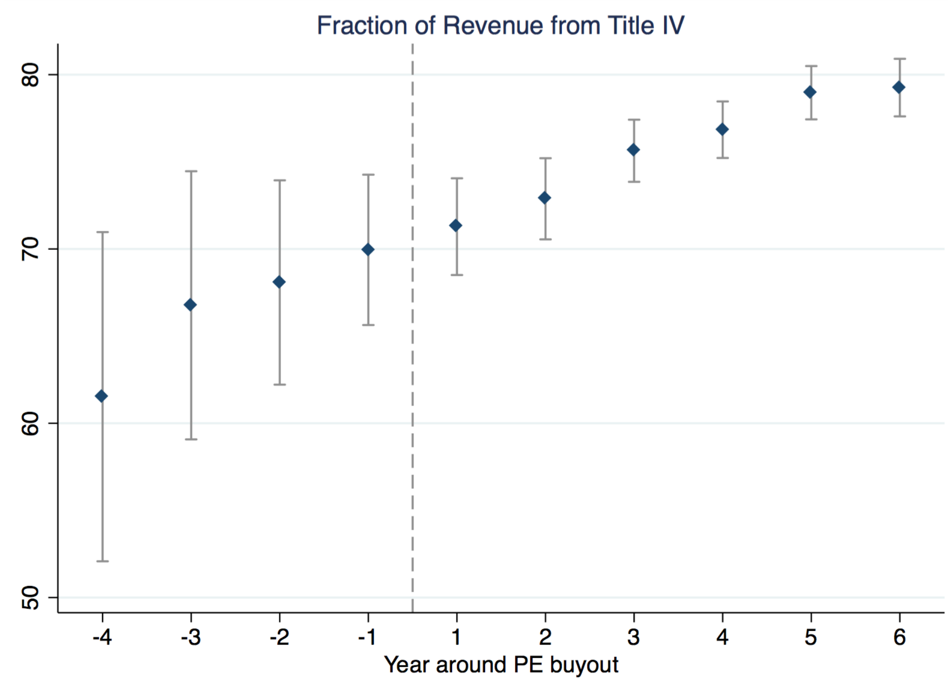
Note: The figure above shows, within the sample of school systems bought by PE, the mean of federal grants per student in the years around the ownership change. 95% confidence intervals shown.

Figure B.4: Financial Event Studies



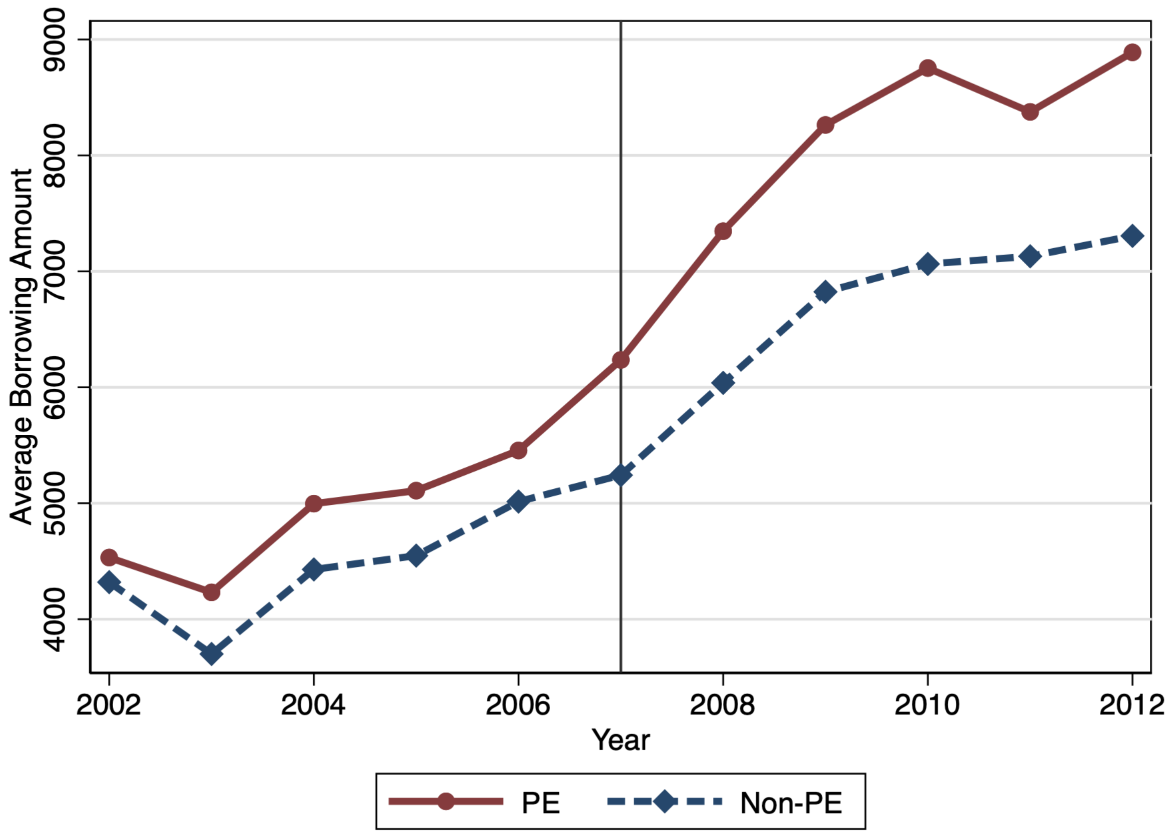
Note: The figure above shows, within the sample of school systems bought by PE, the mean of profits, revenues, and expenditure in the years around the ownership change. 95% confidence intervals shown.

