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WHERE DO STUDENTS GO WHEN FOR-PROFIT COLLEGES LOSE FEDERAL  
AID?

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**ABSTRACT**

Recent policy debates have focused on whether restricting for-profit institutions' access to federal student financial aid could reduce student loan defaults without restricting prospective students' access to higher education. We examine the effects of similar restrictions imposed on over 1,200 for-profit colleges in the 1990s. Using variation in the timing and magnitude of sanctions linked to student loan default rates, we estimate the impact of the loss of federal aid on the enrollment of Pell Grant recipients in sanctioned institutions and their local unsanctioned competitors. On average, sanctioned for-profit colleges experience a 40 percent decrease in annual enrollment in the five years following sanction receipt. Enrollment losses due to for-profit sanctions are offset by enrollment increases within local community colleges. For-profit sanctions also produce negative enrollment spillovers on unsanctioned for-profit competitors, and we provide evidence that these effects are likely due to improved information about local higher education options and/or reputational spillovers to for-profit institutions offering similar programs. Given these offsetting effects, we estimate that within the average county, the public sector absorbs 40 to 60 percent of the total enrollment decline generated by an additional for-profit sanction. Overall, market enrollment declines by just 3 percent. Finally, we provide suggestive evidence that students induced to enroll in community colleges following a for-profit competitor's sanction are less likely to default on their federal loans.

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# 1 Introduction

After more than a decade of substantial growth, for-profit higher education has been the target of increased scrutiny, new regulation, and heated debate in recent years.<sup>1</sup> For-profit colleges may expand the market for higher education and provide important pathways to college for underserved students, but high student loan default rates, accusations of unethical marketing practices, and allegations of financial aid fraud sparked a wave of government investigations beginning in 2010 (U.S. Government Accountability Office 2010; U.S. Senate Committee on Health, Education, Labor and Pensions 2010). Under the Obama administration, the U.S. Department of Education (ED) imposed “Gainful Employment” (GE) regulations that sought to restrict low-performing for-profit colleges’ access to federal student aid (U.S. Department of Education 2010). ED also imposed sanctions on two large national for-profit chains - Corinthian Colleges and ITT Technical Institute.<sup>2</sup> Both companies subsequently filed for bankruptcy, shuttering hundreds of campuses across the country, and leaving behind tens of thousands of students (Fain 2014*a*; Stratford 2015; Smith 2016). The Trump administration has signaled a reversal of these policies by reopening negotiated rulemaking and proposing the elimination of accountability measures under GE (Fain 2018), but the fate of the rule, and with it for-profit institutions and their students, remains uncertain. As these policies are debated, a key concern is how students will fare if colleges lose access to federal student aid or are otherwise induced to close by federal regulation. Previous research shows that restrictions on federal student aid at for-profit colleges led to enrollment declines within sanctioned institutions (Darolia 2013), but a key unanswered question for assessing the welfare implications of such restrictions is whether students in affected institutions enroll in other institutions or forgo college.

In this paper, we seek to answer this question by providing the first assessment of the impact of federal student aid loss imposed on a given for-profit college on the overall enrollment and distribution of students across higher education sectors. Specifically, we quantify the extent to which threatened restrictions to aid for an additional for-profit institution affects enrollment in nearby unsanctioned competitor institutions. To carry out our analysis, we use variation due to regulations imposed in the late 1980s and early 1990s that were similar to the restrictions and regulations imposed in recent years and at the root of current policy debates. As in the current case of GE, the previous round of regulations restricted institutions’ eligibility to disburse federal student aid to students if the institutions’ alumni had difficulty repaying their student

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<sup>1</sup>For-profit institutions currently enroll over 1.3 million students, down from a peak of 2 million students in 2010. Authors’ calculations using Table 303.10 of U.S. Department of Education (2016).

<sup>2</sup>Regulators threatened to cut off the colleges’ access to federal student aid programs for misrepresenting job placement rates of graduates (Corinthian) and failing to comply with accreditation standards (ITT Tech). See <http://www.ed.gov/news/press-releases/us-department-education-heightens-oversight-corinthian-colleges> and <http://www.ed.gov/news/press-releases/department-education-bans-itt-enrolling-new-title-iv-students-adds-tough-new-financial-oversight> for details.

loans. While these cohort default rate (CDR) regulations applied to all colleges that participated in federal aid programs, the vast majority of affected institutions were for-profit institutions. The CDR regulations led to widespread enrollment declines and institutional closures in this sector.

We use a generalized difference-in-differences strategy and comprehensive institution-level administrative data to estimate the first causal effects of how restrictions on institutional eligibility for student aid affect market-level access to higher education and the distribution of students across local public, private nonprofit, and private for-profit institutions. We focus on students who are most affected by access to federal aid – those receiving means-tested federal Pell Grants. Thus, we directly examine whether vulnerable students, whose enrollment decisions may be especially tied to student aid access, are disproportionately affected by federal regulation. Our use of administrative data on Pell Grant recipient enrollment also represents an improvement over the data used in prior estimates of the effects of for-profit sanctions on enrollment (i.e., Darolia 2013) and in examinations of the for-profit sector more generally before 2000, since the institution-level data most commonly used – ED’s Integrated Postsecondary Education Data System (IPEDS) – excludes a large number of for-profit institutions that were in operation and potentially sanctioned in the early 1990s. This more comprehensive data is especially important when analyzing the market-level response to sanctions.

In order to fully assess the effects of federal aid restrictions on students, we need to understand whether students who would have attended sanctioned institutions ultimately switch institutions or forgo postsecondary education altogether. We empirically measure the extent to which a local higher education market contains alternatives to sanctioned for-profit institutions for federal grant recipients. The time period we study is prior to widespread broadband penetration, so most prospective two-year students’ choice sets were limited to colleges in their immediate vicinity.<sup>3</sup> We can therefore assess the consequences of institution closures and the loss of federal student aid on the college-going of the most vulnerable students.

On average, sanctioned for-profit institutions experienced a 40 percent decline in their own enrollment in the five years following sanction receipt. An additional for-profit sanction increases each local community college’s enrollment by about 6 percent. Across all community colleges within a local higher education market, the increase in enrollment, albeit small relative to community colleges’ overall size, was enough to completely compensate for the sanctioned for-profit’s enrollment decline. We also find evidence of negative enrollment spillovers within the for-profit sector. Unsanctioned for-profit institutions experience declines in Pell Grant recipient enrollment when an additional for-profit institution in the same market is sanctioned. After taking into account these negative enrollment spillovers, we estimate that public community colleges absorbed 40 to 60 percent of the overall enrollment decline in the for-profit sector from an additional for-

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<sup>3</sup>We use counties to proxy for local higher education markets, though results are substantively similar if we use radius-based (15 or 30 miles) market measures.

profit sanction. Overall, each additional for-profit sanction led to an approximately 3 percent decrease in aggregate observed enrollment within the local higher education market.

To explore the welfare effects of students switching from for-profit to public institutions, we present descriptive evidence on how sanctions correspond to student borrowing and loan default within a local higher education market. We find that sanctions are associated with sizable reductions in county-wide borrowing and default in the for-profit sector. Despite increasing public sector enrollment, for-profit sanctions do not increase community college students' borrowing or defaults. Back-of-the-envelope estimates suggest that roughly 70 percent of the students induced to stop borrowing by switching sectors would have defaulted on their loans in the absence of sanctions. Therefore, even with the decrease in aggregate market enrollment after a for-profit sanction, many vulnerable students were shifted to colleges where they were likely to reduce borrowing and be less likely to default.

Examining the mechanisms driving the negative spillovers to for-profit competitors, we find evidence of reputational effects within fields of study. In most cases, negative enrollment spillovers are larger in magnitude for institutions within the same field (e.g., beauty, business) as the sanctioned for-profit institution relative to institutions that specialize in other fields or those with more diversified program offerings. This provides suggestive evidence that sanctions improve student information about the quality and costs of colleges in the sector or field, leading students to alter their choices.

Our findings contribute to a growing body of research on for-profit postsecondary education. Several recent studies describe for-profit business practices and missions, advising systems, students, faculty work, and costs.<sup>4</sup> Researchers generally find similar or negative returns to for-profit attendance college attendance relative to other sectors (e.g., Deming, Goldin and Katz 2012; Cellini and Chaudhary 2014; Lang and Weinstein 2013; Cellini and Turner 2016). These findings are supported by Darolia et al. (2015) and Deming et al. (2016) who use resume audit study experimental designs and find that for-profit attendance weakly decreases interview requests. Our paper also contributes more broadly to research on the supply side of the market for higher education. The question of whether for-profit and public institutions compete for students is independently important given the overlap in programs offered by two-year public and for-profit institutions (e.g., Cellini 2009) and disparate costs (e.g., Laband and Lentz 2004; Cellini 2012). Two recent papers examine enrollment spillovers between the for-profit and public sectors due to changes in prices, resources, or institutional availability and find evidence of substitution (Goodman and Henriques

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<sup>4</sup>For research on for-profit institutions' business practices, see Breneman, Pusser and Turner (2006); Kinser (2007); and Tierney and Hentschke (2007). Rosenbaum, Deil-Amien and Person (2006) examine for-profit institutions' advising systems. Chung (2012) and Deming, Goldin and Katz (2012) provide information on the characteristics of for-profit students while Lechuga (2008) focuses on for-profit faculty. Gilpin, Saunders and Stoddard (2015) examine whether for-profit colleges are responsive to labor markets. Finally, Laband and Lentz (2004) and Cellini (2012) assess the costs related to receiving a for-profit postsecondary education.

2015; Armona, Chakrabarti and Lovenheim 2016). Similarly, our analysis contributes to broader debates in education policy, as issues of competition and public-private crowd-out arise in debates over universal preschool, charter schools, and voucher programs (e.g., Bassok, Fitzpatrick and Loeb 2014; Epple, Figlio and Romano 2004).

Finally, this study contributes to the broader literature on the effects of federal student aid policy. Research on the impact of federal student aid on enrollment and persistence has produced mixed results. Pell Grant aid does not appear to increase college entry among traditional-aged students (e.g., Kane 1995; Rubin 2011; Turner 2014; Carruthers and Welch 2015), although it may enhance enrolled students' attainment (Denning 2016; Denning, Marx and Turner 2017; Marx and Turner 2018) and older individuals' initial enrollment decisions (Seftor and Turner 2002). Moreover, in addition to extensive margin enrollment effects, financial aid has the potential to affect students' intensive margin where and when college decisions (e.g., Leslie and Brinkman, 1987; Hoxby and Avery 2004). Focusing on student loans, Dunlop (2013) and Wiederspan (2016) show that access to federal loan aid increases low-income community college students' educational attainment, while Marx and Turner (2017) provide experimental evidence that borrowing increases community college students' attainment and likelihood of transferring to a four-year institution.

Several studies provide evidence that institutions respond to federal student aid by altering tuition or institutional grants (e.g., Singell and Stone 2007; Turner 2012; Turner 2014). For-profit institutions may have particularly strong reactions to changes in access to federal aid programs, as these institutions may receive up to 90 percent of their revenue from federal student aid. Cellini (2010) finds that increases in Pell Grant generosity are correlated with for-profit college openings, particularly in areas with high concentrations of low-income students. Cellini and Goldin (2014) estimate that aid-eligible for-profit programs charge about 78 percent more than similar programs in for-profit institutions that are not eligible to disburse federal student aid.

The remainder of this paper proceeds as follows. In Section 2, we describe federal student aid programs and the standards that institutions must meet to maintain eligibility to disburse federal aid, and discuss our primary sources of data. Section 3 describes our identification strategy and sample. In Section 4, we present estimates of the impact of sanctions on enrollment in sanctioned institutions and their competitors and in Section 5, we provide descriptive evidence of effects on borrowing and default. Section 6 concludes.

## 2 Institutional Background and Empirical Setting

College students receive substantial sums of aid from the federal government. The largest federal financial aid programs, including Pell Grants, work-study, and Stafford Loans, are authorized under Title IV of the

Higher Education Act of 1965 and subsequent amendments (hereafter, Title IV). Title IV programs provide subsidies to low-income college students. At their recent peak, for-profit colleges received as much as a quarter of aggregate Pell Grant and subsidized student loan aid, nearly double the sector’s enrollment share (Baum and Payea 2013).

Colleges must comply with a set of administrative and fiscal requirements to disburse Title IV aid to students. Until the recent GE regulations passed under the Obama administration, the most stringent student performance-based requirement relied on CDRs. During the time period we study, CDRs were defined as the percentage of an institution’s former borrowers who default on their federal student loans within two years of entering repayment. Institutions were required to maintain CDRs less than 25 percent in any three-year period and less than 40 percent in any given year. In the absence of a successful appeal, institutions violating these thresholds lost access to student loans, and potentially all federal student aid, for at least the remainder of the year and the following two fiscal years.<sup>5</sup> Between 60 and 90 percent of all sanctioned institutions appealed this decision. We do not observe whether a sanction was ultimately applied (either due to an unsuccessful appeal or lack of an appeal) prior to the 1996-97 (1997) academic year, but of the sanctions threatened between 1997 and 2000, 95 percent ultimately resulted in federal aid loss.

CDR regulations were enacted in 1989 in response to concerns of poor student outcomes and abuse of federal student aid programs in the for-profit sector (U.S. General Accounting Office 1988; Fraas 1989; Dynarski 1991). While the regulations applied to all institutions, a disproportionate number of for-profits were affected. Prior to the regulation, close to 3,000 for-profit institutions participated in Title IV federal student aid programs. The first CDR-driven sanctions were announced in September 1991. By September 1995, over 1,200 for-profit institutions and a handful of institutions in other sectors had been sanctioned (Figure 1).<sup>6</sup>

Although ED did not gather complete or systematic data on for-profits in the 1980s and 1990s in the IPEDS, research using these data from the time period suggests that the market for sub-baccalaureate education in the late 1980s had many important similarities to the market today. Using the 1989 IPEDS

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<sup>5</sup>Exceeding the 25 percent threshold for three consecutive cohort years resulted in loss of access to loans (and potential loss of access to Pell Grants beginning with the 1997 cohort). Exceeding the 40 percent threshold resulted in “limitation, suspension, or termination” of all Title IV aid programs. CDR thresholds were higher in the early years of enforcement. For instance, in 1991, institutions had to maintain CDRs below 35 percent for the 1987, 1988, and 1989 repayment cohorts and below 60 percent for the 1989 cohort. In 2012, the ED moved to a three-year CDR measure and higher sanction thresholds: institutions with CDRs exceeding 30 percent for three consecutive years lose eligibility to disburse both federal Pell Grants and federal loans, while institutions with CDRs exceeding 40 percent in any single year lose access to federal loans. Appendix Table B.1 displays the full set of sanction triggers and penalties by year.

<sup>6</sup>Between 2003 and 2013, only 27 institutions received CDR-related sanctions. Of these, 23 ultimately avoided federal aid loss due to successful appeals. Despite heightened concern about the loan repayment challenges of for-profit college students, most for-profits avoided CDR sanctions in recent years, possibly due to strategic behavior in managing defaults (as discussed in letters between Secretary of Education Arne Duncan and Senator Tom Harkin dated December 12, 2012, and February 27, 2013). The December 12 letter notes that for-profit colleges “manipulate their Office of Postsecondary Education Identification (OPE-ID) numbers to avoid potential sanctions, including loss of federal financial aid eligibility. These tactics help colleges artificially avoid violating restrictions on high default rates.”

and related NPSAS data, Apling (1993) reports that, as is the case today, for-profit “proprietary schools” enrolled a disproportionate share of women, minority students, and older students in programs ranging from cosmetology to computer science that were typically less than two years in length. Most proprietary schools were small, though a few large institutions existed. Unlike today’s chains that enroll tens or even hundreds of thousands of students, however, the largest institutions enrolled roughly 12,000 students. While online education was not prevalent in the early 1990s, some schools offered correspondence courses by mail. Apling (1993) reports that in 1988, 235 proprietary schools with median enrollment of 800 delivered at least some coursework by mail. However, many of these schools were not eligible for federal aid under Title IV; only 68 institutions with home school programs were accredited (and therefore potentially eligible for Title IV), suggesting that relatively few federal aid recipients pursued correspondence education beyond county borders in the early 1990s.

Drawing on our own Pell Grant data that more accurately capture enrollment in Title IV for-profit institutions, we show that in the years prior to the implementation of the CDR regulations, the share of Pell Grant recipients attending for-profit institutions steadily increased from the mid-1970s, peaking at 27 percent in 1988, while the share of these students enrolled in public institutions concurrently fell from 70 to less than 60 percent (Figure 2). Following the implementation of the CDR regulations, the for-profit share of Pell Grant recipients fell over the next decade to a low of 13 percent in 1998, while the public share of Pell Grant recipients increased over this same period. This shift in the sector of enrollment for Pell Grant recipients was not due to a decline in Pell Grant take-up, as aggregate enrollment grew steadily over this period (Appendix Figure C.1). These patterns provide suggestive evidence that as many sanctioned for-profit institutions lost eligibility to disburse federal student aid, at least some of the low-income students that would have enrolled in these institutions shifted to the public sector.

The climate of rapid for-profit college growth, questionable practices in this sector, and subsequent regulations in the late 1980s and early 1990s bears a strong resemblance to the current U.S. higher education landscape. After the growth in the for-profit sector during the first decade of the 2000s, renewed concern over student outcomes led to the 2014 GE regulations. Under GE, eligibility for federal student aid would be based on graduates’ loan payment-to-earnings ratios, calculated at the program level.<sup>7</sup> At the time the regulation was issued, ED estimated that about 1,400 programs (99 percent of which were in for-profit colleges) would fail GE standards, impacting approximately 840,000 students.<sup>8</sup> Under the Trump

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<sup>7</sup>Specifically, payment-to-earnings ratios are categorized as pass (average loan payments are less than 8 percent of total or 20 percent of discretionary earnings), zone (average loan payments are 8–12 percent of total or 20–30 percent of discretionary earnings), or fail (average loan payments are greater than 12 percent of total or greater than 30 percent of discretionary earnings). Programs become ineligible to disburse Title IV funds if they fail this measure in two out of any three consecutive years or are in the zone for four consecutive years.