Figure B.5: Distance from 90/10 Threshold



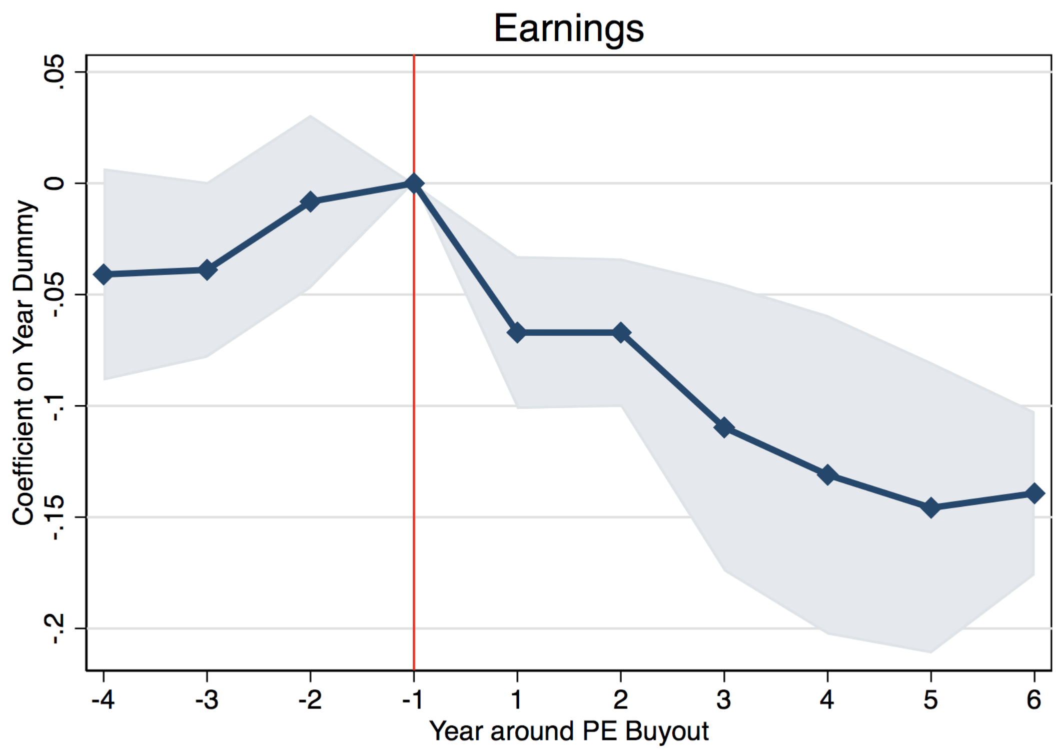
Note: The figure above shows, within the sample of school systems bought by PE, the average fraction of school revenue from Title IV programs in the years around the ownership change. The level of observation is the SystemID. We restrict the observations to schools that existed in the year prior to the buyout. 95% confidence intervals shown. The data source is the Department of Education FSA Proprietary School 90/10 Revenue Percentages. Data are available from 2007 to 2016.

Figure B.6: 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.7: Earnings Event Study (Time Demeaned)

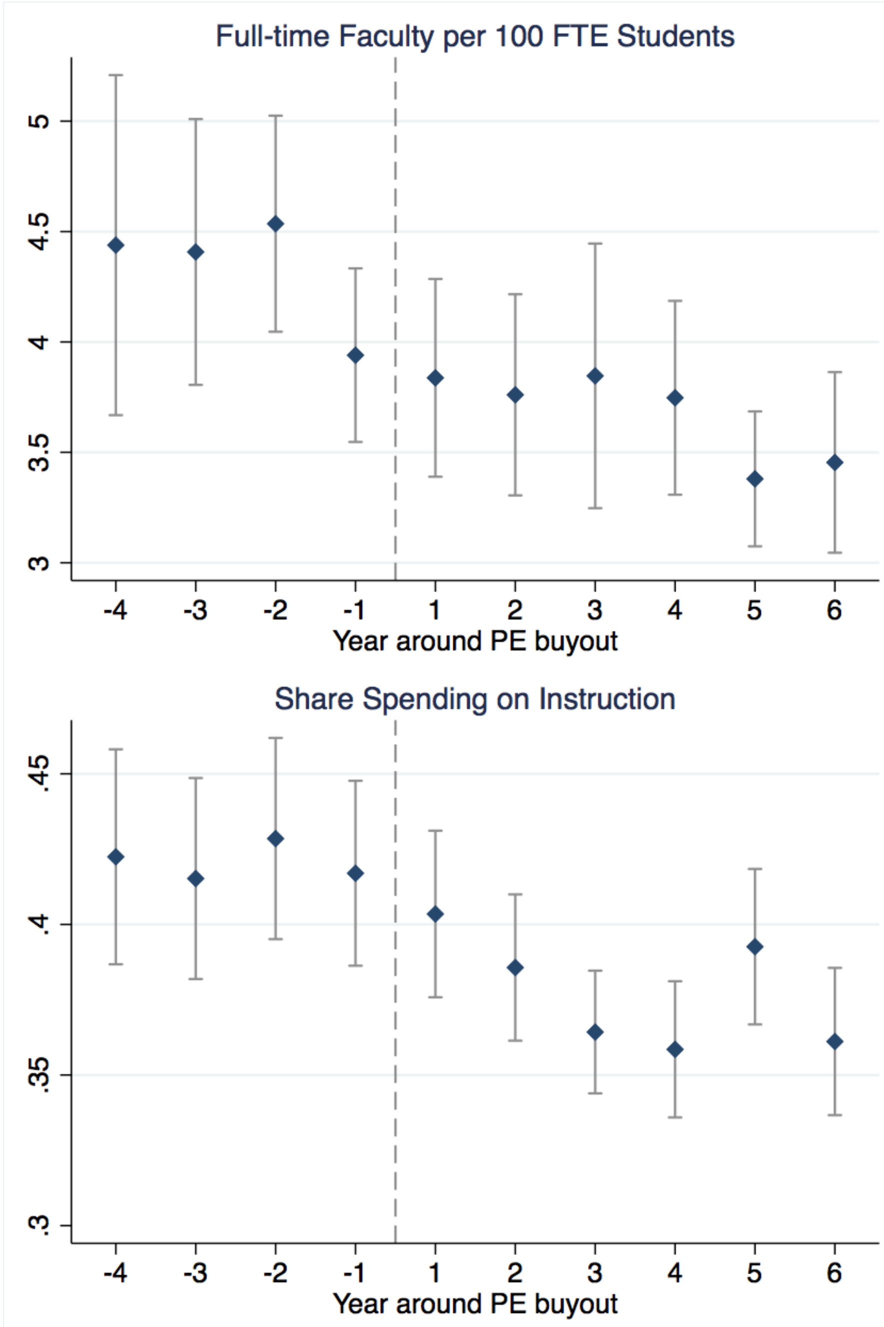


Note: This figure shows the coefficients β_j from the following specification:

$$lnWages_{it} = \alpha_i + \alpha_t + \sum_{j=-4}^{3} \beta_j 1[Year = Year_{PE} + j] + \varepsilon_{it}$$

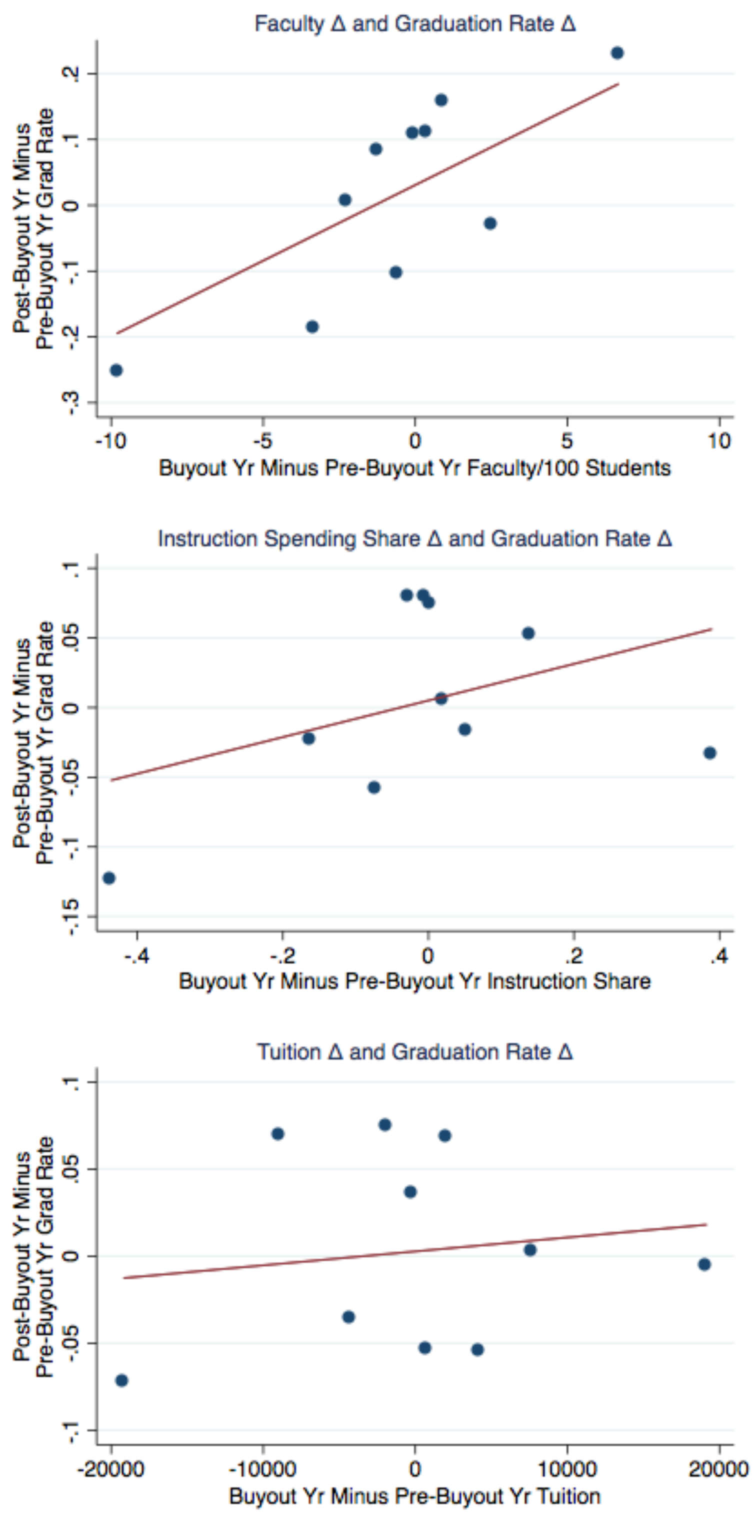
Here, $1[Year = Year_{PE} + j]$ is an indicator of a year before or after the buyout year. The year before the buyout (-1) is the baseline, normalized to zero. We also include school and year fixed effects (α_i and α_t). The sample is all schools, and the control group is all non-private equity-owned schools. The area denotes a 95% confidence interval. This data is at the school, or UnitID level (N=697). We restrict the observations to schools that existed in the year prior to the buyout.

Figure B.8: Education Inputs Event Studies



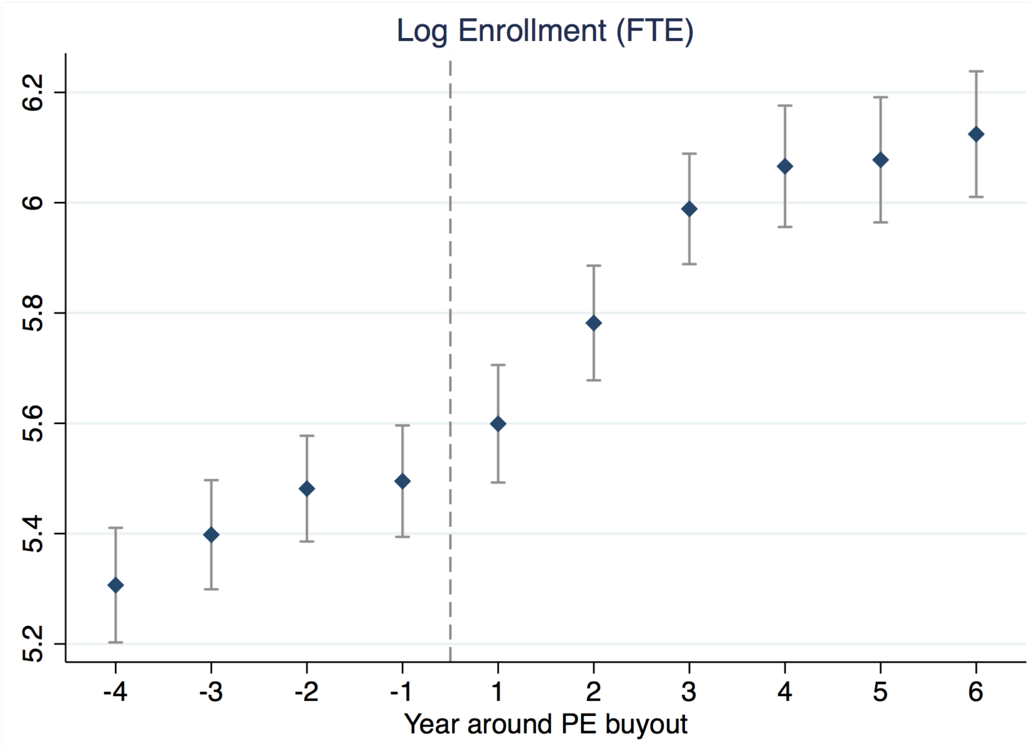
Note: Panel A shows, within the sample of school systems bought by PE, the mean of full-time faculty per 100 FTE students in the years around the ownership change. Panel B shows, within the sample of school systems bought by PE, the mean of the share of spending on instruction in the years around the ownership change. 95% confidence intervals shown.