<sup>8</sup>See <http://www.ed.gov/news/press-releases/obama-administration-announces-final-rules-protect-students-poor-performing-career-college-programs> for details.



administration, implementation of the rule has been delayed and a new negotiated rulemaking process is underway to consider various modifications. While proponents argue that the GE standards will protect vulnerable students from profit-seeking firms that do not prioritize students' interests, opponents argue that the rules will limit underserved students' access to higher education (Fain 2014*b*; Gleason and Mitchell 2014; Mitchell and Zibel 2014; Fain 2018). An understanding of whether and how the loss of federal aid for for-profit colleges affects postsecondary enrollment is essential for predicting the impacts of GE and similar regulations that disproportionately impact the for-profit sector.

## 2.1 Conceptual Framework

We begin with a basic model of college choice loosely following Long (2004) and Jacob, McCall and Stange (forthcoming). Student  $i$  chooses from  $j \in J^m$  colleges in local higher education market  $m$ . Institutions are characterized by the expected out-of-pocket price paid by the student  $P_{ij}$ , academic characteristics  $A_j$  (e.g., programs, quality, or reputation), and distance  $D_{ij}$  to the institution. Prices vary both across and within institutions and depend on student characteristics  $X_i$  (e.g., family income, academic ability, in-state) and college characteristics  $Z_j$  (e.g., listed tuition, sector). A student's income is denoted  $I_i$ , such that  $I_i - P_{ij}$  represents consumption of all other goods and  $\varepsilon_{ij}$  is an unobserved individual-specific preference for institution  $j$ . Both  $A$  and  $P$  are functions of  $S$ , where  $S_j = 1$  when institution  $j$  receives a CDR sanction and is unable to give out federal student aid. An institution's reputation also may depend on whether other institutions in the same market and sector  $c \in \{public, nonprofit, for-profit\}$  have also been sanctioned ( $S_{-jc}$ ).

Individuals assess their expected utility from attending each institution  $U_{ij}$ , while also considering the option of attending no postsecondary education, and choose the option that maximizes their utility, where:

$$U_{ij} = \alpha_0 (I(X_i) - P(X_i, Z_j, S_j)) + \alpha_1 A(Z_j, S_j, S_{-jc}) + \alpha_2 D_{ij} + \gamma X_i + \varepsilon_{ij}. \quad (1)$$

When an institution is sanctioned, it affects students' college choice decisions through three channels. First, CDR sanctions may impact a student's expected cost of attendance. The amount that a student pays out-of-pocket for college equals the gross cost of attendance, less available financial aid. A sanctioned institution loses eligibility to disburse federal loans, and in some cases, Pell Grants and other federal aid. Sanctioned institutions could provide funds to offset the loss of aid from federal sources, but Turner (2014) and Cellini and Darolia (2017) find that for-profit colleges typically provide very little institutional aid. As a result, current and prospective students of sanctioned institutions are likely to experience an increase in their expected out-of-pocket college costs ( $P$ ). Students could absorb these costs, for example, by taking on more

expensive private student loans or increasing work hours. They may also choose to forgo a college education or may switch to a lower-cost competitor institution. Even if a sanction is not upheld, the threat of a sanction might still affect students' expectations of their future cost of continuing in a threatened institution.

Second, sanctions may provide information to prospective students on the quality of a particular institution or sector, reducing perceived academic quality ( $A$ ) and lowering the potential utility from attendance. Institutions sanctioned under the CDR regulations have, by definition, a high percentage of students who cannot repay their student loans. Prospective students may consider a sanction to indicate poor quality and therefore estimate a lower probability of their own success and lower expected lifetime benefits from attendance at the sanctioned institution. Such a calculation would lead to a lower probability of enrolling in college  $j$  and would induce students to enroll in a competing institution rather than forgo education altogether, unless suitable alternative institutions or programs are unavailable locally or offer much lower utility than nonenrollment. A key implication for our study is that these reputational effects of a sanction may also spill over onto institutions that students view as similar — leading students to switch to local institutions in a different sector or a different field of study. For example, students may downgrade their impression of other institutions in the same sector (e.g., other for-profits when a for-profit college is sanctioned) or other institutions that are perceived to be related (e.g., another local branch of an institution within the same “chain”). Prospective students also may consider a sanction of an institution that specializes in a field of study to indicate poor job prospects in that field. For these reasons, we explore whether spillovers are more pronounced among chains or among institutions with similar fields of study.<sup>9</sup>

Finally, sanctions may affect the supply of education. Sanctioned institutions may be unable to support their operations if reductions in student enrollment are sufficiently large, leading some sanctioned institutions to close. This in turn limits prospective students' choice sets and induces further switching to unsanctioned competitor institutions or leaving higher education altogether. Our reduced form estimates of the impact of sanctions on enrollment in a local market will encompass all three of these effects. We focus our analyses on students who are likely to only seek out local college options — those that attend colleges that offer two-year and less-than-two-year degrees — and approximate a student's choice set with counties.<sup>10</sup>

The extent to which students are dissuaded from education or diverted to a different institution following a sanction depends on the availability of institutions offering similarly appealing programs, prices at these institutions, and whether students are fully informed of their options beyond the sanctioned school. All

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<sup>9</sup>Unfortunately, given idiosyncratic reporting of chains, it is difficult to identify branches in our data (for example, some colleges may have separate Office of Postsecondary Education Identification (OPEID) numbers for each branch campus, while others have only one OPEID for all branches). However, in light of the fact that there were substantially fewer for-profit chains in the 1990s (Deming, Goldin and Katz 2012) and that chains are less likely to open multiple branches in the same local market, we believe that our estimates of spillovers are primarily capturing effects on different colleges with similar features. We expand upon this point and explicitly test the role of chains in Section 4.3.

<sup>10</sup>Our results are robust to including both two- and four-year colleges (Section 4.2).

of these factors relate to the degree of competition between colleges in a given higher education market, which has been addressed to a limited extent in previous literature. Peltzman (1973) provides a theoretical framework for modeling how higher education institutions compete for students in an environment with both federal subsidies (Pell Grants and federal loans) and state subsidies (direct funding for public institutions). Cellini (2009) provides evidence that public funding for California community colleges drives for-profit colleges out of the local market, with a corresponding increase in community college enrollment. Using national data, Goodman and Henriques (2015) estimate that the elasticity of for-profit enrollment with respect to state and local appropriations to public institutions is 0.2.

## 2.2 Data Sources

We primarily rely on administrative data on Pell Grant recipients and on institutions subject to CDR sanctions obtained from the ED. The Pell Grant data include the total number of Pell Grant recipients in each federal-aid eligible institution for the 1973–74 through 2011–12 (hereafter, 1974 through 2012) academic years. Pell Grant recipient enrollment provides a reasonable proxy for the enrollment of financially vulnerable undergraduate college students as students with low income and assets (measured by the federal government’s calculation of need) are eligible to receive Pell Grants. We are particularly interested in these relatively low-income and low-asset students since they are most likely to be sensitive to the loss of federal student aid and are also the target of policy efforts to encourage college attendance and completion.<sup>11</sup> In addition, although estimated effects of sanctions on sanctioned schools’ enrollment using IPEDS data in Darolia (2013) are established internally valid, the IPEDS is missing historical records for a non-trivial number of for-profit colleges; thus the Pell Grant data used in this study are better suited than for estimating changes to the total amount and distribution of market-level enrollment during this key time period.

Data on sanctioned institutions include the specific CDR threshold that was violated in all years that sanctions were applied, and institution-specific default rates for all but the first three cohorts of borrowers (i.e., those who entered repayment between 1989 and 1991). In most years, institutions had to maintain CDRs less than 25 percent in any three-year period and less than 40 percent each year. Violation of these thresholds resulted in loss of at least some federal financial aid in the year the sanction was applied and a minimum of two additional academic years. Specifically, institutions that were sanctioned due to three years of CDRs exceeding 25 percent lost eligibility to disburse federal loans but maintained eligibility for grant programs. Institutions that were sanctioned due to a single year’s CDR exceeding 40 percent could lose

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<sup>11</sup>The ratio of Pell Grant recipients to IPEDS fall enrollment is approximately 0.2 in two-year public institutions during the period we examine. While the IPEDS excludes many for-profit institutions that were operating in the 1980s and 1990s, Apling (1993) reports that close to 50 percent of students enrolled in for-profit schools in fall 1986 received Pell Grant aid (compared to 12 percent of community college students), suggesting that the share of for-profit students receiving Pell Grants during the period we examine may have been substantially higher than the share of students receiving Pell Grants in the public sector.

eligibility to disburse both grants and loans for an indefinite period. Following the ED’s definition, in our main specifications, our definition of a sanctioned institution includes both sets of institutions. However, we also explore heterogeneous effects by sanction type to assess whether the loss of all Title IV aid has a larger effect on enrollment than the loss of access to loans alone.

Typically, sanctions were effective immediately and restricted aid access for both current and prospective students. However, a sanctioned institution could appeal its case to ED in a process that typically lasted one to two years. During this time, the institution was allowed to continue participating in Title IV programs but would be responsible for repaying any loans disbursed during the appeals period if the sanction was ultimately upheld. An important limitation of our data is that we cannot observe whether institutions successfully appealed a sanction before the 1997 academic year.<sup>12</sup> Thus, our main estimates can be thought of as intent-to-treat (ITT) effects that encompass both the impact of the actual loss of federal student aid (in cases where institutions did not appeal or lost an appeal) and a threatened sanction with no subsequent loss of aid (due to a successful appeal) on enrollment. To the extent that students and/or institutions respond to threatened sanctions (even if the sanction is ultimately overturned on appeal), our estimates will represent the policy relevant treatment effect of federal regulation.

Our data do not contain institutions that do not participate in Title IV federal student aid programs.<sup>13</sup> We therefore cannot distinguish between prospective students who forgo higher education in response to a sanction and those that give up their Pell Grant to attend a nonparticipating institution. One might interpret such non-Title IV offerings as potentially inferior, since students cannot obtain public financial aid to attend these institutions and because these programs would be generally unaccredited. Nonetheless, to the extent that students leaving sanctioned institutions enroll in these non-Title IV institutions, our estimates will understate the extent to which unsanctioned competitors absorb enrollment declines in sanctioned institutions.

We use counties to proxy for local higher education markets, as in Cellini (2009), and exclude institutions in U.S. territories.<sup>14</sup> We match institutions with counties using their address and/or zip code, when available in the Pell Grant administrative data or CDR data. For institutions with missing location information in these data sets, we use the Postsecondary Education Participants System (PEPS) to link institutions to

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<sup>12</sup>Through a Freedom of Information Act request, we were able to obtain information on institutions that unsuccessfully appealed their sanctions for the 1990 through 1994 repayment cohort related sanctions. However, this data does not allow us to distinguish between institutions that successfully appealed their sanction and institutions that never submitted an appeal, and thus, we cannot determine the set of institutions that were ultimately penalized during these years. We observe all appeals and outcomes starting with the 1995 repayment cohort (for which sanctions were imposed in 1997).

<sup>13</sup>Cellini and Goldin (2014) document the large number of these institutions in the for-profit sector in more recent years.

<sup>14</sup>We also examine the robustness of our estimates to alternative definitions of local higher education markets in which we consider an institution’s competitors to be the set of schools within a 15 or 30 mile radius. As discussed in Section 4.2, we obtain similar results using county-based and radius-based market measures.

counties.<sup>15</sup> PEPS also contains information on Title IV institution closures. All institutions that closed between 1986 and 2010 remain in our sample and are assigned Pell Grant recipient enrollment equal to zero in the closed years to account for sanction-driven enrollment declines due to closure.

### 2.3 Trends in Pell Grant Enrollment, Borrowers, and Closures

In the years prior to the implementation of federal regulations that tied CDRs to sanctions (1980–1988), the overall number of Pell Grant recipients was weakly increasing. The share of Pell Grant recipients attending for-profit institutions grew from less than 10 percent to just under 30 percent (Figure 2). Over this same period, the share of these students enrolled in public institutions fell from 75 to just under 60 percent. Beginning in 1989, when the first set of institution-level CDRs were released, the for-profit share of Pell Grant recipients fell continuously until 1998, while public institutions enrolled an increasing percentage of recipients. Total Pell Grant recipient enrollment increased continuously until 1993 and remained constant for the next nine years (Appendix Figure C.1).

These patterns are even more pronounced among two-year public and for-profit institutions, which experienced the majority of sanctions and/or competitor sanctions (Figure 3). Between 1988 and 1998, the share of Pell Grant recipients enrolled in two-year for-profit institutions fell by 15 percentage points (close to 60 percent), while the share enrolled in public two-year institutions grew by almost an equal magnitude.

The federal sanctions we focus on were explicitly linked to student loan default rates. Figure 4 displays the number of borrowers and CDRs across sectors beginning in 1992 (unfortunately, sector-specific CDRs are not available before 1992). Panel A shows the the share of federal borrowers entering repayment by sector and cohort year. Echoing the patterns in Pell Grant recipient enrollment, the distribution of borrowers across sectors shifted during the years when federal sanctions were most prevalent (see Appendix Figure C.2 trends in the total number of borrowers entering repayment, which is generally increasing from 1996 to present, and the aggregate default rate, which is steadily decreasing between 1992 and 2005). The share of borrowers entering repayment from public institutions increased and the share leaving for-profit institutions fell. As shown in Panel B, the CDRs of for-profit colleges dropped precipitously in the years in which sanctions were most frequently imposed, while CDRs remained fairly constant in the public and nonprofit sectors.

Finally, we describe trends in institution closures over this period. A large number of for-profit institutions closed their doors beginning in 1989, the first year that institution-specific CDRs were released. Over the next decade, more than 2,000 Title IV for-profit institutions closed (Appendix Figure B.1). To further investigate the correlation between federal sanctions and changes in institution closure rates, we estimate descriptive hazard models (described in Appendix B). Appendix Figure B.2 displays the correlation between

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<sup>15</sup>See <http://www2.ed.gov/offices/OSFAP/PEPS/index.html> for details.

sanction receipt and the cumulative hazard of closure over the following five years. These results suggest that sanction receipt in the for-profit sector is correlated with an over 40 percent increase in the likelihood of closure within the next five years.<sup>16</sup> Sanctioned nonprofit institutions also have an increased hazard of closure, while public institutions appear to be unaffected. These results suggest that the “treatment” of an additional for-profit competitor being sanctioned likely affects institutions through multiple channels, with detrimental impacts on the prices and reputation of competitors that remain open paired with a reduction in the number of competitor institutions.

### 3 Empirical Framework

We use a generalized difference-in-differences framework to estimate the causal effect of sanctions on enrollment within sanctioned schools and their unsanctioned competitors within the same local higher education market (county). Our main focus is on generating an estimate of the impact of a sanction on overall enrollment to assess whether federal sanctions reduce access to education within a local higher education market. To do this, we estimate ordinary least squares (OLS) regressions of the following form:

$$enrl_{jy\tau} = \beta^c (\mathbf{s}_{j\tau}^c \times post_{y\tau}) + \gamma_d (\mathbf{s}_{-j\mathbf{d}m\tau} \times post_{y\tau}) + \alpha_{j\tau} + \alpha_y + \alpha_t + t\alpha_c + \epsilon_{jmy\tau} \quad (2)$$

Where  $j$  indexes institutions,  $y$  indexes calendar years,  $\tau$  indexes potential sanction years (hereafter “sanction-years”),  $m$  indexes local higher education markets,  $c \in \{p, np, fp\}$  indicates the sector to which institution  $j$  belongs (public, nonprofit, and for-profit, respectively), and bold terms represent vectors. The treatments of interest are  $\mathbf{s}_{j\tau}^c$ , an indicator for whether institution  $j$  in sector  $c$  received a sanction in sanction-year  $\tau$ , and  $\mathbf{s}_{-j\mathbf{d}m\tau}$ , which indicates the number of institution  $j$ ’s competitors in sector  $d \in \{p, np, fp\}$  that were sanctioned in sanction-year  $\tau$ . Both of these terms are interacted with  $post_{y\tau}$ , an indicator for the year of the sanction and the five following academic years. Main effects of own and competitor sanctions are accounted for by institution by sanction-year fixed effects ( $\alpha_{j\tau}$ ) and fixed effects for the number of years before or after the sanction ( $\alpha_t$ , where  $t = y - \tau$ ) account for main effects of  $post_{y\tau}$ . Calendar year fixed effects ( $\alpha_y$ ) account for year-specific shocks that affect all institutions similarly (e.g., changes in the maximum Pell Grant or rules dictating Pell Grant eligibility). We include a linear time trend that varies by sector,  $t\alpha_c$ , to account for changes in sector-specific features over time (e.g., reductions in state funding for community colleges).  $\epsilon_{jmy\tau}$  is a composite error term.

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<sup>16</sup>Our measure of closure comes from the PEPS data. The PEPS data allow us to distinguish between closures and mergers, but only contain information on Title IV institutions. Thus, we do not observe closures for institutions that exit the Title IV program prior to closing. To the extent that CDR-related federal regulations induced institutions to leave Title IV, Appendix Figures B.1 and B.2 will underestimate the number of closures and the correlation between sanction receipt and closure.

To assess the effect of an additional sanction in sector  $d$  on market enrollment, we need to account for the fact that each sanctioned school may have multiple competitors. Let  $\mu_{dm\tau}$  represent the average number of unsanctioned schools that are competitors of a sector  $c$  sanctioned school within a given market  $m$ . We calculate the effect of an additional sanctioned school in sector  $c$  on market level enrollment via a linear combination of estimated coefficients. For instance, with  $c = fp$ , the effect of an additional for-profit sanction on market-wide enrollment will be estimated by  $\hat{\beta}^{fp} + \hat{\mu}_{fp,m\tau} \times \hat{\gamma}_{fp}$ .