Figure B.9: Relationship between Graduation Rate Changes and Other Variables In Year Following Buyout



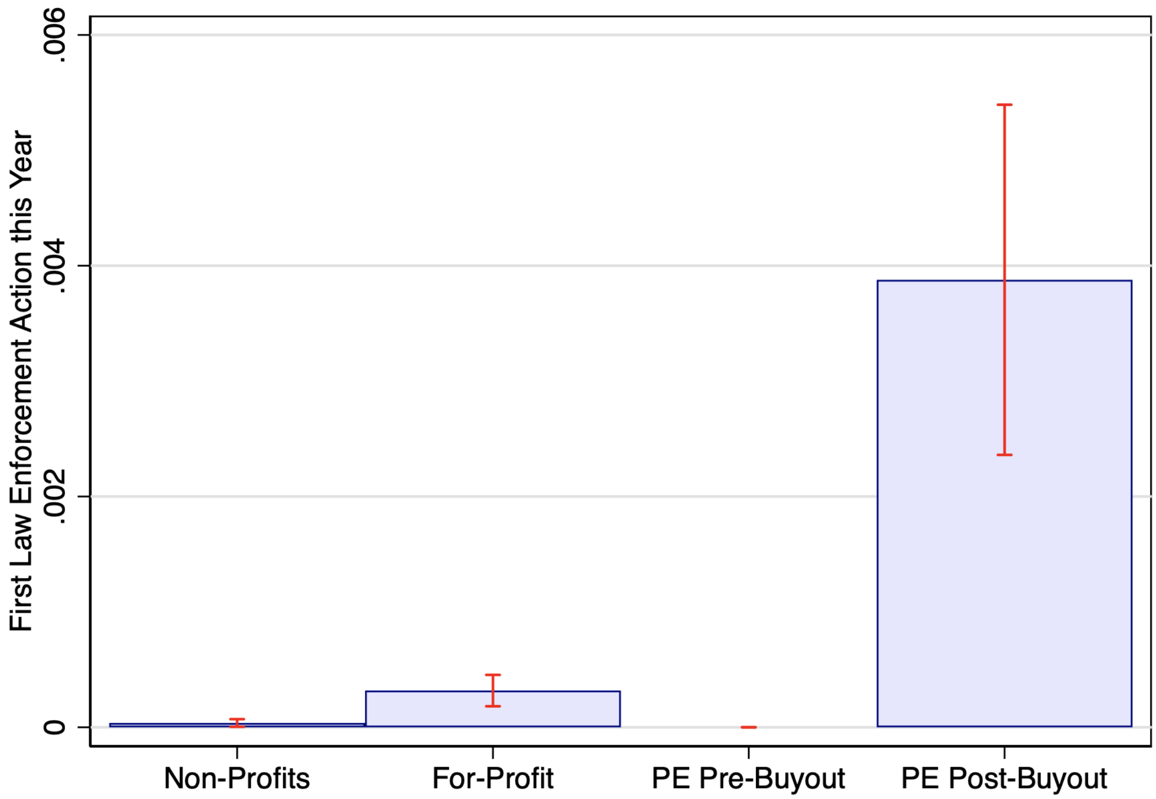
Note: Panel A contains a binscatter relating changes in faculty per 100 students (x-axis) to graduation rates (y-axis), between the two years before and after the buyout. Panels B and C repeat this analysis but with the instruction share of expenditure and tuition on the x-axis, respectively.

Figure B.10: Enrollment Event Study



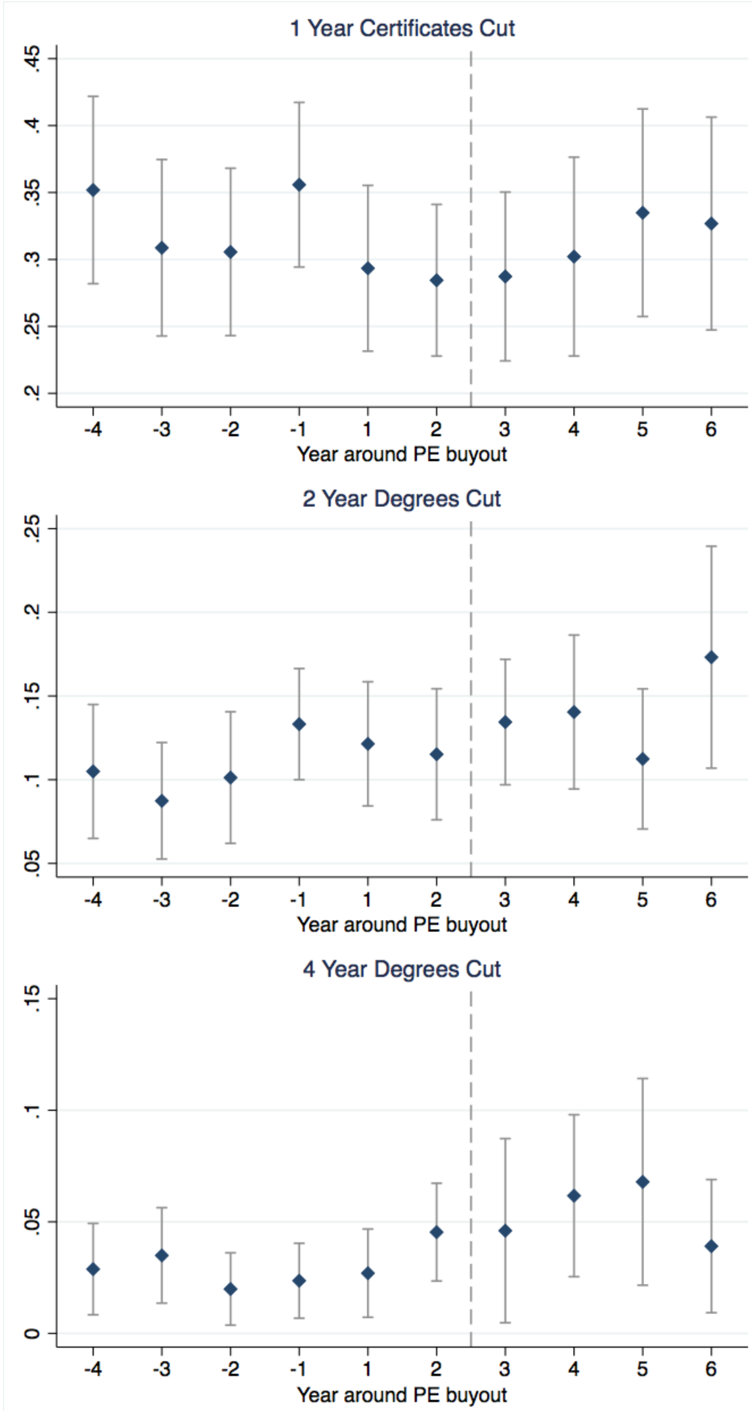
Note: The figure above shows, within the sample of school systems bought by PE, the mean of enrollment in the years around the ownership change. 95% confidence intervals shown.

Figure B.11: 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.12: Degree Cuts Around Buyouts



Note: These plots show the number of degree cuts by year around private equity buyouts, within schools that switched from independent to private equity-owned. A degree cut is the removal of a degree from the school's offerings. There are a total of 230 possible degree offerings.

Appendix C: Subsidy Capture Tests

C.1 Cohort Default Rate Bunching

A key determinant of federal aid eligibility that has been consistently in force for decades is a limit on the extent to which students can default. School survival depends on not triggering these thresholds. Before 2012, the policy held that the share of students that default in the fiscal year after the fiscal year in which they graduated cannot exceed 25 percent for three years in a row, nor can it be higher than 40 percent in a single year. The two-year cohort default rate (CDR) is the fraction of students within a certain repayment cohort who default within two years of entering repayment, which may be vulnerable to manipulation (Looney and Yannelis (Looney and Yannelis)).

We find evidence that private equity-owned institutions are better at avoiding the threshold. Appendix C Figure 1 shows the density of two-year cohort default rates by institution type. We restrict the sample to pre-2012, as the policy changed somewhat in that year.[14] The solid line shows private equity-owned institutions, and the other two lines show independent for-profit and non-profit schools. The vertical line is the 25 percent two-year CDR threshold. CDRs largely evolve smoothly across the threshold among independent for-profits and other schools. In contrast, there is a sharp drop in the default density right before the threshold at private equity-owned schools, consistent with avoiding the threshold.

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

[14] In 2012, the CDR calculation was changed from a two-year to a three-year window (that is, default is now measured in the second fiscal year after graduation). To partially compensate for this more onerous policy, the 25 percent was changed to 30 percent. The rule change was expected to be very detrimental to for-profit colleges (see e.g. http://www.finaid.org/loans/cohortdefaultrates.phtml).

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 have at some point been private equity-owned. We document this in Appendix C Table 1. 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.[15] 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.[16] In 2017, the rules were

[15]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.

[16]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

suspended altogether.[17]

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

$$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \tag{1}$$

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

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \tag{2}$$

Equation 2 is estimated for the 250 day trading period from 270 days prior to the event period.[18] The abnormal return in Equation 1 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

$$CAR[0, n] = \sum_{t=0}^{n} AR_{it}, \tag{3}$$

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.

for more information.

[17] See the Washington Post for more information.

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

Appendix C Figure 2 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.[19] 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 Appendix C Figure 2 shows the jump in CAR following the June 2, 2011 rule weakening. Again we see no response for the control group.

Appendix C Table 2 presents results analogous to those in the figure. We use variants of the following specification

$$CAR_{it} = \alpha_i + \alpha_t + \delta FP_i * Post_t + \varepsilon_{it}, \tag{4}$$

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 Appendix C Table 2 show results for the initial announcement of GE rules. The first column presents difference-in-differences estimates using post and treatment dummies, the second column adds date fixed effects, while the third column includes both sets of fixed effects. 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 also consistent with the graphical results.

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

[19] See the announcement for more information.

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: 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.

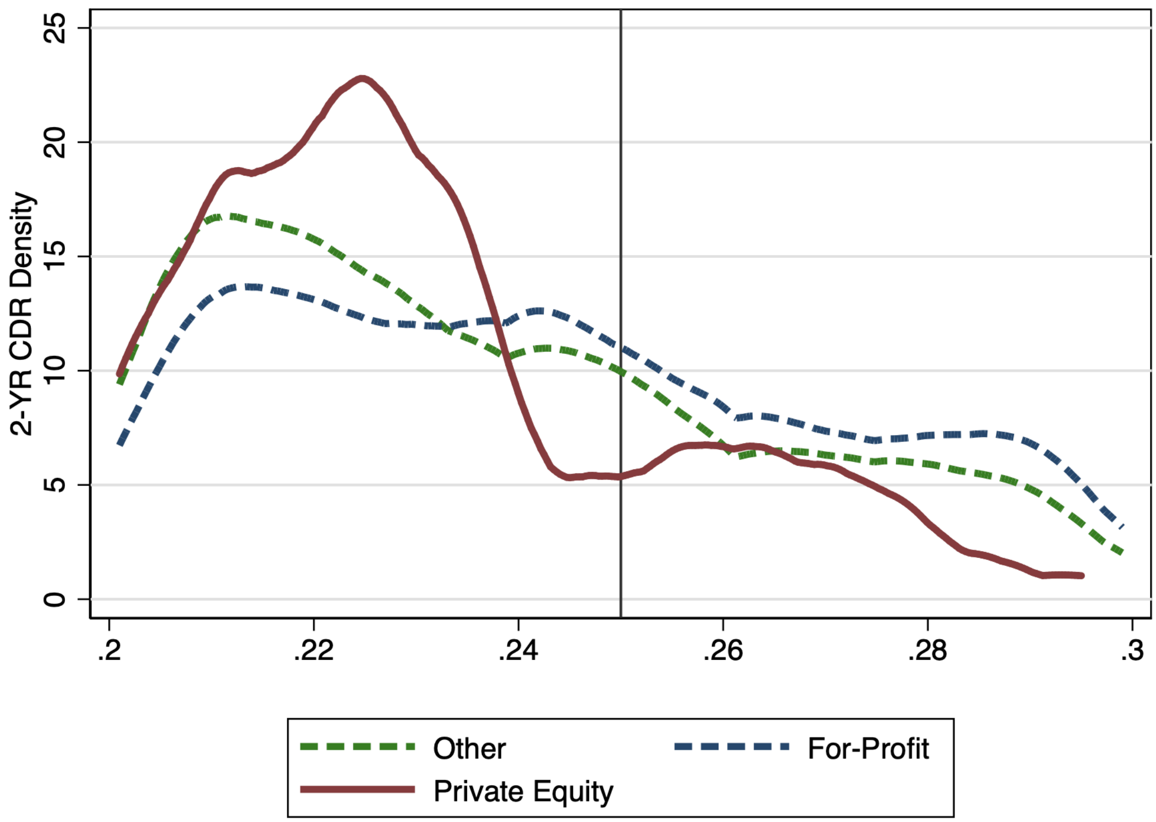
Table C.2: Gainful Employment Event Studies