Our key identifying assumption is similar to the assumption of parallel trends in the standard difference-in-differences setting, specifically, that no other factors affecting enrollment in either the sanctioned or competitor institutions were contemporaneous with the timing of sanction receipt or the number of competitors sanctioned within the local higher education market. With respect to identifying effects on sanctioned institutions own enrollment, this assumption implies that counterfactual Pell Grant recipient enrollment trends should be similar in institutions that do and do not receive sanctions in the same sector in the years after the sanction is applied.<sup>17</sup> In the case of identifying spillover effects, this assumption implies similar trends for unsanctioned competitor institutions in the same sector that were in markets that differed only in the number of sanctioned institutions in a particular sector. A testable implication of this assumption is that counterfactual enrollment trends for unsanctioned public institutions should be similar in markets that had  $n$  versus  $n + 1$  additional sanctioned for-profit institutions. It is unlikely that competitors anticipate and preemptively adjust to sanctions that will be imposed on neighboring institutions in future years. However, in larger markets, schools might be exposed to more sanctioned competitors and it may be the case that overall enrollment trends in larger versus smaller markets differ. We address this concern in four ways. First, we include market-specific time-trends in our main specification and show that our results are robust to removing these trends, allowing these trends to vary between for-profit and other institutions, and by for-profit field of study.

Second, we estimate event-study models, in which  $post_{y\tau}$  in equation (2) is replaced by a set of indicators for years before and after sanction receipt/number of competitors receiving sanctions:

$$enrl_{jy\tau} = \sum_{k=-10}^{10} \left\{ \beta^{c,k} \left( \mathbf{s}_{j\tau}^c \times \mathbf{1}[t = k]_{\tau} \right) \right\} + \sum_{k=-10}^{10} \left\{ \gamma_d^k \left( \mathbf{s}_{-j\mathbf{d}m\tau} \times \mathbf{1}[t = k]_{\tau} \right) \right\} + \alpha_{j\tau} + \alpha_y + \alpha_t + t\alpha_c + \epsilon_{jmy\tau} \quad (3)$$

where  $\mathbf{1}[t = k]_{\tau}$  indicates the period  $k$  years before or after sanction year  $\tau$ . This allows for an explicit test of whether enrollment trends in years prior to the sanction are statistically distinguishable for schools that did

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<sup>17</sup>This assumption will be violated if institutions endogenously adjust their recruitment, tuition, and institutional aid practices in anticipation of being sanctioned. Darolia (2013) does not find evidence of an enrollment expectations effect when institutions exceeded the three year 25 percent CDR threshold for one or two years.

and did not receive sanctions (i.e.,  $\beta^{c,-10} = \dots = \beta^{c,-1} = 0$ ) and whether pre-period enrollment trends within unsanctioned institutions that had one additional sanctioned competitor differed from pre-period trends of unsanctioned schools with one fewer sanctioned competitor (i.e.,  $\gamma_d^{-10} = \dots = \gamma_d^{-1} = 0$ ).

Third, we separate institutions into quartiles based on market size (number of institutions) in 1990, the year before the first sanctions were imposed. Finally, to address the potential for serial correlation in both types of treatments, we estimate models in which we restrict our focus to the first “event” experienced by an institution. An event is either the receipt of sanction or having a sanctioned competitor. As discussed in Section 4.2, the results of these exercises suggest that our key identifying assumption is not violated.

### 3.1 Sample definition

We limit our main sample in a few ways. First, our main analyses focus on sub-baccalaureate institutions (institutions offering two-year and less-than-two-year credentials).<sup>18</sup> Few for-profit institutions offered baccalaureate degrees during this time period, and even fewer baccalaureate-granting for-profits received sanctions.<sup>19</sup> Nonetheless, we show that our estimates are robust to the inclusion of four-year institutions in our sample. We further restrict our analysis to the effects of sanctions imposed between 1991 and 2000, focusing on changes in enrollment between the five years before and after sanction receipt, with robustness checks using a ten-year window. Of the total number of threatened sanctions between 1991 and 2012, 99 percent fell within the years we examine. Third, our main sample excludes counties that contain more than 50 two-year institutions (on average, in a given year between 1986 and 2005) as we are unlikely to be able to detect enrollment spillovers from an additional for-profit sanction in these 12 large markets.<sup>20</sup> Our estimates are robust to the inclusion of all counties in our analysis sample. Appendix A provides a detailed description of our data sources and main analysis sample.

### 3.2 Characteristics of Institutions by Sector and Sanction Receipt

Table 1 displays the characteristics of the institutions form the basis of our analytic sample. Beginning in 1991, a given institution could receive up to two CDR-related sanctions (resulting in either loss of loans and/or loss of all Title IV aid) on an annual basis. Panel A contains information on all school by sanction-year observations within our sample, regardless of own or competitor sanction receipt. Over the period

<sup>18</sup>We cannot distinguish between two-year and less-than-two-year institutions in our main data sources (Pell Grant and CDR administrative data).

<sup>19</sup>Only 4 baccalaureate-granting public institutions, 23 baccalaureate-granting nonprofits, and 10 baccalaureate-granting for-profits were sanctioned. In the year prior to the release of the first set of CDR sanctions (1990), only 6 percent of for-profit colleges offered four-year degrees.

<sup>20</sup>These counties include: Maricopa County (AZ), Los Angeles County (CA), Orange County (CA), San Diego County (CA), Miami-Dade County (FL), Cook County (IL), Wayne County (MI), New York (NY), Allegheny County (PA), Philadelphia County (PA), Dallas County (TX), and Harris County (TX). The remaining counties include institutions that received 75 percent of all sanctions imposed on two-year institutions.



we examine, 74 percent of all Pell Grant recipients enrolled in sub-baccalaureate schools attended public institutions, just 3 percent attended a nonprofit schools, and the remaining 24 percent were enrolled in the for-profit sector (Panel A). In contrast, among students enrolled in sanctioned institutions, only 20 percent attended public community colleges, while 79 percent were enrolled in a for-profit school (Panel B). Enrollment in unsanctioned schools with at least one sanctioned local competitor was similar to overall enrollment, with 65 to 71 percent of students attending community colleges and 27 to 31 percent in for-profit schools (Panels C through E).

Average enrollment in public institutions was increasing over the period we examine, even within sanctioned community colleges. In contrast, the average for-profit institution lost students. The enrollment declines in sanctioned for-profits and their unsanctioned for-profit competitors were larger in both levels and percentage terms than overall enrollment declines in this sector.

## 4 The Impact of Sanctions on Enrollment

We start our analysis of the impact of the threatened loss of aid on overall enrollment in the market by estimating equation (2). The top row of Panel A in Table 2 contains estimated effects of sanctions on an institution’s own enrollment in the five years after receiving a sanction. In all three sectors, sanctions result in enrollment declines, although the reduction is only statistically significant in the case of sanctions applied to for-profit institutions. This is perhaps not surprising as public and nonprofit institutions were relatively unlikely to be sanctioned (e.g., Figure 1).

In the five years following sanction receipt, public institutions lose 58 students per year, while sanctioned nonprofit institutions lose 37 students per year. These statistically insignificant enrollment declines represents reductions relative to pre-sanction enrollment of 23 percent and 13 percent, respectively. Our main focus is on sanctions applied to for-profit institutions, as this sector received the vast majority of sanctions. Sanctioned for-profit institutions lose a statistically significant 98 students per year, on average, in the five years after sanction receipt – a 40 percent decline from baseline enrollment.

Panel B in Table 2 shows results using a ten-year window. Over this longer time horizon, sanctioned public institutions experience larger, statistically significant enrollment declines of 138 students, while enrollment in a sanctioned for-profit drops by 76 students. Enrollment within sanctioned for-profits continues to decline, albeit at a slower rate, for up to 10 years after the sanction, suggesting effects that persist beyond the period in which a sanctioned school was directly impacted. One explanation is the increased rate of closure among sanctioned for-profits. As described in Appendix B, sanctioned for-profits experienced a 40 percent increase in the cumulative hazard of closure in the five years following sanction receipt.

These own-enrollment effects do not take into account spillovers from sanctioned institutions to their unsanctioned competitors, and these effects are critically important to assessing the overall impact of federal regulation on students' access to higher education. The second row of estimates in Panel A of Table 2 represent the spillover effects of sanctions on unsanctioned local competitor institutions in the five years after a sanction. Spillovers from additional public and for-profit institutions receiving sanctions are small and statistically insignificant, while each additional sanction applied in the nonprofit sector leads unsanctioned competitors to absorb an additional 30 students per year, a statistically significant increase. Estimated enrollment spillovers represent the enrollment gain for a given competitor, but each sanctioned institution has multiple competitors. Thus, we scale the estimated per-institution enrollment spillovers by the number of competitor institutions exposed to a sanction to estimate the effect of sanctions on market-wide enrollment. An additional nonprofit sanction actually increases county-wide enrollment, although this result should be viewed with caution given that very few nonprofit schools received sanctions. An additional sanction in either the public or for-profit sector has only small effects on overall county enrollment after taking into account the number of unsanctioned competitors exposed to a given sanctioned school. In both cases, the enrollment decrease represents a 3 percent reduction relative to baseline enrollment. When considering a ten-year time-frame in Panel B, we find similar impacts on the market when a for-profit is sanctioned (a 3 percent reduction), but virtually no change on enrollment when a public institution is sanctioned (-0.3 percent), as competitors see small positive enrollment gains. Together, the results in Table 2 suggest that many of the students induced to leave sanctioned institutions may have enrolled in other schools. We further explore the nature of enrollment spillovers in Section 4.1.

We explore the dynamics of enrollment spillovers by estimating event-study models in the form of equation (3). These results are plotted in Figure 5.<sup>21</sup> Each marker represents the estimated effect of one additional sanctioned public (Panel A), nonprofit (Panel B), or for-profit (Panel C) school sanctioned on enrollment in the average unsanctioned competitor in the years before or after sanction receipt (with  $t - 1$  serving as the omitted category), while shaded regions represent 95 percent confidence intervals. Across all three panels, we observe virtually no significant differences in enrollment in the pre-sanction time period, suggesting that our assumption of parallel pre-trends holds.<sup>22</sup> Turning to the post-sanction years, when a public institution is sanctioned (Panel A), we observe significant increases in enrollment in competitor institutions beginning

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<sup>21</sup>Event study estimates of own enrollment effects for for-profit institutions reveal a sharp decline in enrollment in the year of the sanction and following two years, which is consistent with the period of federal student aid loss associated with a sanction (Panel C of Appendix Figure C.3). Sanctioned for-profits also appear to have significantly larger enrollment increases over the 10 years prior to sanction receipt than unsanctioned competitors, suggesting that for-profit schools that were especially fast growing were also generating more student borrowers and/or worse post-college outcomes.

<sup>22</sup>Of the 9 pre-sanction coefficients representing the estimated effects of an additional sanctioned for-profit competitor, one is significantly different from 0 ( $p = 0.028$ ). However, a test of the joint significance of the pre-period coefficients does not reject the hypothesis that they are all statistically indistinguishable from 0 ( $p = 0.619$ ).

five years later. Effects of nonprofit sanctions on competitors are noisy and statistically insignificant in all post-sanction years (Panel B). Notably, Panel C shows that when a for-profit institution is sanctioned, competitor enrollment initially drops, but recovers around year six. Beginning 8 years after sanction receipt, enrollment within unsanctioned competitor institutions is significantly higher relative to the year before the sanction was imposed. We explore potential explanations for this pattern below.

#### 4.1 Unpacking the Effects of Sanctions on Market Enrollment

The small estimated declines in market-level enrollment from an additional for-profit sanction may mask substantial heterogeneity across competitor sectors. For example, we might expect enrollment spillovers to be larger for similar institutions due to reputational effects or similarities in course offerings. We explore this possibility by estimating specifications that allow for heterogeneity in enrollment spillovers from an additional sanctioned school by competitor sector; results are displayed in Panels B and C of Table 3. We find no evidence of heterogeneous enrollment spillovers when an additional public institution is sanctioned (column 1). Within the nonprofit sector, we find a significant increase in enrollment (about 30 students) among unsanctioned nonprofit competitors when an one additional nonprofit in the same market is sanctioned.

We do find evidence of heterogeneous enrollment spillovers from an additional for-profit institution sanctioned (column 3). Panel B shows that, on average, each local public community college enrolls 51 more students each year when one additional for-profit college within the same market is sanctioned in the five years after sanction receipt, representing a percent increase. In contrast, the average unsanctioned for-profit school experiences an annual loss of 13 students (10 percent). Scaling these estimates to the market-level using the average number of competitors in each sector, we estimate that the average enrollment decline for a given sanctioned for-profit college (102 students) is effectively absorbed by the 117 student increase in community college enrollment (i.e., a 51 student increase in each of the 2.3 unsanctioned public competitors of the average sanctioned for-profit). At the same time, an additional sanctioned for-profit generates an enrollment decline totaling 177 students across its approximately 14 local unsanctioned for-profit competitors. Combining the direct and spillover effects in the for-profit sector, our estimates suggest an additional for-profit sanction leads to loss of 279 students, but about 42 percent of these students are absorbed by local community colleges.<sup>23</sup>

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<sup>23</sup>As shown in Appendix Table C.2, estimated effects on  $\ln(\text{enrollment}+1)$  are largely similar. We examine  $\ln(\text{enrollment}+1)$  rather than  $\ln(\text{enrollment})$  to be able to capture enrollment declines due to school closures and open schools that lose Title IV eligibility and thus have 0 Pell Grant recipients. For instance, the estimated 0.72 reduction in log enrollment within sanctioned for-profits represents a 51 percent decline, which is larger, but comparable to the 41 percent enrollment decline we find in Table 3. Likewise, we estimate that an additional sanctioned for-profit competitor leads to an 8 percent increase in each local community college's enrollment and a 5 percent decrease in each local unsanctioned for-profit competitor's enrollment. Scaling the estimated increase of 51 students within a given community college due to an additional for-profit competitor by baseline community college enrollment suggests these schools experienced a 5.5 percent increase in annual enrollment. Likewise, the negative spillovers on unsanctioned for-profit competitors due to an additional local for-profit being sanctioned represents a 10

Estimates using a 10-year window (Panel C) suggest that, in the longer-run, even more students may be switching sectors in response to a sanction. Sanctioned for-profits lose 81 students per year, but 72 students are gained by public competitors, nearly offsetting losses in sanctioned institutions. For-profit competitors again experience negative spillovers of 15 students. Combining these figures and scaling by the number of competitors, we estimate that roughly 285 students leave the for-profit sector, but 166 students – about 58 percent – are absorbed by public competitors. These offsetting enrollment gains and losses across sectors explain the relatively small 3 percent decrease in county-wide enrollment due to an additional sanctioned for-profit.

## 4.2 Robustness

In this section, we show that our main estimates are robust to a variety of specifications and sample definitions. We first consider an alternative specification that allows for differences in enrollment responses to sanctions within unsanctioned competitors based on the size of the population (rather than number of schools) exposed to sanctions. There is substantial variation in enrollment levels across sanctioned for-profits, ranging from 0 to over 7000, so an additional for-profit institution receiving a sanction would likely have larger effects on unsanctioned competitors’ enrollment in markets where sanctioned for-profit enrollment is larger than average. Thus, we create an alternative measure of the “bite” or magnitude of competitor sanctions by constructing a measure of the number of students potentially exposed to a sanction within a given sector and market. We use enrollment within sanctioned institutions in the year before the sanction was announced, as enrollment in the year of the sanction itself will likely endogenously respond to the loss (or threat of loss) of federal aid. Focusing on markets in which at least one for-profit sanction, the number of for-profit students exposed to a sanction ranges from 0 to 8819, with a mean of 648 and median of 285. Finally, because baseline enrollment within unsanctioned competitors also varies substantially, we estimate specifications with  $\ln(\textit{enrollment} + 1)$  as the dependent variable and likewise, use the log of our measure of number of students exposed to sanctions.

Spillover effects estimated from this model can be interpreted as enrollment elasticities, specifically, the elasticity of enrollment for an unsanctioned institution in a given sector with respect to the number of students who are exposed to sanctions in a given sector. Estimated own enrollment and spillover effects are presented in Table 4. Sanctioned for-profits experience a 0.72 log point (51 percent) enrollment decrease in the five years after sanction receipt. The lower panel indicates that a one percent increase in the number of Pell recipients in the for-profit sector that were exposed to a sanction generates a 0.043 percent increase in enrollment within a given unsanctioned public sector institution and a 0.021 percent decline in unsanctioned percent decrease relative to baseline enrollment.

for-profits. These results suggest a relatively small enrollment elasticity with respect to enrollment of students exposed to sanctions in competitor institutions. Given the much larger size of the average community college in markets with sanctioned for-profits (923), it is not surprising that these schools did not experience large changes in overall enrollment.

We further test the robustness of our results by estimating own and spillover enrollment effects of sanctions within markets that vary in size.<sup>24</sup> Specifically, we divide our main sample into quartiles based on the total number of institutions within the local higher education market in 1990 to address the concern that markets with more schools sanctioned are very different in structure than markets with fewer schools sanctioned. Results are shown in the first four columns of Table 5. Estimated effects of for-profit sanctions on own and competitor enrollment levels are relatively similar across markets of different sizes, and the overall reduction in market enrollment due to an additional for-profit sanction is between a 1 and 7 percent. In all four quartiles, we find evidence of enrollment decreases within sanctioned for-profits and significant increases in unsanctioned public competitors from an additional for-profit sanction. Enrollment spillovers of an additional for-profit sanction on unsanctioned for-profits are negative and statistically significant in all but the smallest counties that have three or fewer institutions. These results provide evidence that the spillover effects estimated using our main sample cannot be explained by differences in the size of markets with more versus fewer sanctioned schools.

The last column of Table 5 focuses on the 12 largest counties with more than 50 two-year institutions that are excluded from our main sample. Each additional sanctioned for-profit within these very large markets leads to a 1 percent decrease in overall enrollment. Estimated enrollment spillovers for a given public (for-profit) competitor are smaller than in other markets, most likely due to the large number of such schools available to absorb students displaced from sanctioned for-profits.