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

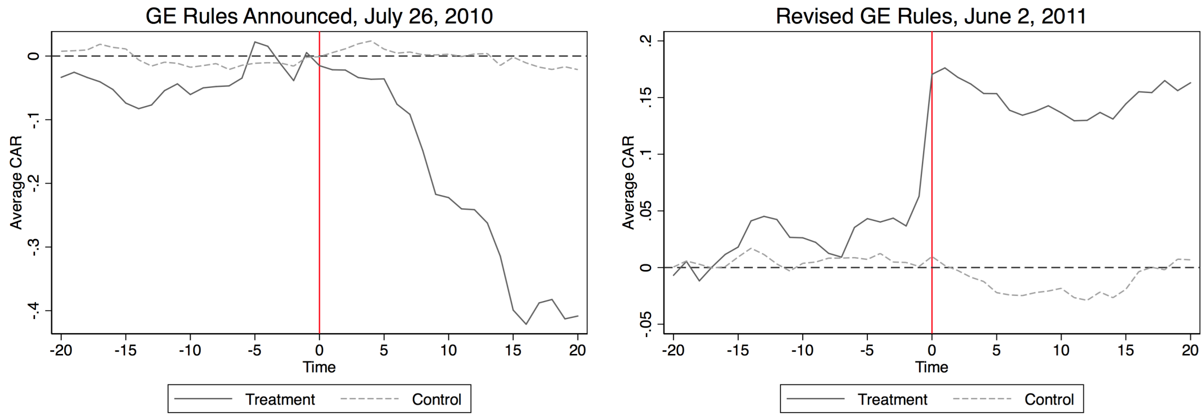
Note: *Average Cumulative Abnormal Returns for the stocks are calculated around 60-day event windows, $CAR[0,n] = \sum_{t=0}^{n} AR_{it}$. Standard errors are clustered at the firm level. Coefficients marked with $*$, $**$,$***$, denote p < .1, p < .05, p < .01, respectively.

Figure C.1: 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.

Figure C.2: 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.

Appendix D: Community Colleges as Source of Additional Enrollment

We find a large increase in the number of full-time equivalent enrolled students after a buyout. Given the negative effects on student success measures, buyouts are unlikely to make existing student types (i.e., that would have enrolled before the buyout) weakly better off. However, whether additional students – regardless of their preparedness – are better or worse off as a result of the buyout depends on their outside option. At one extreme, additional students may be drawn from a population that would not attend college otherwise. These students may benefit relative to receiving no higher education at all. At the other extreme, private equity-owned schools may draw students away from institutions with higher value-added.

A rich education economics literature finds strong evidence that (a) community colleges are an available substitute to for-profits, and (b) the returns to for-profit education are zero or negative relative to community college education.[20] We examine evidence for substitution at the commuting zone (CZ) level, which roughly corresponds to a local labor market. We regress the change in all community college enrollment (Δ^{96-16}Enrollment) within a CZ on the change in private equity (Δ^{96-16}PE Enrollment) in that CZ.[21] The results are in Appendix D Table 1. If there is no substitution, we expect a coefficient of zero. Conversely, if there is full substitution, we expect a coefficient of -1. In column 1, the point estimate is -.67. The second row shows the results from an F-test that the coefficient is equal to -1; it reveals that we cannot reject full substitution away from community colleges. The second column repeats the analysis using full-time enrollment and finds similar results. Corresponding graphical evidence is in Appendix D Figure 1 Panel A. We do not expect substitution from high quality institutions to private equity-owned schools, so we use them in a placebo test. We define high quality institutions as those institutions where more than 50 percent of students graduate within 150 percent of the usual time. There is no effect for higher quality institutions (Appendix D Table 1 columns 3 and 4 and

[20] See Jacobson et al. 2005, Jepsen et al. 2014, Liu and Belfield (2014), Cellini and Chaudhary (2014), Darolia et al. (2015), Deming et al. (2016), Cellini and Turner (2016), Armona et al. (2017), and Cellini, Darolia, and Turner (2017). These papers are summarized in Appendix A Section 2.

[21] There were 709 commuting zones in the United States in 2000. We have a lower number in our sample, as some commuting zones do not have colleges in the sample.

Appendix D Figure 1 Panel B). Thus, the effects in columns 1 and 2 are not driven by general population or other sources of enrollment growth.

Appendix D Figure 2 takes an event study approach within CZs. It shows increasing community college enrollment over time before the entry of a private equity-owned school, and a flat line afterward. Private equity-owned schools appear to siphon enrollment away from community colleges, likely because of superior marketing.[22] Consistent with this strategy, the targeting analysis in Section 3.3 found that private equity firms tend to acquire schools in commuting zones with a higher number of community colleges. One possibility is that private equity schools draw the worst students away from local community colleges. If this is the case, we would expect to see an improvement in education outcomes at community colleges after private equity entry. To explore this possibility, we examine graduation rates at community colleges in commuting zones following a private equity buyout. We find no significant effect on graduation rates. In sum, additional students enrolled as a result of expansion after buyouts seem to be drawn away from attending community colleges. Together with much higher tuition and lower success measures, this suggests that additional students are unlikely to be made better off by the buyout.

[22] Results are available upon request.

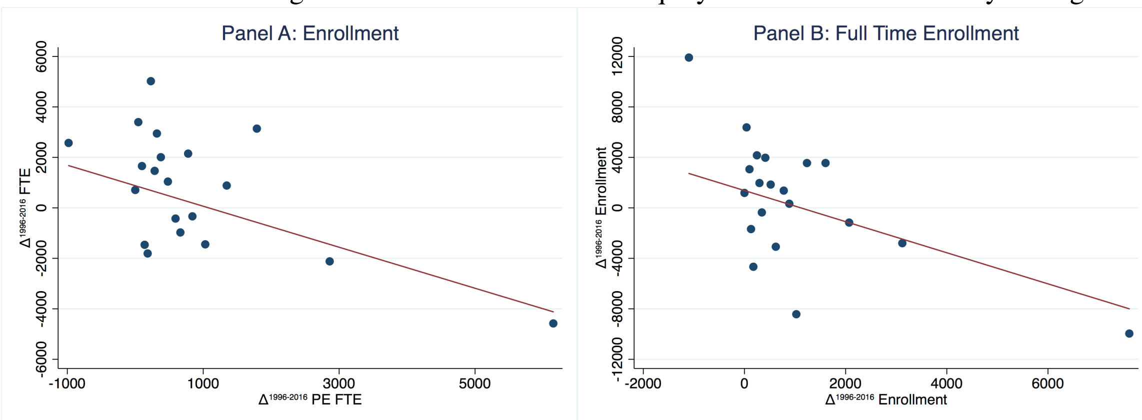
Table D.1: Relationship Between Entry and Community College Enrollment

	Community Colleges		High Quality Schools	
	Δ^{96-16} Enrollment	Δ^{96-16} FTE	Δ^{96-16} Enrollment	Δ^{96-16} FTE
	(1)	(2)	(3)	(4)
Δ^{96-16} PE Enrollment	-0.67**		1.09	
	(0.3)		(0.90)	
Δ^{96-16} PE FTE		-1.121**		0.9
		(0.49)		(0.7)
P-Value (=-1)	.27	.81	.0036	.002
Observations	451	451	301	301
R^2	.03	.03	.10	.09

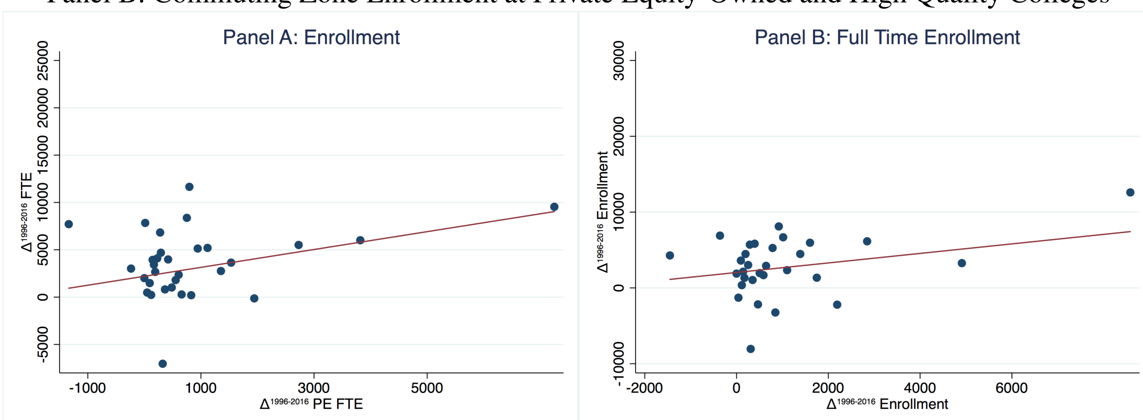
Note: This table shows the relationship between changes in private equity-owned and community college enrollment at the commuting zone level between 1996 and 2016. Columns 1 and 3 include all enrollment, while columns 2 and 4 include only full-time enrollment. Columns 3 and 4 are placebo tests, which replace community college enrollment with enrollment at institutions that graduate more than half of their students with 150% of the normal time ("high quality schools"). We also show the p-value from an F-test that the coefficient equals -1, which is consistent with full substitution. Community colleges are defined as public institutions granting two year or lower degrees. Huber-White robust standard errors are presented in parentheses. Coefficients marked with $*$, $**$,$***$, denote p < .1, p < .05, p < .01, respectively.

Figure D.1: Commuting Zone Enrollment by School Type

Panel A: Commuting Zone Enrollment at Private Equity-Owned and Community Colleges

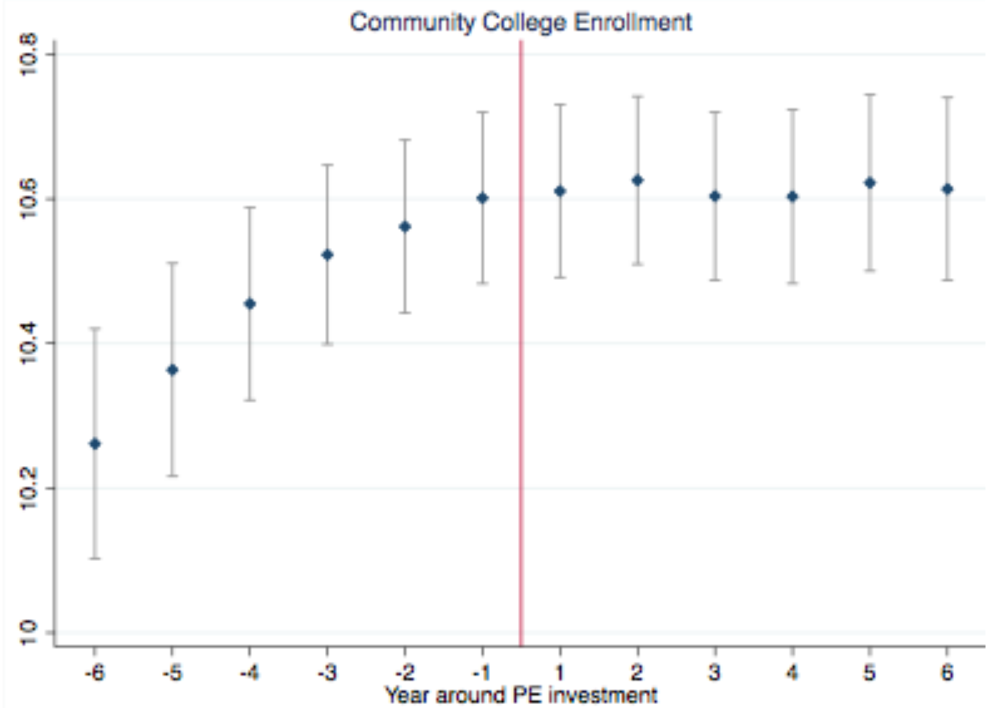


Panel B: Commuting Zone Enrollment at Private Equity-Owned and High Quality Colleges



Note: The graphs in Panel A collapse the mean change in community college enrollment and full-time enrollment within a commuting zone into twenty bins ranked by the mean change in private equity-owned school enrollment. The figure on the left (right) shows the cross sectional relationship between the change in enrollment (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. The graphs in Panel B are a placebo test; they replicate Panel A, but use high quality colleges (>50% of students graduate in normal time) rather than community colleges.