An additional concern might be that differences in employment trends between similar sized counties with more versus fewer sanctioned schools are contributing to our results. To give an example, if unemployment is increasing in particular industries that disproportionately employ former for-profit students, for-profit borrowers might have trouble repaying their loans and enrollment within for-profits might respond to the lack of employment opportunities related to the programs these schools offer. Table 6 shows that our results are robust to the inclusion of county by sector linear time trends. The first column presents estimated own enrollment effects and enrollment spillovers from an additional sanctioned competitor from a specification that excludes county-specific linear trends, while column 2 duplicates estimates from Table 3. Column 3

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<sup>24</sup>Our results are robust to the inclusion of the largest counties with more than 50 two-year institutions, where we might expect a weaker reaction of competitors to sanctioned institutions (Appendix Table C.3). Relative to our baseline results, we find slightly smaller positive enrollment effects among public competitors of sanctioned for-profits and slightly smaller negative spillovers to for-profit competitors. However, in aggregate, county-wide enrollment falls by only 1 percent and the public sector absorbs 43 percent of the enrollment decline within a sanctioned for-profit and its unsanctioned for-profit competitors.

includes estimates from specifications that allow county-linear trends to vary between for-profit and other institutions and column 4 allows county-specific for-profit trends to vary by for-profit industry.<sup>25</sup> Estimates are similar regardless of whether the county time trends are allowed to vary by for-profit or for-profit industry. Estimated market level enrollment declines from an additional for-profit sanction are smaller without county specific trends – the opposite of what we would expect to find if counties that had more for-profit sanctions were also experiencing rising unemployment.

In our next robustness test, we include four-year institutions in our sample. Many selective four-year public and nonprofit institutions draw students from outside of the local market, and thus, we would not expect to see a response to changes in local demand. Outside of the for-profit sector, we would not expect four-year college enrollment to be responsive to sanctions that primarily targeted two-year institutions, and there were very few for-profits classified as four-year institutions in the 1990s. Nonetheless, we check to be sure our results are unaffected by the inclusion of these institutions. As shown in Appendix Table C.4, we obtain similar results when we include this broader group of institutions in our sample and estimate that each additional for-profit sanction leads to a 1 percent drop in county-wide enrollment.

The estimates we have presented thus far combine the effects of sanctions that cause schools to lose access to student loans with sanctions that may cause an institution to lose of all Title IV aid. We might expect stronger effects on enrollment (particularly Pell Grant enrollment) for institutions threatened with the loss of all Title IV aid, as grant aid directly reduces the net cost of college. Separate estimates by type of sanction are shown in Appendix Table C.5. Effects of for-profit sanctions on own enrollment are similar for sanctions with different consequences, but spillovers from the threatened loss of Title IV are larger in magnitude for both public and for-profit competitors. These findings suggests that the loss of Title IV generates stronger reputational impacts across sectors than simply the loss of access to loans.

We explore heterogeneity by sanction-year in Appendix Table C.6. The largest decrease in own-enrollment following a sanction occurs in 1991, the first year that sanctions were imposed. One interpretation of this finding is that the for-profit institutions that were most affected by a sanction closed or left Title IV, leaving a (relatively) positively selected sample of for-profits that could potentially be sanctioned in subsequent years. The finding of both positive spillovers to public institutions and negative spillovers to for-profit competitors (when an additional for-profit competitor is sanctioned) is consistent with an industry-wide reputational effect: impacts appear strongest in the first several years of the policy (1991–1995) as potential students learn more about for-profit colleges, and then (with an exception in 1998) decrease in magnitude when later-year sanctions are imposed, when many sanctioned and unsanctioned for-profit schools have closed or left the Title IV program, and (presumably) potential students already gained more information about the

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<sup>25</sup>Appendix A.4 describes the industry classifications we use.

sector as a whole.

Our main estimates are also robust to alternative definitions of an institution’s local higher education market. Although counties have been used to proxy for local higher education markets in many previous papers (e.g., Cellini 2009; Cellini 2010), it is not necessarily the case that current and prospective students would not search for higher education alternatives across county lines. Thus, we geocode the locations of institutions in our sample and consider other institutions to be local competitors if they fall within a 15 or 30 mile radius.<sup>26</sup> Appendix Table C.7 presents these estimates for all schools that we were able to geocode and schools that are in our main sample. The similarity of these estimates to our main results suggests that using counties to proxy for local higher education markets is a reasonable practice.

### 4.3 Mechanisms

As discussed previously, when a local for-profit college is sanctioned and its students are exposed to a loss of federal student aid, we would expect to see weakly positive enrollment changes in other institutions and sectors, as these schools have become relatively cheaper. Thus, the negative spillovers we find for competing for-profit institutions in the same county are surprising. One explanation is that — not unlike today — the reputation of the sector was tarnished when individual institutions were sanctioned. To explore this hypothesis we conducted an archival analysis of newspaper records.<sup>27</sup> We found several national news stories on cohort default rates and the problems of student loan repayment in “private trade schools.” Perhaps more relevant to our study were numerous stories in local newspapers reporting on sanctions and the closure of local institutions. We present select quotations in Appendix D. These quotes suggest that when one school gets sanctioned, other private trade schools may suffer; for example, after a local competitor shut down in 1991, a for-profit college founder suggested that the image of the local trade school industry “has taken a pretty heavy beating. Any damage to any private career school affects every other school” (Morgan 1991).

Our archival analysis also suggested that spillovers might be more likely among branches of the same chain of institutions. To assess this empirically, we code chains by matching names of colleges in more than one location. Our match is necessarily imprecise, but we are able to identify at least a subset of chains with multiple locations in the same county (see Appendix A.3). We would be most concerned that our negative within-county spillovers are driven by two locations of the same chain in a given county, but just 6 percent of all for-profits had multiple locations in same county during the 1990s. Of the 9,688 unique for-profit schools located in markets within which at least one for-profit competitor was sanctioned, only 137 (1 percent) belonged to the same chain as the sanctioned school. Thus, it is unlikely that preemptive actions taken

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<sup>26</sup>A small number of institutions could not be geocoded and thus are excluded.

<sup>27</sup>We ran queries in Lexis-Nexis using the names of the 20 largest sanctioned for-profit colleges as well as 10 other randomly selected smaller sanctioned for-profits.

by unsanctioned locations within a chain that also contains sanctioned institutions in the same county can explain the negative spillovers. We confirm this hypothesis in Table 7, which presents point estimates from a specification that allows spillover effects of an additional for-profit competitor sanction to vary by whether the sanctioned competitor belonged to the same chain. The point estimate is positive and not statistically distinguishable from either zero or the estimated spillover effect on other unsanctioned for-profits.

While chain-wide responses to a single location being sanctioned cannot explain our finding of negative enrollment spillovers in unsanctioned for-profits, it may be that reputational effects are stronger among institutions that offer programs in fields similar to those offered by sanctioned institutions. For example, an article describing a local sanctioned beauty school noted, “[h]air-dressing schools are also prevalent on state and national lists,” perhaps leading students away from other for-profit cosmetology schools in the local market. To assess spillovers by field, we grouped for-profit colleges into five broad “field” categories using keywords appearing in college names, with the remainder whose names do not indicate a particular field depicted as “General” for-profits, as described in Appendix A.4.

For-profit institutions vary substantially in size across field of study.<sup>28</sup> For example, in 1990, schools classified as offering beauty programs enrolled 46 students on average, while general for-profits had 284 Pell grant recipients. Thus, we test for heterogeneity in spillovers by field of study using the same specification that generated results for Table 4. Specifically, we estimate the effect of the log number of Pell Grant recipients potentially exposed to a sanction (i.e., that were enrolled in a sanctioned institution in the year prior to sanction receipt) on  $\ln(\textit{enrollment})$ .

Enrollment responses to sanctions vary significantly across fields ( $p < 0.001$ ). The largest own enrollment declines due to sanction receipt occur among general for-profits (0.90 log points or 59 percent), and those focusing on computing/business (1.56 log points or 79 percent), culinary/arts/hospitality (1.65 log points or 81 percent), and engineering/mechanical trade programs (1.08 log points or 66 percent). Beauty schools also experience significant enrollment decreases, albeit of a smaller magnitude (0.47 log points or 37 percent), while enrollment losses in sanctioned health-focused for-profits are not statistically distinguishable from zero. Across all for-profit fields, own enrollment effects are negative, and jointly significant ( $p < 0.001$ ).

As might be expected, sanctions applied to general for-profits generate significant positive enrollment spillovers to public institutions, which typically offer a range of fields. More surprisingly, sanctions applied to beauty-focused for-profits also produce significant spillovers to public schools that are of a similar magnitude, despite the fact that many community colleges do not offer cosmetology programs. Although estimated

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<sup>28</sup>Appendix Table A.1 shows that total number of unique for-profit institutions and average enrollment by field of study, the number and average enrollment of sanctioned for-profit institutions by field, and the number and average enrollment of unsanctioned for-profit competitors of different-field sanctioned for profits and same-field sanctioned for-profits, by field. The final two columns display characteristics of public competitors of sanctioned for-profits, by field.



enrollment gains from a marginal increase in the number of students exposed to sanctions are jointly significant ( $p < 0.001$ ), we cannot reject that effects are statistically different across the broad for-profit industry categories we examine ( $p = 0.630$ ).

Supporting the argument that within-field reputations matter, in every field but health (which did not experience significant own enrollment declines from sanctions), spillovers from sanctioned for-profit competitors in the same field are negative and larger in magnitude than spillovers from sanctioned for-profits in other fields. The largest field-specific spillovers are in the culinary/arts/hospital and engineering/mechanical trade fields. A one percent increase in the number of Pell Grant recipients exposed to sanctions within these sectors leads to a 0.20 and 0.25 percent enrollment decline within other local culinary/arts and engineering/mechanical trades schools, respectively. Unsanctioned beauty schools also experience a significant enrollment loss when an additional beauty school competitor is sanctioned, with a 1 percent increase in the number of beauty school students exposed to sanctions leading to a 0.03 percent decline in unsanctioned competitor beauty schools' enrollment. Across all fields, effects of for-profit sanctions on unsanctioned for-profit competitors are jointly significant ( $p < 0.001$ ). None of the estimated enrollment spillovers to unsanctioned for-profit competitors in different fields are statistically significant and we cannot reject a test that the coefficients are jointly insignificant ( $p = 0.724$ ).

Although not definitive, the direction and magnitudes of these results suggest that reputational effects within fields may be at play, at least for some fields. A final, optimistic interpretation of the negative spillovers to competitor for-profits is that sanctions may have improved student information about the quality and costs of colleges in this sector, leading students to make more informed choices. We cannot assess this hypothesis directly, but we examine patterns of student outcomes on default and borrowing in section 5 that provide suggestive evidence that this may be the case.

## 5 Descriptive Evidence on Borrowing and Default

In the previous section, we show that when for-profit institutions are threatened with federal sanctions, their own enrollment falls, enrollment in competitor for-profit institutions likewise decreases, and public institutions absorb these students. However, it is unclear whether this reallocation of students across sectors in response to for-profit sanctions represents a gain in private or social welfare. Ideally, we would compare attainment and earnings outcomes of students affected by sanctions to their outcomes in the absence of sanctions. Given data limitations, we can only proxy for student outcomes by examining changes in borrower and defaults across sectors in response to sanctions. Specifically, we estimate market-level regressions by regressing the total number of borrowers or defaulters within a market on the number of institutions,  $N$ , in

market  $m$  and sector  $c$  that had ever been sanctioned as of year  $t$  and market and year fixed effects:

$$Y_{mt}^c = \gamma_{mt}^c \mathbf{N}_{mt}^c + \delta_m + \delta_t + \nu_{mt}. \quad (4)$$

We examine whether the changes in enrollment that occurred following for-profit sanctions are correlated with changes in borrowing and repayment outcomes. Because entry into repayment lags enrollment, we lag our measure of the number of institutions in a market that were threatened with sanctions by two years. Unfortunately, since we first observe borrowers and defaulters beginning with the 1992 cohort, we cannot identify the effects of earlier sanctions.

As shown in Panel A of Table 9, each additional sanctioned institution is significantly correlated with a decrease in the number of borrowers in a local higher education market. Specifically, the point estimate in column (1) indicates that 44 fewer students took on federal loans — a 12 percent decline from baseline borrowing — when one additional institution was sanctioned in any sector. The reduction was driven by a drop in borrowers entering repayment from nonprofit and for-profit institutions in response to sanctions in these same sectors. Specifically, 26 fewer nonprofit students borrowed following a nonprofit sanction and 59 fewer for-profit students borrowed following a for-profit sanction. Community colleges appear to gain 24 percent of the would-be for-profit borrowers (e.g., Panel A, column (2), last row) suggesting that a large number of students who were shifted to community colleges following the sanction of a for-profit institution also shifted out of borrowing. The decline in borrowing in nonprofit institutions following a nonprofit sanction does not appear to be absorbed by any other sector. Finally, public sector sanctions are associated with an increased number of for-profit borrowers. This correlation may be due to prospective or current community college students shifting into for-profit institutions after losing access to federal student aid within the public sector, although we do not find a corresponding increase in Pell Grant recipient enrollment.

In Panel B of Table 9, we examine the correlation between sanctions and defaults. The dependent variable is the number of students who entered repayment and defaulted on their federal loans within two years in the specified sector. As shown in column (1), one additional institution receiving a sanction results in 31 fewer borrowers defaulting within two years. Own sector sanctions in all three sectors correlate with significant reductions in defaults. Despite the small increase in the number of borrowers attending community colleges following a for-profit sanction indicated in Panel A, defaults in the public sector do not change (Panel B, column (2), last row).

Finally, to get a rough estimate of the share of students induced to stop borrowing who would have eventually defaulted in the absence of federal sanctions, we can compare the changes in the number of borrowers in Panel A to the changes in the number of defaulters in Panel B. Comparing these estimates from

column (1) suggest that roughly 70 percent of the students induced to stop borrowing would have defaulted on their loans in the absence of threatened sanctions.

## 6 Conclusions

In recent years, expansive growth followed by increased scrutiny of the for-profit sector has led to the closure of several large for-profit college chains and debates over new regulations that may further restrict federal student aid at many other institutions in this sector. To shed light on how these changes might affect aggregate college enrollment and the distribution of students across sectors, this study draws on historical data from a time when policymakers implemented similarly restrictive regulations. We use these cohort default rate regulations with a generalized difference-in-differences design to assess whether and how student enrollment shifts within and across sectors when (primarily) for-profit institutions lose eligibility for federal student aid due to federal sanctions.

We find that Pell Grant recipient enrollment falls in for-profit institutions that are threatened with the loss of federal aid. Compared to previous research that examines all students (Darolia 2013), the magnitude of our results suggests that the enrollment of vulnerable students — recipients of the means-tested Pell Grant — is more strongly affected by federal aid loss. Further extending the literature, our results reveal that when a for-profit college is sanctioned, enrollment in other local competitor for-profit colleges also declines. Archival news analysis and analysis by field suggests that — much like today — the whole sector suffers the reputational impacts of federal sanctions placed on individual institutions. While the enrollment decline from an additional for-profit sanction is completely absorbed by the public sector, once negative enrollment spillovers to unsanctioned local for-profit competitors are accounted for, we estimate that about 40 to 60 percent of all for-profit students deterred from going to college in the sector shift to public community colleges. On net, we find evidence that the threatened sanction of a for-profit institution reduces aggregate enrollment in a local market by about 3 percent.

Overall, our results suggest several important implications for the sub-baccalaureate market. First, it is evident that most students in sanctioned for-profit institutions can and do find programs to fit their needs in the public sector. Our results compliment the findings of Cellini (2009) and Goodman and Henriques (2015), in that there appears to be strong competition for students across sectors at the two-year college level. Second, capacity constraints at lower-cost competitor public institutions did not appear to be a concern in the time period and context that we study, as public institutions were generally able to accommodate students who switched sectors in response to federal sanctions. However, declining public support for community colleges and concerns over capacity constraints in some states may suggest a weaker public sector response in more

recent years.<sup>29</sup> On the other hand, the growth of distance learning in both public and for-profit institutions will likely loosen capacity constraints and at the same time allow students to shift to a much broader set of institutions outside of their local higher education market.

But is the shift of students from for-profit to public institutions and the loss of some enrollment in the local market welfare enhancing? Our descriptive analysis reveals some suggestive evidence of improved student outcomes in the form of lower student loan borrowing and defaults as students shifted into public institutions in response to sanctions on for-profit colleges in the 1980s and 1990s. Added to this, the body of literature on for-profit student outcomes indicates that students in for-profit institutions experience similar (at best) and typically worse labor market outcomes than students in public institutions (e.g., Cellini and Turner 2016; Cellini and Chaudhary 2014; Darolia et al. 2015; Deming et al. 2016; Cellini and Turner 2016; Lang and Weinstein 2013) and have little earnings gain, if any, over individuals who do not attend college at all (Cellini and Turner 2016). Considering both the private and social costs of a for-profit vs. public education, Cellini (2012) finds that while direct public subsidies are higher for community colleges than for for-profits, the cost to students of tuition and borrowing in the for-profit sector far outweighs the taxpayer cost differential, as two-year public institutions charge about one-fifth the tuition of two-year for-profits (U.S. Department of Education 2015). On net, the costs to students and taxpayers together are about \$15,600 lower in the public sector per student per year (Cellini 2012), suggesting that shifting students from the for-profit to the public sector may indeed be welfare enhancing by both reducing costs and increasing benefits.

Although we study an earlier time period, our results can inform current debates surrounding accountability in higher education and restrictions on access to federal student aid for low-performing for-profit colleges. They suggest that restrictions on federal aid – such as those debated as part of the Gainful Employment rule in recent years – would likely result in only small declines in overall college-going. A large number of students would likely find programs to meet their needs in public institutions, yielding better outcomes for students and taxpayers.

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<sup>29</sup>See for example Bohn, Reyes and Johnson (2013) and Keller (2011) on capacity constraints in California community colleges.