Figure D.2: Private Equity-Owned 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, within a commuting zone. Community colleges are defined as public institutions that grant two year or lower degrees.

Appendix E: Course Catalogs

All Title IV colleges are required to disclose their ownership history through course catalogs, which are collected by the Department of Education. We researched ownership history of schools in part through these course catalogs. An example is given below, of the University of Phoenix, which in 2016 was the largest for-profit college in the United States. The University of Phoenix is a subsidiary of Apollo Education Group, which is wholly owned by Apollo Global Management and the Vistria Group, a Chicago-based private equity fund. Thus the 2018 course catalog notes on p.1 that: "*University of Phoenix, Inc. is a wholly-owned subsidiary of Apollo Education Group, Inc. ("the Parent"). The Parent's stock is wholly- owned by AP VIII Queso Holdings, L.P., which is owned by Apollo Global Management, LLC and The Vistria Group, LLC.*"

Figure E.1: Sample Course Catalog

UNIVERSITY OF PHOENIX

Beginnings -- A Brief History

In 1976, the leading edge of the Baby Boom generation was just turning 30. That same year saw the introduction of the first personal computer, the Apple I -- an event that signaled the birth of a new economic system in which intellectual capital would eventually supplant industrial might as the dominant economic force. These milestones marked the beginning of a sea of change in higher education, though many (perhaps even most) within that system did not recognize it at the time.

Considered together, these phenomena suggested that the jobs that would make up the workforce of the future were only just beginning to be created or imagined. In order to fill those jobs, the bulk of the new workforce would require higher-level knowledge and skills than those needed in a manufacturing economy. At the same time, the largest-ever age cohort of the population, adult learners, would be going through the stages of life during which they would be most affected by the coming economic dislocation and would need advanced education to adapt to these changes.

It was in this historical context in 1976 that Dr. John Sperling, a Cambridge-educated economist and professor-turned-entrepreneur, founded University of Phoenix. Sperling anticipated the confluence of technological, economic, and demographic forces that would in a very short time herald the return of ever larger numbers of adult learners to formal higher education.

In the early 1970s, at San Jose State University in San Jose, California, Sperling and several associates conducted field-based research in adult education. The focus of the research was to explore teaching/learning systems for the delivery of educational programs and services to adult learners who wished to complete or further their education in ways that complemented both their experience and current professional responsibilities. At that time colleges and universities were organized primarily around serving the needs of the 18-22 year-old undergraduate student. That is not all that surprising, given that the large majority of those enrolled were residential students of traditional college age, just out of high school. According to Sperling adult learners were invisible on the traditional campus and were treated as second-class citizens.

Other than holding classes at night (and many universities did not even do this), no efforts were made to accommodate their needs. No university offices or bookstores were open at night. Students had to leave work during the day to enroll, register for classes, buy books or consult with their instructors and advisors. Classes were held two or three nights per week and parking was at the periphery of a large campus. The consequence, according to Dr. Sperling was that most adult learners were unable to finish a four-year program in less than eight years, or a two-year program in less than four years (Tucker, 1996, p. 5).

Sperling's research convinced him not only that these underserved learners were interested in furthering their educational goals, but also that this group differed from their more traditional counterparts in significant ways. He saw a growing need for institutions that were sensitive to and designed around the learning characteristics and life situations of a different kind of learner population. He suggested ways for institutions to pioneer new approaches to curricular and program design, teaching methods, and student services. These beliefs eventually resulted in the creation of University of Phoenix, and they continue to this day to inspire the University's mission, purpose, and strategies. As an institution, University of Phoenix is unique in its single-minded commitment to the educational needs of non-traditional students, who in fact today make up the majority (73 percent) of all college enrollees. This focus informs the University's teaching and learning model approach to designing and providing student services, and academic and administrative structure. It also guides the institution as it plans and prepares to meet the needs of the next generation of learners.

Over the last three and a half decades, the University of Phoenix has been cause-driven working to build an institution with the agility to address directly the shifting economic and academic challenges that many students face. Dr. Sperling's predictions concerning the innovations higher education would be required to make have come to pass. Today roughly 45 percent of all college students work at least part-time and approximately one quarter of all students have dependent children. The educational tenets set forth by Dr. Sperling in 1976 now apply to the majority of college students in the United States.

Official School Colors

University of Phoenix Official School Colors are University of Phoenix Red and University of Phoenix Platinum.
These are custom colors and proprietary to the University.

Ownership Information

University of Phoenix, Inc. is a wholly-owned subsidiary of Apollo Education Group, Inc. ("the Parent"). The Parent's stock is wholly-owned by AP VIII Queso Holdings, L.P., which is owned by Apollo Global Management, LLC and The Vistria Group, LLC. The University's central administration is located in Phoenix, Arizona.

Our Mission Statement

University of Phoenix provides access to higher education opportunities that enable students to develop knowledge and skills necessary to achieve their professional goals, improve the performance of their organizations, and provide leadership and service to their communities.

Our Purpose

- To facilitate cognitive and affective student learning-knowledge, skills, and values- and to promote use of that knowledge in the student's workplace.
- To develop competence in communication, critical thinking, collaboration, and information utilization, together with a commitment to lifelong learning for enhancement of students' opportunities for career success.
- To provide instruction that bridges the gap between theory and practice through faculty members who bring to their classroom not only advanced academic preparation, but also the skills that come from the current practice of their professions.
- To provide General Education and foundational instruction and services that prepare students to engage in a variety of university curricula.
- To use technology to create effective modes and means of instruction that expand access to learning resources and that enhance collaboration and communication for improved student learning.

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