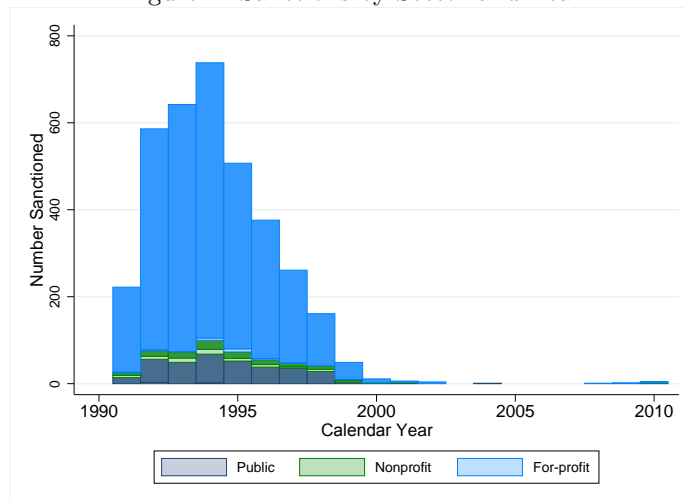
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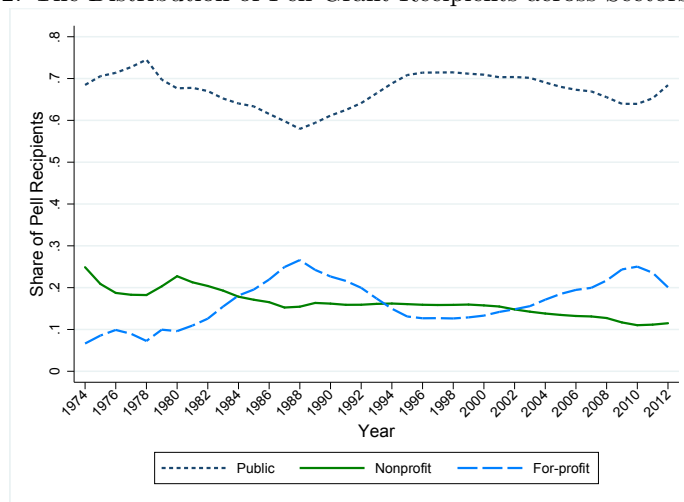
# Figures and Tables

Figure 1: Sanctions by Sector and Year



Source: Sanction administrative data. Notes: Sample includes all two- and four-year institutions with federal borrowers entering repayment. Dark bars represent two-year institutions, light bars represent four-year institutions.

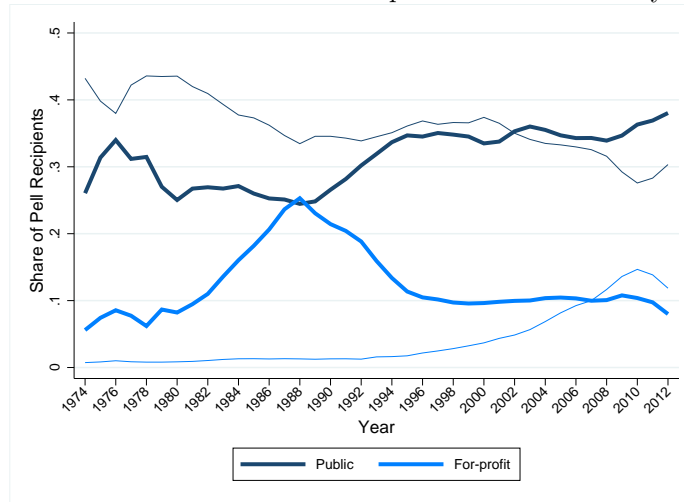
Figure 2: The Distribution of Pell Grant Recipients across Sectors by Year



Source: Pell Grant administrative data. Notes: Sample includes two- and four-year institutions with Pell Grant enrollment in the specified academic year. The short-dashed dark blue line represents the share of Pell Grant recipients enrolled in public institutions, the long-dashed light blue line represents the share of Pell Grant recipients attending for-profit institutions, and the long-dashed-dotted green line represents the share of Pell Grant recipients attending nonprofit institutions.

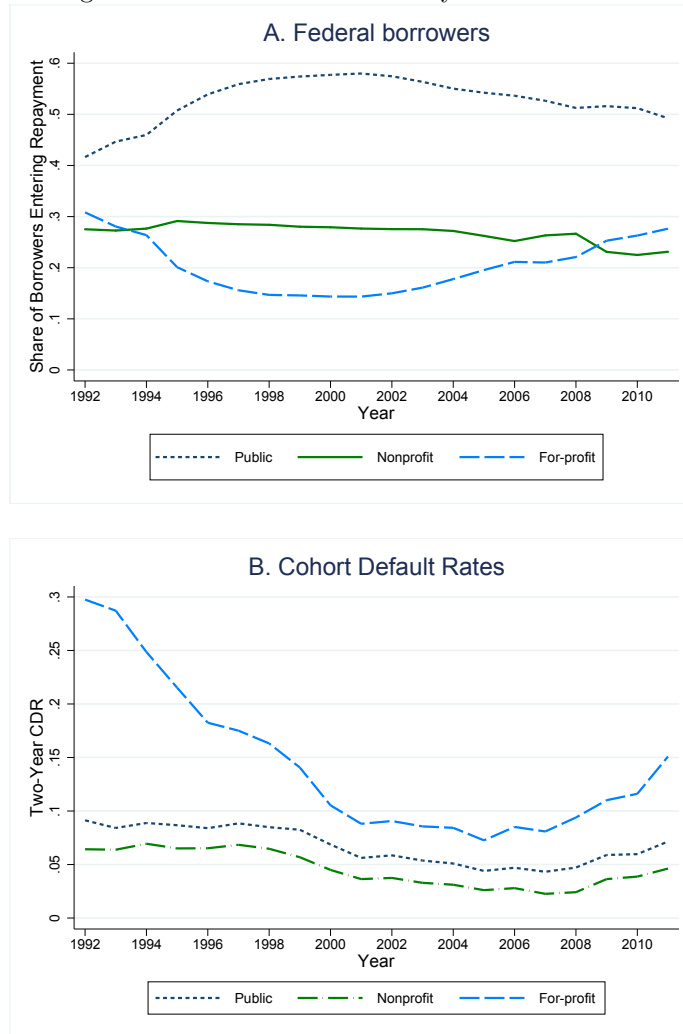


Figure 3: The Distribution of Pell Grant Recipients across Sectors by Year and Level



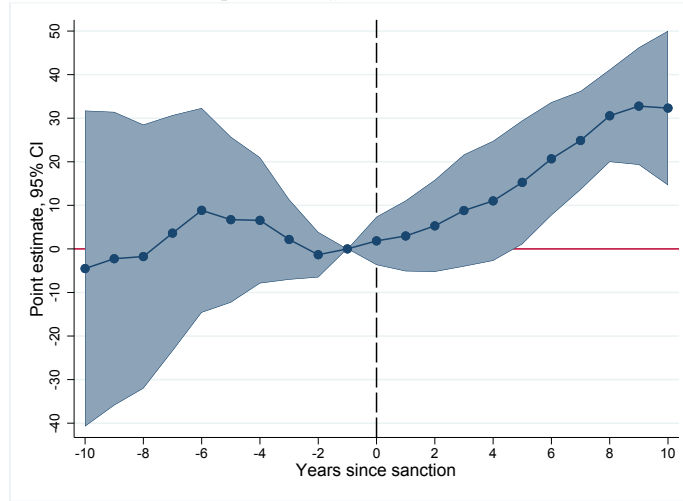
Source: Pell Grant administrative data. Notes: Sample includes two- and four-year public and for-profit institutions with Pell Grant enrollment in the specified academic year. Thick lines represent two-year institutions (including less than two-year institutions), and thin lines represent four-year institutions. Nonprofit institutions' share is omitted.

Figure 4: Borrowers and CDRs by Sector and Year

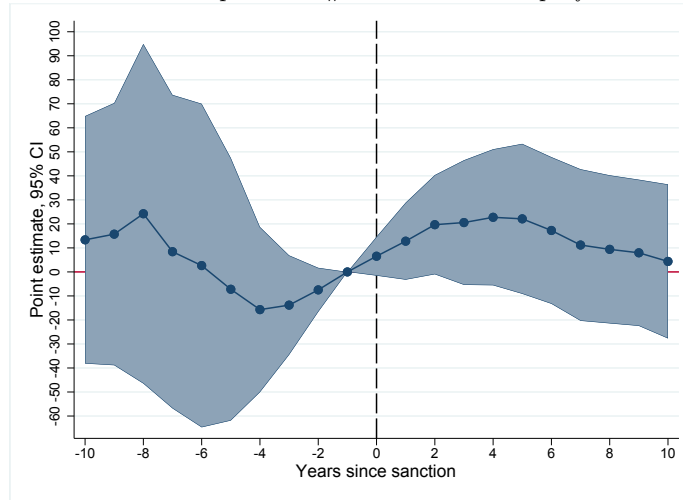


Source: CDR administrative data. Notes: Sample includes two- and four-year institutions with CDR data. Panel A displays the share of federal borrowers entering repayment in the specified cohort-year by sector. Panel B displays the ratio of total federal borrowers who defaulted within two years of entering repayment to the total number of federal borrowers who entered repayment in the specified cohort-year.

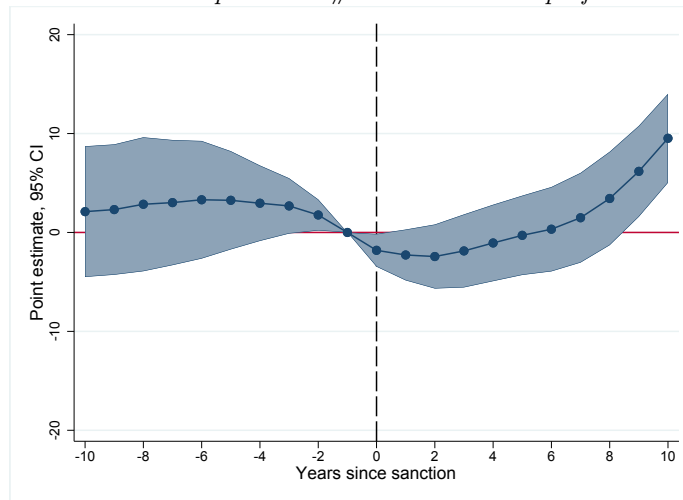
Figure 5: Effect of Sanctioned Competitor Institutions on Pell Enrollment  
*A. Competitor  $\times$  # Sanctioned Publics*



*B. Competitor  $\times$  # Sanctioned Nonprofits*



*C. Competitor  $\times$  # Sanctioned For-profits*



*Source:* Pell Grant, CDR, sanction, and PEPS administrative data. *Notes:* Sample is limited to two-year institutions with a Title IV program participation agreement in 1980 through 2010. Sample is limited to institutions in counties with fewer than 50 institutions (on average, across years). Closed institution enrollment is set to zero. Point estimates and 95 percent confidence intervals from a regression of Pell Grant recipient enrollment on the number of public, nonprofit, and for-profit competitors in the local higher education market that received a sanction in the sanction-year, interacted with years before/after sanction receipt (with  $t - 1$  serving as the omitted category). Regressions also include indicators for sanction receipt by sector interacted by years before/after sanction receipt, institution by sanction-year fixed effects, year fixed effects, years before/after sanction receipt fixed effects, and sector and county linear trends. See Section 3 for additional details.

Table 1: Characteristics of Institutions by Sector and Sanction Receipt

	(1) Public	(2) Nonprofit	(3) For-profit
<i>A. All institutions in sector</i>			
Average Pell Grant recipient enrollment			
Pre-sanction ( $t - 5$ to $t - 1$ )	642	65	110
Post-sanction ( $t = 0$ to $t + 5$ )	802	65	89
Share of Pell recipients ( $t - 1$ )	0.74	0.03	0.24
Observations (school by sanction year)	14,673	5,410	33,182
<i>B. Sanctioned institutions in sector</i>			
Average Pell Grant recipient enrollment			
Pre-sanction ( $t - 5$ to $t - 1$ )	459	159	250
Post-sanction ( $t = 0$ to $t + 5$ )	537	118	139
Share of Pell recipients ( $t - 1$ )	0.20	0.01	0.79
Observations (school by sanction year)	280	49	2,085
<i>C. Unsanctioned competitor of sanctioned public institution</i>			
Average Pell Grant recipient enrollment			
Pre-sanction ( $t - 5$ to $t - 1$ )	958	51	124
Post-sanction ( $t = 0$ to $t + 5$ )	1252	65	76
Share of Pell recipients ( $t - 1$ )	0.71	0.02	0.27
Observations (school by sanction year)	300	167	1,379
<i>D. Unsanctioned competitor of sanctioned nonprofit institution</i>			
Average Pell Grant recipient enrollment			
Pre-sanction ( $t - 5$ to $t - 1$ )	911	55	103
Post-sanction ( $t = 0$ to $t + 5$ )	1276	64	81
Share of Pell recipients ( $t - 1$ )	0.65	0.05	0.31
Observations (school by sanction year)	65	78	398
<i>E. Unsanctioned competitor of sanctioned for-profit institution</i>			
Average Pell Grant recipient enrollment			
Pre-sanction ( $t - 5$ to $t - 1$ )	923	52	135
Post-sanction ( $t = 0$ to $t + 5$ )	1231	51	97
Share of Pell recipients ( $t - 1$ )	0.67	0.02	0.31
Observations (school by sanction year)	2,205	1,374	9,730

*Source:* Pell Grant, CDR, sanction, and PEPS administrative data. *Notes:* Sample includes two-year institutions participating in Title IV programs between 1986 and 2005. Competitor institutions are other two-year institutions in the local higher education market (county).

Table 2: The Impact of Sanctions on Enrollment in Sanctioned and Competitor Institutions

<i>Sanctioned sector:</i>	<i>1. Public</i>	<i>2. Nonprofit</i>	<i>3. For-profit</i>	Test of equality ( <i>p</i> -value)
<i>A. 5-year pre-/post-sanction window</i>				
Post x Threatened sanction	-58 (37)	-37 (27)	-98 (11)**	0.083
Post x # competitors sanctioned	-2 (6)	30 (10)**	-3 (2)	0.005
Number of institutions   threatened sanction				
Competitors	9.5	13.6	17.4	
Predicted $\Delta$ county enrollment	-74 (56)	366 (131)**	-154 (40)**	
<i>% change (rel to baseline)</i>	-3%	13%	-3%	
Counties		1,364		
Institutions		5,845		
Observations		585,915		
<i>B. 10-year pre-/post-sanction window</i>				
Post x Threatened sanction	-138 (62)*	-35 (31)	-76 (12)**	0.258
Post x # competitors sanctioned	14 (8)	14 (13)	-2 (2)	0.111
Number of institutions   threatened sanction				
Predicted $\Delta$ county enrollment	-9 (54)	149 (157)	-118 (35)**	
<i>% change (rel to baseline)</i>	-0.3%	5%	-3%	
Counties		1,364		
Institutions		5,845		
Observations		1,118,565		

*Source:* Pell Grant, CDR, sanction, and PEPS administrative data. *Notes:* Sample is limited to two-year institutions with a Title IV program participation agreement in 1980 through 2010. Institutions in counties with more than 50 institutions (on average, across years) are excluded. Closed institution enrollment is set to zero. Estimates from a regression of Pell Grant recipient enrollment on whether the institution received a sanction in the sanction year, interacted with post-sanction receipt and sector, number of public, nonprofit, and for-profit competitor institutions that received sanctions in the sanction year, interacted with post-sanction receipt, institution by sanction-year fixed effects, year fixed effects, years since sanction fixed effects, and sector and county linear trends. See Section 3 for additional details. Robust standard errors clustered by county in parentheses; \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$ .

Table 3: Heterogeneity in the Impact of Sanctions on Enrollment by Competitor Sector

<i>Sanctioned sector:</i>	<i>1. Public</i>	<i>2. Nonprofit</i>	<i>3. For-profit</i>	Test of equality ( <i>p</i> -value)
<i>A. Number of institutions / threatened sanction</i>				
Public competitor	1.4	1.4	2.3	
NP competitor	0.8	1.9	1.5	
FP competitor	7.3	10.2	13.6	
<i>B. 5-year pre-/post-sanction window</i>				
Post x Threatened sanction	-44 (36)	-36 (26)	-102 (11)**	0.029
Post x # competitors with threatened sanction				
x Public	9 (32)	116 (113)	51 (13)**	0.450
x Nonprofit	18 (14)	30 (14)*	-1 (3)	0.093
x For-profit	-8 (10)	20 (14)	-13 (3)**	0.091
Test of equality ( <i>p</i> -value)	0.138	0.730	0.741	
Predicted $\Delta$ county enrollment: additional sanction	-73 (53)	391 (132)**	-161 (36)**	
% change (rel to baseline)	-3%	14%	-3%	
Observations	585,915			
<i>C. 10-year pre-/post-sanction window</i>				
Post x Threatened sanction	-118 (62)+	-36 (30)	-81 (12)**	0.281
Post x # competitors with threatened sanction				
x Public	65 (58)	56 (163)	72 (19)**	0.991
x Nonprofit	19 (16)	31 (20)	-5 (5)	0.181
x For-profit	1 (14)	9 (15)	-15 (4)**	0.263
Test of equality ( <i>p</i> -value)	0.422	0.741	0.741	
Predicted $\Delta$ county enrollment: additional sanction	-7 (59)	198 (144)	-128 (32)**	
% change (rel to baseline)	-0.3%	7%	-3%	
Observations	1,118,565			

*Source:* Pell Grant, CDR, sanction, and PEPS administrative data. *Notes:* Sample is limited to two-year institutions with a Title IV program participation agreement in 1980 through 2010. Institutions in counties with more than 50 institutions (on average, across years) are excluded. Closed institution enrollment is set to zero. Estimates from a regression of Pell Grant recipient enrollment on whether the institution received a sanction in the sanction year, interacted with post-sanction receipt and sector, number of public, nonprofit, and for-profit competitor institutions that received sanctions in the sanction year, interacted with post-sanction receipt and sector, institution by sanction-year fixed effects, year fixed effects, years since sanction fixed effects, and sector and county linear trends. See Section 3 for additional details. Robust standard errors clustered by county in parentheses; \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$ .

Table 4: The Impact of Sanctions and the Size of the Population Exposed to Sanctions on  $\ln(\text{Enrollment})$

<i>Sanctioned sector:</i>	<i>1. Public</i>	<i>2. Nonprofit</i>	<i>3. For-profit</i>	Test of equality ( <i>p</i> -value)
Post x Threatened sanction	-0.109 (0.078)	-0.651 (0.400)	-0.719 (0.065)**	<0.001
Post x $\ln(\text{recipients exposed to sanctions in sector})$				
x Public	-0.010 (0.019)	0.0003 (0.025)	0.043 (0.008)**	0.018
x Nonprofit	-0.008 (0.017)	0.040 (0.020)*	0.026 (0.012)*	0.136
x For-profit	-0.014 (0.011)	0.028 (0.019)	-0.021 (0.006)**	0.084
Test of equality ( <i>p</i> -value)	0.962	0.571	<0.001	

*Source:* Pell Grant, CDR, sanction, and PEPS administrative data. *Notes:* See Table 3 for sample. Estimates from a regression of  $\ln(\text{enrollment} + 1)$  on whether the institution received a sanction in the sanction year, interacted with post-sanction receipt and sector,  $\ln(\text{enrollment} + 1)$  within public, nonprofit, and for-profit sanctioned institutions in the market in the year prior to sanction receipt, interacted with post-sanction receipt and sector, institution by sanction-year fixed effects, year fixed effects, years since sanction fixed effects, and sector and county linear trends. and specification description. Robust standard errors clustered by county in parentheses; \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$ .

Table 5: Robustness of the Impact of Sanctions on Institutions and Competitors:  
Heterogeneity by County Size

	(1) 1st quartile	(2) 2nd quartile	(3) 3rd quartile	(4) 4th quartile	(5) Large markets
Post x Threatened sanction					
x Public	-21 (10)*	-51 (98)	-146 (70)*	-62 (105)	-310 (203)
x Nonprofit	-27 (27)	-32 (61)	-123 (65)+	35 (28)	-158 (89)+
x For-profit	-56 (21)** [0.321]	-98 (19)** [0.551]	-91 (20)** [0.691]	-109 (20)** [<0.001]	-116 (46)* [0.602]
Post x # public competitors sanctioned					
x Public	-112 (94)	95 (77)	-65 (28)*	34 (64)	-1 (60)
x Nonprofit	73 (32)*	109 (64)+	23 (25)	28 (27)	-25 (25)
x For-profit	45 (15)** [0.169]	-14 (26) [0.106]	11 (20) [0.076]	-8 (12) [0.405]	6 (12) [0.505]
Post x # NP competitors sanctioned					
x Public	-21 (41)	63 (65)	631 (400)	-76 (84)	-132 (209)
x Nonprofit	19 (11)+	20 (19)	25 (30)	47 (24)+	-11 (21)
x For-profit	68 (42) [0.293]	-64 (49) [0.274]	-26 (29) [0.187]	50 (15)** [0.338]	23 (20) [0.262]
Post x # FP competitors sanctioned					
x Public	104 (47)*	104 (26)**	53 (20)**	30 (13)*	17 (8)*
x Nonprofit	-295 (247)	-33 (18)+	-2 (7)	5 (3)	2 (2)
x For-profit	-9 (16) [0.080]	-42 (15)** [<0.001]	-8 (4)+ [0.013]	-8 (3)** [<0.001]	-4 (1)** [<0.001]
Predicted $\Delta$ county enrollment: adtl for-profit sanctioned	-23 (20)	-138 (59)*	-63 (56)	-202 (77)**	-336 (108)**
<i>% change (rel to baseline)</i>	-4%	-7%	-1%	-2%	-1%
Counties	956	276	93	42	12
Institutions	1,446	1,594	1,482	1,406	1,233
Observations	149,116	159,423	146,410	138,908	120,780

Source: Pell Grant, CDR, sanction, and PEPS administrative data. Notes: See Table 3 for sample and specification description. Quartiles are defined in terms of the baseline (1990) number of schools in a given county: 1st quartile = <4 schools, 2nd quartile = 4-10 schools, 3rd quartile = 11 - 24 schools, 4th quartile = 25-58 schools. Large markets are those that are dropped from main sample (>50 schools per year on average). Brackets contain *p*-values from a test of the equality of effects of sanctions or competitor sanctions across sectors. Robust standard errors clustered by institution in parentheses; \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$ .



Table 6: Robustness of the Impact of Sanctions on Institutions and Competitors: County-Linear Trends

	(1)	(2)	(3)	(4)
<b>Post x Threatened sanction</b>				
x Public	-55 (41)	-44 (36)	-60 (28)*	-60 (28)*
x Nonprofit	-35 (20)+	-36 (26)	-75 (57)	-75 (57)
x For-profit	-88 (11)** [0.420]	-102 (11)** [0.138]	-81 (11)** [0.037]	-75 (11)** [0.033]
<b>Post x # public competitors sanctioned</b>				
x Public	20 (40)	9 (32)	7 (25)	7 (25)
x Nonprofit	15 (11)	18 (14)	51 (26)*	51 (26)*
x For-profit	-2 (10) [0.607]	-8 (10) [0.730]	-10 (7) [0.039]	-11 (6)+ [0.045]
<b>Post x # NP competitors sanctioned</b>				
x Public	125 (118)	116 (113)	136 (98)	136 (98)
x Nonprofit	10 (14)	30 (14)*	96 (32)**	96 (32)**
x For-profit	11 (9) [<0.001]	20 (14) [<0.001]	12 (11) [0.005]	12 (12) [0.005]
<b>Post x # FP competitors sanctioned</b>				
x Public	71 (15)**	51 (13)**	23 (9)**	23 (9)**
x Nonprofit	3 (1)*	-1 (3)	-18 (11)	-18 (11)
x For-profit	-8 (2)** [0.495]	-13 (3)** [0.450]	-7 (2)** [0.414]	-7 (2)** [0.415]
<b>Predicted <math>\Delta</math> county enrollment:</b>				
adtl for-profit sanctioned	-36 (42)	-161 (36)**	-153 (39)**	-148 (38)**
% change (rel to baseline)	-1%	-3%	-3%	-3%
<b>County linear trends</b>				
County x for-profit trends		X	X	
County x for-profit x industry trends				X

Source: Pell Grant, CDR, sanction, and PEPS administrative data. Notes: See Table 3 for sample and specification description. Brackets contain  $p$ -values from a test of the equality of effects of sanctions or competitor sanctions across sectors.

Table 7: The Impact of Sanctions on Pell Grant Recipient Enrollment: Heterogeneity by Chain Status

<i>Sanctioned sector:</i>	<i>For-profit</i>
Post x Threatened sanction	-102 (11)**
Post x # competitors with threatened sanction	
x Public	51 (13)**
x For-profit	
x Same chain as sanctioned competitor(s)	-1 (20)
% change (rel. to baseline)	-2%
x Different chain	-13 (3)**
% change (rel. to baseline)	-11%

*Source:* Pell Grant, CDR, sanction, and PEPS administrative data. *Notes:* See Table 3 for sample and specification description. See Appendix A.3 for description of the classification of for-profit chains. Estimated main effects of public and nonprofit sanctions, spillover effects due to public and non-profit sanctions, and spillovers from sanctioned for-profits with respect to nonprofit enrollment are not reported. Robust standard errors clustered by county in parentheses; \*\* p<0.01, \* p<0.05, + p<0.1.

Table 8: The Impact of Sanctions on Pell Grant Recipient Enrollment: Field of Study Analysis

<i>Sanctioned sector:</i>	<i>1. General FP</i>	<i>2. Health FP</i>	<i>3. Beauty FP</i>	<i>4. Comp/Bus FP</i>	<i>5. Cul/Arts FP</i>	<i>6. Mech/Eng FP</i>	<i>Test of joint sig. (p-val)</i>
Post x Threatened sanction	-0.895 (0.207)**	-0.657 (0.402)	-0.467 (0.069)**	-1.564 (0.201)**	-1.646 (0.435)**	-1.083 (0.297)**	<0.001
Post x ln(receipients exposed to sanction)							
x Public	0.028 (0.013)*	-0.012 (0.022)	0.029 (0.009)**	0.025 (0.018)	0.016 (0.031)	0.028 (0.019)	<0.001
x For-profit							
x Same industry	-0.013 (0.025)	0.021 (0.048)	-0.026 (0.013)*	-0.050 (0.038)	-0.290 (0.046)**	-0.221 (0.082)**	<0.001
x Different industry	-0.009 (0.012)	0.00004 (0.023)	-0.020 (0.014)	0.007 (0.014)	0.002 (0.020)	-0.006 (0.025)	0.724
	[0.884]	[0.706]	[0.758]	[0.195]	[<0.001]	[0.008]	

*Source:* Pell Grant, CDR, sanction, and PEPS administrative data. *Notes:* See Table 3 for sample and specification description. See Appendix A.3 for a description of the classification of for-profit industries. Robust standard errors clustered by county in parentheses; \*\* p<0.01, \* p<0.05, + p<0.1.

Table 9: Correlations between Sanctions and the Number of Borrowers and Defaulters

<i>Dependent variable = Borrowers/defaulters in sector</i>	<i>(1) All</i>	<i>(2) Public</i>	<i>(3) Nonprofit</i>	<i>(4) For-profit</i>
<i>A. Borrowers</i>				
Baseline number (1992)	382	123	13	246
Number of sanctioned schools ( $t-2$ )				
All sectors	-44 (10)**			
Public		-10 (14)	-3 (3)	34 (17)*
Nonprofit		14 (20)	-26 (8)**	-107 (113)
For-profit		14 (4)**	-0.2 (0.3)	-59 (8)**
Observations	18,466	18,466	18,466	18,466
<i>B. Defaulters</i>				
Baseline number (1992)	139	22	3	113
Number of sanctioned schools ( $t-2$ )				
All sectors	-31 (4)**			
Public		-5 (2)*	-1 (1)	12 (7)+
Nonprofit		1 (3)	-10 (2)**	-67 (62)
For-profit		0.3 (0.5)	-0.2 (0.1)*	-33 (4)**
Observations	18,466	18,466	18,466	18,466

*Source:* Pell Grant, CDR, sanction, and PEPS administrative data. *Notes:* Sample includes counties with two-year institutions participating in Title IV that enrolled Pell Grant recipients at any point between 1988 and 2005. Ordinary least squares estimates of the impact of an additional two-year institution in the specified sector ever being under threat of a sanction at  $t - 2$ . Panel A dependent variable is the total number of federal borrowers formerly enrolled in a two-year institution entering repayment in a county and year in the specified sector, 1992–2005. Panel B dependent variable is the total number of federal borrowers formerly enrolled in a two-year institution entering repayment in a county and year in the specified sector who defaulted on their loans within two years, 1992–2005. Clustered standard errors by county in parentheses; \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$ . Regressions also include county and year fixed effects.

## A Data Appendix

### A.1 Administrative data sets

1. *Data on cohort default rates (CDR)* for the academic years 1992 through 2009. Default rates are calculated for the cohort that has been in repayment for two fiscal years (e.g., the 1992 default rate applies to the cohort of borrowers that entered repayment in FY 1990). There is one original file for every year, which contains information on the institution (name, address, type) and the default rates for the three preceding years. We use the most updated information on default rates. For example, the default rate corresponding to the year 2001 appears in the 2001, 2002, and 2003 original files and we use the information that appears in the 2003 file.
2. *Data on sanctions due to CDR violations* for the cohort years (academic years) 1989 (1991) through 2008 (2010). There is one observation per institution-cohort year for the set of institutions that had at least one borrower entering repayment in the cohort year. This data includes the sanction trigger and penalty (e.g., Table C.1) by institution and cohort year.
3. *Data on Pell Grant recipients* and total amount disbursed per institution and year for the academic years 1974 through 2012. There is one original file for every year and each file contains information on the institution’s location, number of recipients, and total amount disbursed.
4. *Postsecondary Education Participants System (PEPS) data* includes information pertaining to an institution’s location, sector, participation in Title IV programs, closure date (if participating in Title IV programs at the time of closure), and provides a crosswalk between earlier institution identifiers (“Pell IDs”) and modern institution identifiers (“OPEIDs”). These data cover all institutions that ever participated in Title IV.
5. *Postsecondary Career School Survey (PCSS) data* was fielded by ED for the purpose of collecting information on postsecondary institutions offering vocational education programs in 1976, 1978, 1980, and 1981. It contains information on location, sector, and programs offered by schools in this sector. See <https://www.icpsr.umich.edu/icpsrweb/ICPSR/studies/2382> for additional details.

### A.2 Analysis data set construction

We first created the single file containing the annual CDR information for all institutions, covering academic years 1992-2010, and a single file containing the annual information on sanctions due to CDR violations for all institutions, covering academic years 1991-2010. Schools are identified by their federal OPEIDs.

We took several steps to clean and harmonize the Pell Grant data across years. First, prior to 2000, school are identified by their “Pell ID”, which in many, but not all cases, is the same as the OPEID. We use the crosswalk between pre-2000 school identifiers (“Pell ID”) and current school identifiers (OPEID) from the PEPS data to synchronize school identifiers across years and create a single file containing the Pell Grant recipient information for all institutions between 1974 and 2012. Despite the fact that we are able to match most schools over time, there are a small number of cases in which we cannot match a school’s Pell ID to its OPEID or the OPEID changes between two consecutive years. We recode these cases to have a single OPEID when between the two years in which the OPEIDS differ, institutional records show the same name and address.

Because the Pell Grant administrative data does not provide separate records for Title IV branch campuses in the early years of the program, we combine recipients from branch and main campuses under the main campus OPEID in years in which this information is available.<sup>30</sup> There are also instances in which recipients from separate institutions within a larger system are combined and reported under only one OPEID (that in other years refers to a specific institution). This primarily occurs in the public sector (e.g., the Indiana Ivy Tech community college system, which includes 14 separate Title IV institutions, reports all recipients under one OPEID in some years), but there are two large for-profit chains that suffer from this issue (ITT Tech and DeVry). To deal with the fact that this variation in reporting leads to large changes in enrollment that are unrelated to actual enrollment changes, we impute recipients for locations in years in which Title IV enrollment is not separately reported. We use the most recent year in which recipients are reported for specific institutions and calculate the share of all recipients contained within each institution relative to the total number of recipients summed over the set of schools that are reported under a single OPEID in other years. Then, in years in which recipients are not reported for separate institutions, we allocate the total number of recipients reported under the single OPEID based on these baseline shares. At most, less than 3 percent of schools have imputed recipients in a given year. Finally, there are cases in which a given institution will have two separate OPEIDS with the same name and location in a given year. These are primarily small programs offered within hospitals that have separate OPEIDS for nursing and other medical technology fields in early years of the Pell Grant data. We collapse duplicate records that have the same address and name into a single observation, summing across Pell Grant recipients. We add closure dates and fill in missing addresses and other information using PEPS data.

We restrict our sample to include all schools with a record in either the Pell Grant administrative data

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<sup>30</sup>Note that a Title IV branch campus is a separate location of an institution that is covered under the main institution’s program participation agreement with ED. These are generally much smaller sites that serve a specific purpose or population (e.g., incarcerated adults, high school students, etc.). Title IV branch campuses are distinct from community college systems or for-profit chain that contain multiple institutions because in such cases, each location will have its own program participation agreement and a unique OPEID.

or the CDR administrative data in at least one year between 1981 and 2010 (which provides a window of 10 years before the first sanctions and after the last sanctions). We classify schools by control (public, nonprofit, for-profit) and level (2-year, 4-year) using the Pell, CDR, and PEPS administrative data. Of 10,089 institutions in the sample, 51 remain unclassified. This is because the Pell Grant data does not have a reliable measure of institutional sector before 1983. We use data from the PCSS to determine the sector of a subset of these institutions. Only some schools in the PCSS have OPEIDS, and some schools without OPEIDS are present in the main data set. In these cases, we match records based on institution name and location. We drop the remaining 13 schools not assigned to a sector from our sample. None of these schools contain Pell Grant recipients or after 1982 have CDR records in any year. We assume that the 56 schools without any information on degrees granted are two-year institutions.

A small number of institutions are listed as belonging to different sectors over time. In some cases, this may represent true transitions between nonprofit and for-profit status. However, institutions that are listed as public schools in most years are misclassified with the same frequency. When there are discrepancies in a given institution's reported sector, we use the modal value of this variable. Less than 1 percent of institutions are affected.

Institutions are assigned to counties by zip codes. Specifically, we link institutions to county Federal Information Processing Standard (FIPS) codes using a zip code–FIPS code crosswalk. Since our sample spans three decades, we use the 2010 county definitions to ensure that institutions are consistently assigned to local markets. FIPS codes were manually entered for the 32 institutions that were had invalid or missing zip codes. We are unable to match four small institutions in our sample to a county and thus, we drop these schools. None of these schools have Pell Grant recipient enrollment after 1991. In the years in which these schools were serving Pell Grant recipients, total enrollment ranged from 3 to 49 students.

### **A.3 Chains coding and descriptive statistics**

Chains are identified through institution names in 1990 - the year prior to the release of the first round of sanctions. We focus on this year because it should most accurately predict an institution's name during the years in which sanctions were applied but does not suffer from the potentially endogenous response on the part of sanctioned institutions to join, leave, or form a chain. Unfortunately, there is not a reliable indicator for whether an institution belongs to a chain during the period we examine. We assume that two or more institutions belong to a chain if they have the same name, allowing for variation in the spelling of common words (e.g., Sch versus School, Tech versus Technology) and taking into account the fact that school names that include many very common words (e.g., American Beauty College) will not represent two locations of

the same chain unless other criteria are met (e.g., all instances are within the same state or group of adjoining states).

In 1990, we estimate that 32 percent of two-year for-profit institutions (containing 44 percent of Pell Grant recipients enrolled in the two-year for-profit sector) belonged to a chain that had at least two schools. The average for-profit chains had 4 locations with a total of 726 Pell Grant recipients enrolled in 1990. In contrast, the average single-location for-profit enrolled 118 Pell Grant recipients.

Almost half of all chains (45 percent) contained only two institutions, while the largest chain had 35 locations. We classify chains by whether they had locations in multiple states. While only 37 percent of two-year for-profit chains were multi-state, the schools belonging to these chains contained 73 percent of all Pell Grant recipients enrolled in a for-profit chain. Single-state chains had an average of 3 locations containing a total of 355 recipients while multi-state chains contained 6 schools enrolling 1674 students, on average.

#### A.4 Field of study coding and descriptive statistics

Unfortunately, there is not reliable information available on programs offered by most for-profit institutions during the 1980s and 1990s. While the IPEDS collects information on degrees and credentials received by CIP code, as discussed above, many for-profit schools are absent from the IPEDS during the period of interest. We assign for-profit institutions to six mutually exclusive field of study categories based on a school's name. Because listed names of institutions change over time, especially in the for-profit sector, and because the decision of what programs to offer could be endogenous to sanction receipt, we classify institutions based on their name in 1990, the year prior to the first sanctions were released.

**Beauty/cosmetology** for-profit schools are those with any of the following terms in their names: aesthetic, barber, beaut, bty, coiffures, cosm, comtly, culture, dermaogic, electrology, esthetics, hair, hrdrsng, "hr ds", nail, salon, skin, spa, style, styling, vogue. We also include schools in the Wilfred, Aveda, and Paul Mitchell chains as these institutions offered only cosmetology programs.

**Health** for-profit institutions are those that are not classified as beauty schools and have any of the following terms in their names: acupuncture, anesth, body, cancer, chiropractic, counseling, cyotech, dental, dentist, diagnostic, dietetic, doctor, drug, fitness, eeg, electrolysis, heal, histotech, histologic, hlth, holistic, hosp, laboratory, massage, med, midwifery, muscle, myomassology, myotherapy, nurse, nursing, nrsg, nrs, nutrition, ofradio, oncology, ophthalmology, optometry, optician, paramed, pedodontic, pharmacy, physician, psycholgy, radiologic, rad-tech, reserve, resp, shiatsu, sonograph, surgical, therap, ultrasoundm, xray, x-ray. Institutions that would be classified as both beauty and health related based on their names are placed in

the beauty category.

**Computing, business, and business technology** focused for-profits are those that are not classified as health or beauty and have names containing any of the following terms: accounting, accountancy, banking, business, buisness, busn, "bus clg", commerce, commercial, comput, cmptr, court, data, electology, fiber, financial, law, legal, management, network, office, paraprof, processing, program, "sch of bus", secretar, steno, software, technolog, "word process", workforce. Schools that are classified as both computing and health are placed in the health category.

**Hospitality, culinary, arts, and personal service** oriented for-profits are those that are not classified as health, computing, or beauty and have with any of the following terms as part of their names: art, acting, actor, animal, audio, baking, ballet, bartend, brdcast, broadcast, canine, casino, chauffeurs, cinema, conser-vatory, cooking, creative, culinary, culture, cuisine, dance, dealing, dealer, design, drama, draft, drawing, dog, equestrian, film, fash, floral, food, funeral, gaming, golf, horse, hospitality, hotel, jewelry, k-9, luthiary, modeling, mortician, mortuary, motel, movement, music, nanny, painting, paper, pastry, pet, photo, piano, printing, recording, reporting, restaurant, restoration, scriptwriting, sewing, sound, studio, symphony, tailor, taxidermy, theater, theatre, television, travel, tv, upholstery, video.

**Mechanical, trades, engineering, and transportation** focused for-profits are those that are not classified as beauty, health, computing, or hospitality focused schools and have any of the following terms in their names: aero, airline, appliance, auto, aviation, boat, construction, diamond, diesel, drafting, driver, driving, electron, engineer, flight, flight, gunsmith, heating, indus, locksmith, mechanic, microwave, motor-cycle, seaboard, refrigeration, repair, tractor, trailer, transport, transmission, truck, vehicle, wastewater, watch, weld, yacht.

We classify schools that do not fall into one of the five categories as **general** for-profits. This category includes institutions that offer many different programs (that may align with the above categories) and specialized institutions for which we were not able to determine the types of programs offered from the school's name.



Table A.1: Descriptive statistics by field

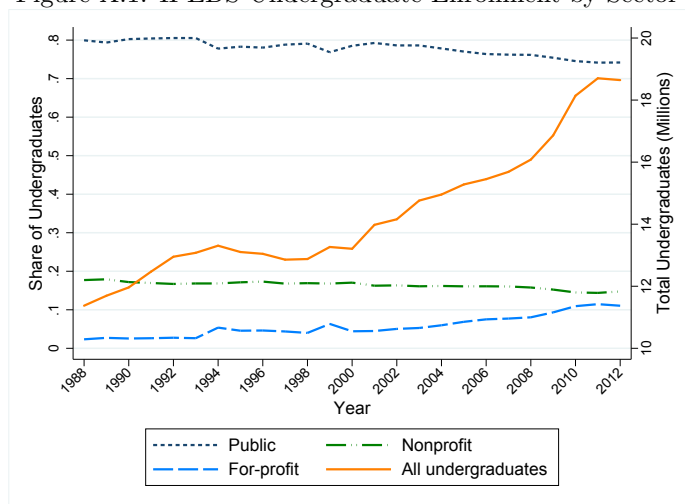
	Baseline (1990)		Sanctioned*		Unsanctioned FP comp* of sanctioned FP in any industry		Unsanctioned FP comp* of sanctioned FP in same industry		Unsanctioned pub comp* of sanctioned FP in industry:	
	<u>N</u>	<u>Av enrollment</u>	<u>N</u>	<u>Av enrollment</u>	<u>N</u>	<u>Av enrollment</u>	<u>N</u>	<u>Av enrollment</u>	<u>N</u>	<u>Av enrollment</u>
General	690	284	427	485	2,641	161	1,196	169	774	1,188
Beauty, cosm.	1,767	46	1,287	118	4,078	46	2,981	42	1,635	1,107
Culinary, arts, hosp.	125	91	30	298	472	59	26	162	65	1,451
Health	144	166	50	519	684	113	52	185	106	1,312
Business, computing	449	281	224	560	1,485	215	365	169	452	1,122
Mech., transp., engin.	109	199	67	503	370	183	43	135	131	983

*Notes:* See section A.4 for description of industry categories and classification. \* Includes multiple obs of same school if sanctioned more than once or competitor sanctioned more than once; average enrollment is in  $t - 1$ .

## A.5 IPEDS data set construction

We used data from the annual fall enrollment and institutional characteristics (IC) Integrated Postsecondary Education Data System IPEDS files to measure total undergraduate enrollment by sector, county, and year. Institutions were allocated to counties using a crosswalk between county FIPS codes and institutions' zip codes and states. Information on institutional control and level (four-year, two-year, or less than two-year) was used to allocate institutions to sectors. Fall enrollment was summed across all institutions in a sector-year-county combination. Figure A.1 displays total fall undergraduate enrollment in IPEDS institutions between 1988 and 2012 (solid line, right y-axis) as well as the distribution of IPEDS undergraduates across sectors (left y-axis).

Figure A.1: IPEDS Undergraduate Enrollment by Sector



*Notes:* Sample limited to counties with at least one Pell Grant recipient enrolled in a two-year institution (including less than two-year institutions) between the 1988 and 2003 academic years. Fall undergraduate enrollment from IPEDS fall enrollment files. Years represent academic years (e.g., 1988 = 1987–88 academic year).

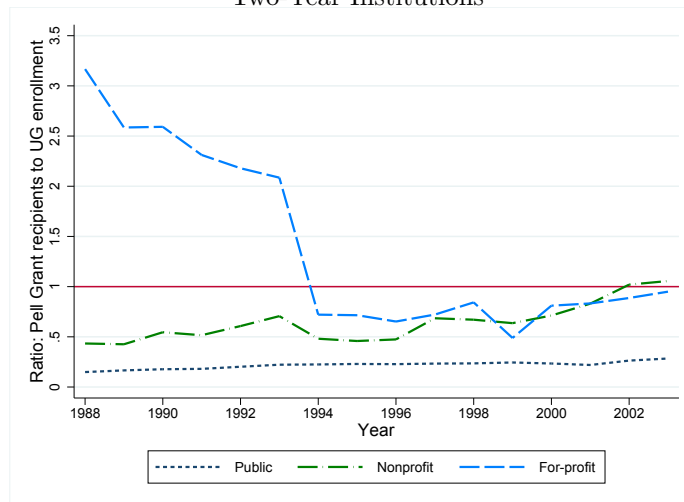
## A.6 Pre-2000 representation of for-profit institutions with Pell Grant recipients in IPEDS

Theoretically, the IPEDS universe includes all institutions in a given year that participated in Title IV programs. However, prior to 2001, the IPEDS data omits a large number of for-profit institutions that show-up in administrative data as enrolling Pell Grant recipients. For example, the Digest of Education Statistics reports 323 for-profit institutions in 1988 (U.S. Department of Education, 2015, Table 317.10) while the Pell Grant administrative data includes 2,791 for-profit institutions with at least one Pell Grant recipient enrolled in the same year. Some of these extra institutions may represent “branch campuses,” which may be grouped with “parent campuses” in the IPEDS. However, the treatment of branch and parent

campuses cannot account for the discrepancy between for-profit enrollment reported in the IPEDS and Pell Grant enrollment calculated from administrative data. As shown in Figure A.2, the number of Pell Grant recipients enrolled in two-year for-profit institutions exceeded the total number of undergraduates these institutions enrolled in 1988 by more than 300 percent.<sup>31</sup> For-profit institutions that were sanctioned and/or closed in the early 1990s are the most likely to be missing from the IPEDS.

Public and nonprofit institutions that participated in Title IV programs in the 1980s and 1990s appear to be better represented in the IPEDS. The number of Pell Grant recipients enrolled in two-year institutions in these sectors is always less than total undergraduate enrollment. The number of institutions in the IPEDS closely matches the number of institutions in the Pell Grant administrative data. For example, in 1988, the IPEDS data reports 1,673 nonprofit institutions and 1,591 public institutions, while the Pell Grant administrative data contain 1,752 nonprofits and 1,825 public institutions. Due to the large amount of measurement error in the IPEDS data relating to for-profit institutions, we limit our analyses that use IPEDS data to focus on public and nonprofit institutions.

Figure A.2: Pell Grant Enrollment as a Percentage of Total IPEDS Enrollment by Sector:  
Two-Year Institutions



*Notes:* Sample limited to counties with at least one Pell Grant recipient enrolled in a two-year institution (including less than two-year institutions) between 1988 and 2003. Undergraduate enrollment from IPEDS fall enrollment files.

<sup>31</sup>Results are quite similar when the sample is expanded to include four-year institutions. This is because very few for-profit institutions in the 1980s and 1990s were classified as four-years.

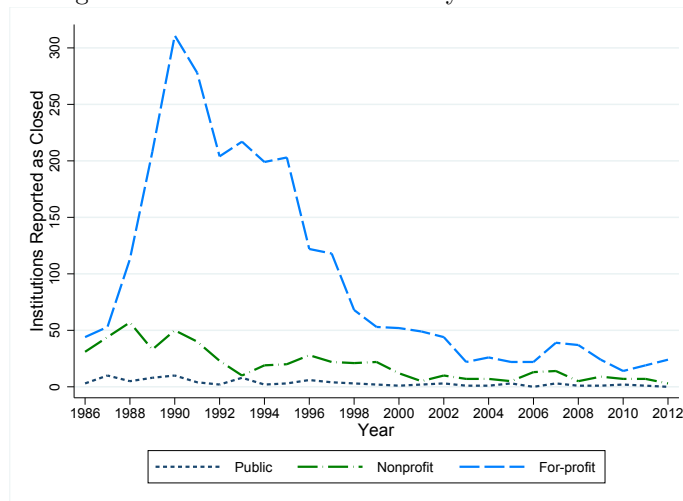
## B Closures

To further investigate the correlation between federal sanctions and changes in institution closure rates, we estimate a descriptive hazard model:

$$\Pr(\text{closed}_{jt} = 1 | \text{closed}_{jt-1} = 0) = \sum_{k=0}^5 (\gamma_k^c \text{sanct}_{j,t-k}^c) + \delta_c + \delta_t + \delta_m + \nu_{jmt}. \quad (5)$$

Here, we model the hazard that institution  $j$  closes in year  $t$  (conditional on remaining open until year  $t - 1$ ) as a function of the institution's sector  $c \in \{\text{public}, \text{nonprofit}, \text{for-profit}\}$  in year ( $t$ ), market ( $m$ ), and being sanctioned in the current or past five years ( $k$ ).<sup>32</sup> We include fixed effects for each sector  $\delta_c$ , year  $\delta_t$ , and market  $\delta_m$ . We estimate several variations of equation (5). First, we examine the two types of sanctions schools can receive (i.e., loss of only loans versus loss of Title IV aid) separately. Second, we allow for heterogeneity by for-profit field of study.

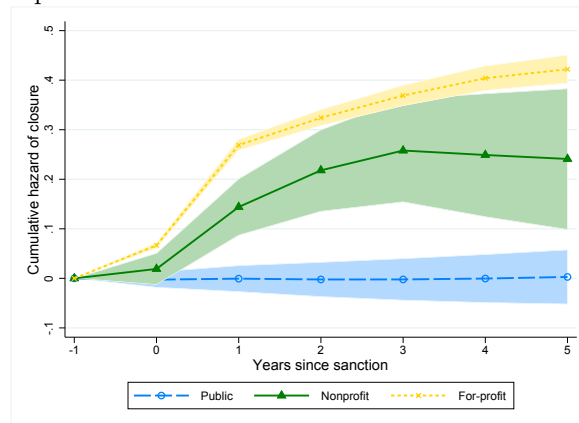
Figure B.1: Institution Closures by Sector and Year



Source: PEPS administrative data. Notes: Sample includes two- and four-year institutions that had an active Title IV program participation agreement at the time of closure.

<sup>32</sup>We have estimated models that include up to seven years of lags but only the first five years following a sanction have a statistically significant association with institution closure.

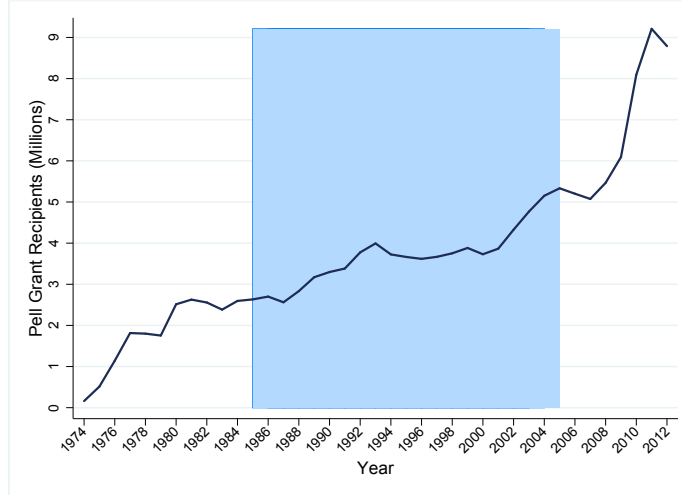
Figure B.2: The Impact of Sanctions on the Cumulative Hazard of Closure by Sector



Source: Pell Grant, CDR, sanction, and PEPS administrative data. Notes: Sample includes two-year institutions with a Title IV program participation agreement. Coefficients and 95% confidence intervals from a regression of the cumulative hazard of closure on any sanction receipt interacted with years since the sanction was received and sector; regressions also include year and county fixed effects. Robust standard errors clustered by institution.

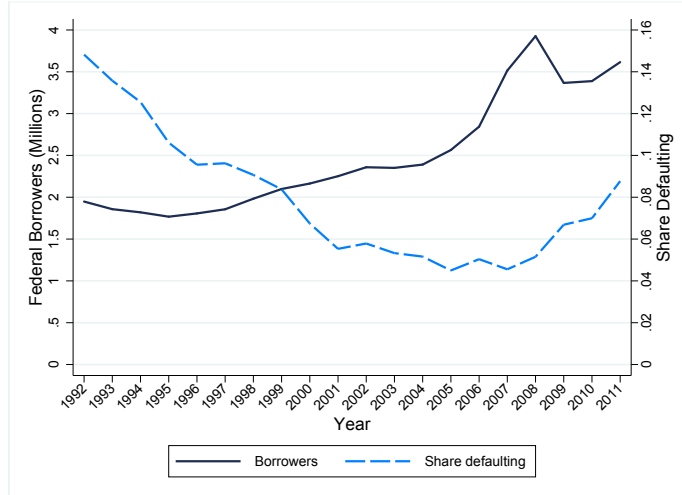
## C Additional Figures and Tables

Figure C.1: The Number of Pell Grant Recipients by Year



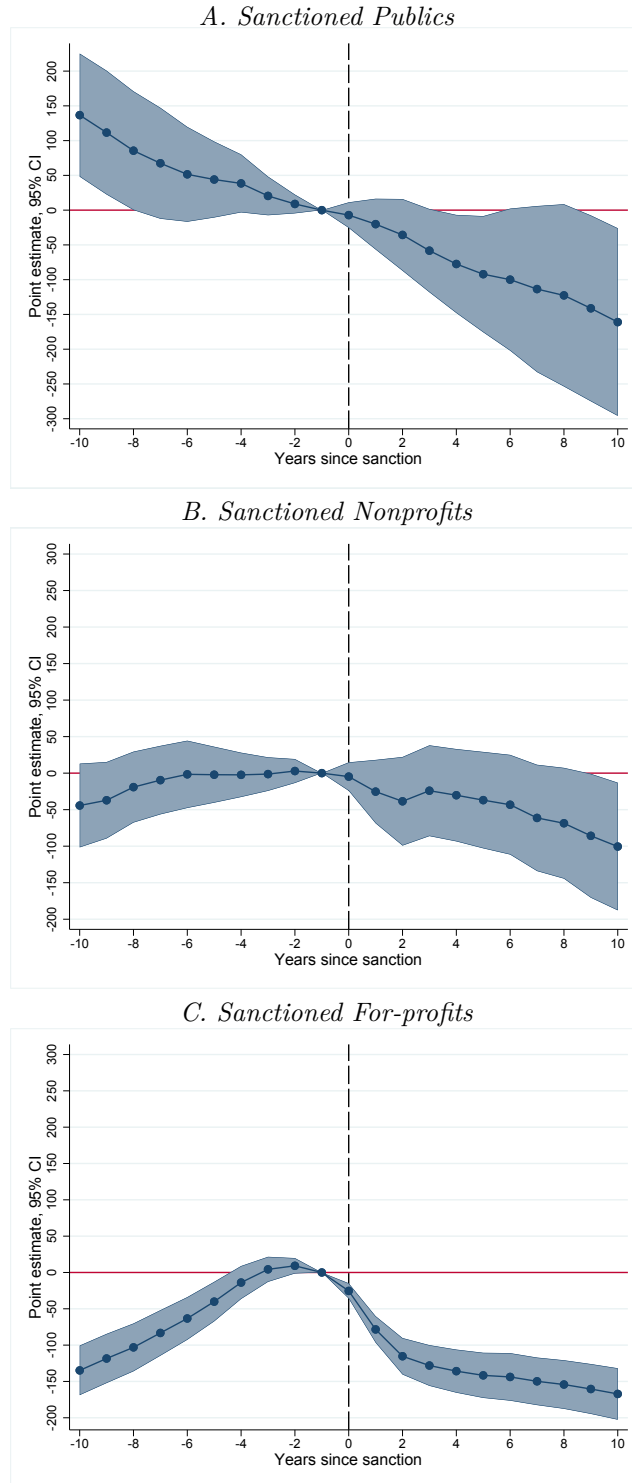
*Source:* Pell Grant administrative data. *Notes:* Sample includes two- and four-year institutions with Pell Grant enrollment in the specified academic year. The solid line represents the total number of students receiving Pell Grants. The shaded area represents the years that we focus on in our main analyses.

Figure C.2: The Number of Federal Borrowers by Cohort Year



*Source:* CDR administrative data. *Notes:* Sample includes two- and four-year institutions with CDR data. The solid line indicates the total number of federal borrowers (in millions) used to construct schools' cohort default rates by cohort (corresponding to the left axis) and the dashed line indicates the share of federal borrowers in a give cohort that defaulted within two years of entering repayment.

Figure C.3: Effect of Sanctions on Pell Enrollment in Sanctioned Institutions



*Notes:* Point estimates and 95 percent confidence intervals from a regression of Pell Grant recipient enrollment on the number of public, nonprofit, and for-profit competitors in the local higher education market that received a sanction in the sanction-year, interacted with years before/after sanction receipt (with  $t - 1$  serving as the omitted category). Regressions also include indicators for sanction receipt by sector interacted by years before/after sanction receipt, institution by sanction-year fixed effects, year fixed effects, years before/after sanction receipt fixed effects, and sector and county linear trends. See Section 3 for additional details.

Table C.1: Sanction Triggers and Penalties

Cohort year	Year informed of sanction	Range of aid loss if app. immed.	Trigger	Penalty	Subject to sanction	Appeals	Sanctions maintained
1989	1991	1991-1993	>=35% in 1987, 1988, 1989 >60% for 1989	Immediate loss of loans Limitation, suspension, or termination of Title IV	178 75		
1990	1992	1992-1994	>=35% in 1988, 1989, 1990 >55% in 1990 >40% in 1990, <5 pp gain 1989-1990	Immediate loss of loans Limitation, suspension, or termination of Title IV Limitation, suspension, or termination of Title IV	121 558		
1991	1993	1993-1995	>=30% in 1989, 1990, 1991 >50% in 1991 >40% in 1991, <5 pp gain 1990-1991	Immediate loss of loans Limitation, suspension, or termination of Title IV Limitation, suspension, or termination of Title IV	404 455		
1992	1994	1994-1996	>=25% in 1990, 1991, 1992 >45% in 1992 >40% in 1991, <5 pp gain 1991-1992	Immediate loss of loans Limitation, suspension, or termination of Title IV Limitation, suspension, or termination of Title IV	652 376		
1993	1995	1995-1997	>=25% in 1991, 1992, 1993 >40% in 1993	Immediate loss of loans Limitation, suspension, or termination of Title IV	433 222		
1994	1996	1996-1998	>=25% in 1992, 1993, 1994 >40% in 1994	Immediate loss of loans Limitation, suspension, or termination of Title IV	330 157		
1995	1997	1997-1999	>=25% in 1993, 1994, 1995 >40% in 1995	Immediate loss of loans Limitation, suspension, or termination of Title IV	236 109	235 0	226 109
1996	1998	1998-2000	>=25% in 1994, 1995, 1996 >40% in 1996	Immediate loss of loans Limitation, suspension, or termination of Title IV	138 66	130 4	135 62
1997	1999	1999-2001	>=25% in 1995, 1996, 1997 >40% in 1997	Immediate loss of loans, potential or immediate loss of Pell Limitation, suspension, or termination of Title IV	42 13	42 7	36 6
1998	2000	2000-2002	>=25% in 1996, 1997, 1998 >40% in 1998	Immediate loss of loans, potential or immediate loss of Pell Limitation, suspension, or termination of Title IV	10 2	9 2	8 2
1999	2001	2001-2003	>=25% in 1997, 1998, 1999 >40% in 1999	Immediate loss of loans, potential or immediate loss of Pell Limitation, suspension, or termination of Title IV	6 1	5 1	4 0
2000	2002	2002-2004	>=25% in 1998, 1999, 2000 >40% in 2000	Immediate loss of loans, potential or immediate loss of Pell Immediate loss of loans	4 1	4 1	3 1
2002	2004	2004-2006	>=25% in 2000, 2001, 2002	Immediate loss of loans and Pell	1	1	0
2006	2008	2008-2010	>40% in 2006	Immediate loss of loans	1		0
2007	2009	2009-2011	>40% in 2007	Immediate loss of loans	2	2	0
2008	2010	2010-2012	>=25% in 2006, 2007, 2008 >40% in 2008	Immediate loss of loans and pell Immediate loss of loans	2 3	2 3	0 1
2009	2011	2011-2013	>=25% in 2007, 2008, 2009 >40% in 2009	Immediate loss of loans and Pell Immediate loss of loans	4 1	4 1	0 0
2010	2012	2012-2014	>=25% in 2008, 2009, 2010 >40% in 2010	Immediate loss of loans and Pell Immediate loss of loans	1 1	1 1	0 0
2011	2013	2013-2015	>=25% in 2009, 2010, 2011 >40% in 2011	Immediate loss of loans and Pell Immediate loss of loans	6 2	6 2	2 1
<i>Move to 3 year cdrs</i>							
2012	2015	2015-2017	>=30% in 2010, 2011, 2012 >40% in 2012	Loss of loans and/or Pell Loss of loans	8 10		

Source: CDR and sanction administrative data. Notes: Sample includes all institutions that were sanctioned. Information on appeals and appeal outcomes were provided in response to a Freedom of Information Act (FOIA) request to ED. No institutions triggered sanction threats for the 2001, 2003, 2004, and 2005 cohorts.



Table C.2: Impact of Sanctions on ln(Enrollment)

<i>Sanctioned sector:</i>	<i>1. Public</i>	<i>2. Nonprofit</i>	<i>3. For-profit</i>	Test of equality ( <i>p</i> -value)
Post x Threatened sanction	-0.118 (0.072)	-0.652 (0.365)+	-0.717 (0.066)**	<0.001
<i>% increase</i>	-11%	-48%	-51%	
Post x ln(recipients exposed to sanctions in sector)				
x Public	-0.090 (0.077)	0.007 (0.142)	0.081 (0.017)**	0.018
<i>% increase</i>	-9%	1%	8%	
x Nonprofit	-0.028 (0.095)	0.078 (0.174)	0.061 (0.022)**	0.136
<i>% increase</i>	-3%	8%	6%	
x For-profit	-0.044 (0.054)	0.115 (0.116)	-0.047 (0.012)**	0.084
<i>% increase</i>	-4%	12%	-5%	
Test of equality ( <i>p</i> -value)	0.962	0.571	<0.001	

*Source:* Pell Grant, CDR, sanction, and PEPS administrative data. *Notes:* See Table 3 for sample and specification description. Robust standard errors clustered by county in parentheses; \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$ .

Table C.3: Impact of Threatened Sanctions on Pell Grant Recipient Enrollment: All Counties

<i>Sanctioned sector:</i>	<i>1. Public</i>	<i>2. Nonprofit</i>	<i>3. For-profit</i>	Test of equality ( <i>p</i> -value)
Post x Threatened sanction	-57 (37)	-91 (61)	-103 (15)**	0.486
Post x # competitors with threatened sanction				
x Public	13 (39)	-63 (145)	34 (9)**	0.749
x Nonprofit	-4 (15)	-2 (20)	1 (2)	0.956
x For-profit	-1 (8)	24 (11)*	-6 (1)**	0.022
Test of equality ( <i>p</i> - value)	0.918	0.130	<0.001	
Number of institutions   threatened sanction				
Public competitor	2.1	4	4.0	
NP competitor	1.6	6.2	4.7	
FP competitor	15	39.5	35.4	
Predicted $\Delta$ county enrollment:				
adtl sanction	-46 (86)	599 (435)	-169 (30)**	
% change ( <i>rel to baseline</i> )	-1%	4%	-1%	
Counties		1,380		
Institutions		7,176		
Observations		714,637		

*Source:* Pell Grant, CDR, sanction, and PEPS administrative data. *Notes:* Sample is limited to two-year institutions with a Title IV program participation agreement in 1980 through 2010. See Table 3 for sample and specification description. Robust standard errors clustered by county in parentheses; \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$ .

Table C.4: Robustness of the Impact of Sanctions on Pell Grant Recipient Enrollment: All Institutions

<i>Sanctioned sector:</i>	<i>1. Public</i>	<i>2. Nonprofit</i>	<i>3. For-profit</i>	Test of equality ( <i>p</i> -value)
Post x Threatened sanction	-59 (36)	-191 (74)**	-115 (12)**	0.177
Post x # competitors with threatened sanction				
x Public	54 (36)	53 (64)	46 (10)**	0.974
x Nonprofit	-0.2 (13)	0.4 (12)	-1 (3)	0.996
x For-profit	-17 (11)	13 (13)	-15 (3)**	0.118
Test of equality ( <i>p</i> -value)	0.151	0.472	<0.001	
Number of institutions   threatened sanction				
Public competitor	2	2.1	3.2	
NP competitor	2.6	4.8	4.6	
FP competitor	7.7	12	14.3	
Predicted $\Delta$ county enrollment: additional sanction	-77 (70)	84 (187)	-183 (41)**	
% change ( <i>rel to baseline</i> )	-2%	1%	-2%	
Counties		1,553		
Institutions		7,719		
Observations		782,892		

*Source:* Pell Grant, CDR, sanction, and PEPS administrative data. *Notes:* See Table 3 for specification. Sample includes two- and four-year institutions with a Title IV program participation agreement in 1980 through 2010. Institutions in counties with more than 50 institutions (on average, across years) are excluded. Robust standard errors clustered by county in parentheses; \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$ .

Table C.5: The Impact of Sanctions on Pell Grant Recipient Enrollment:  
Heterogeneity by Sector and Type of Sanction

<i>Sanctioned sector:</i>	<i>1. Public</i>	<i>2. Nonprofit</i>	<i>3. For-profit</i>	Test of equality ( <i>p</i> -value)
Post x Threatened loss of loans	-71 (52)	-3 (28)	-77 (13)**	0.999
Post x Competitor with threatened loss of loans				
x Public	-27 (31)	-20 (49)	16 (11)	0.458
x Nonprofit	-11 (17)	7 (10)	-0.4 (3)	0.591
x For-profit	-0.01 (11)	18 (10)+	-6 (3)+	0.092
Test of equality ( <i>p</i> -value)	0.606	0.324	0.073	
Predicted $\Delta$ county enrollment: additional sanction	-122 (76)	194 (138)	-122 (40)**	
% change: total enrollment	-4%	6%	-3%	
Post x Threatened loss of T4	-23 (27)	-65 (26)*	-65 (13)**	0.371
Post x Competitor threatened loss of T4				
x Public	58 (41)	186 (157)	61 (14)**	0.716
x Nonprofit	33 (10)**	32 (19)+	-2 (3)	0.007
x For-profit	-11 (14)	0.1 (20)	-12 (4)**	0.830
Test of equality ( <i>p</i> -value)	0.007	0.370	<0.001	
Predicted $\Delta$ county enrollment: additional sanction	9 (83)	259 (166)	-101 (42)*	
% change: total enrollment	0.4%	8%	-2%	
Counties		1,364		
Institutions		5,842		
Observations		585,915		

*Source:* Pell Grant, CDR, sanction, and PEPS administrative data. *Notes:* See Table 3 for sample and specification description. Robust standard errors clustered by county in parentheses; \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$ .

Table C.6: Impact of Sanctions on Pell Grant Recipient Enrollment: Heterogeneity by Sanction Year

<i>Year of sanction:</i>	(1) 1991	(2) 1992	(3) 1993	(4) 1994	(5) 1995	(6) 1996	(7) 1997	(8) 1998	(9) 1999	(10) 2000
Total threatened with sanction										
Public	10	41	38	56	44	32	30	24	4	1
Nonprofit	6	8	10	10	5	4	2	2	2	0
For-profit	123	332	384	462	312	221	138	81	25	7
Post x Threatened sanction										
x Public	-190 (46)**	-111 (56)*	-44 (50)	-40 (47)	29 (62)	29 (98)	-27 (99)	9 (87)	-120 (59)*	-130 (2)**
x Nonprofit	-121 (25)**	-103 (38)**	-43 (39)	-43 (42)	23 (82)	8 (18)	37 (42)	29 (51)	7 (42)	
x For-profit	-292 (67)** [0.024]	-141 (27)** [0.670]	-135 (19)** [0.029]	-87 (15)** [0.418]	-19 (15) [0.668]	-28 (16)+ [0.245]	-26 (18) [0.352]	-48 (23)* [0.356]	-34 (53) [0.219]	-15 (168) [<0.001]
Post x # FP competitors sanctioned										
x Public	90 (23)**	93 (12)**	73 (16)**	44 (13)**	48 (24)*	18 (22)	34 (23)	16 (36)	15 (43)	612 (566)
x Nonprofit	-3 (10)	-2 (3)	2 (4)	3 (3)	5 (3)+	0.2 (6)	-11 (9)	-32 (17)+	-37 (31)	-279 (164)+
x For-profit	-3 (10) [0.001]	-11 (5)* [<0.001]	-10 (5)* [<0.001]	-9 (4)* [<0.001]	-8 (3)** [<0.001]	-2 (3) [0.695]	-7 (6) [0.199]	-24 (8)** [0.459]	0.1 (16) [0.466]	-94 (87) [0.135]
Predicted $\Delta$ county enrollment:										
adtl for-profit sanction	-153 (193)	-105 (78)	-107 (65)	-107 (65)	-6 (58)	-13 (54)	-60 (93)	-365 (152)*	-44 (99)	61 (199)
<i>% change (rel to baseline)</i>	-3%	-2%	-2%	-2%	-0.1%	-0.3%	-1%	-9%	-2%	2%
Counties	1,323	1,326	1,326	1,330	1,332	1,333	1,335	1,337	1,339	1,342
Institutions	5,312	5,315	5,299	5,325	5,334	5,339	5,366	5,367	5,322	5,286
Observations	58,432	58,465	58,289	58,575	58,674	58,729	59,026	59,037	58,542	58,146

Source: Pell Grant, CDR, sanction, and PEPS administrative data. Notes: See Table 3 for sample and specification description. Robust standard errors clustered by county in parentheses; \*\* p<0.01, \* p<0.05, + p<0.1.

Table C.7: Robustness of the Impact of Sanctions on Pell Grant Recipient Enrollment to Alternate Market Definitions

	15 mile radius		30 mile radius	
	(1)	(2)	(3)	(4)
Post x Threatened sanction				
x Public	-54 (40)	-43 (40)	-51 (37)	-46 (37)
x Nonprofit	-86 (60)	-36 (27)	-83 (62)	-35 (27)
x For-profit	-96 (15)** [0.564]	-94 (11)** [0.080]	-94 (14)** [0.516]	-95 (11)** [0.067]
Post x # public competitors sanctioned				
x Public	40 (39)	5 (33)	12 (19)	2 (15)
x Nonprofit	16 (11)	14 (13)	11 (8)	8 (9)
x For-profit	-7 (9) [0.113]	-9 (10) [0.219]	1 (6) [0.499]	-2 (5) [0.464]
Post x # NP competitors sanctioned				
x Public	19 (138)	62 (98)	43 (83)	51 (60)
x Nonprofit	5 (15)	21 (12)+	4 (15)	16 (10)
x For-profit	10 (7) [0.917]	20 (10)* [0.903]	11 (10) [0.801]	19 (10)+ [0.812]
Post x # FP competitors sanctioned				
x Public	30 (10)**	23 (7)**	17 (4)**	10 (3)**
x Nonprofit	1 (1)	-1 (1)	1 (1)	-0.1 (1)
x For-profit	-3 (1)** [<0.001]	-5 (1)** [0.002]	-1 (1) [<0.001]	-2 (1)* [0.001]
Change in total enrollment: adtl for-profit sanction	-96 (64)	-128 (28)**	-31 (81)	-96 (27)**
Excludes institutions in "large" markets		X		X
Institutions	7,161	5,845	5,845	7,161
Observations	682,671	585,915	682,671	585,915

Source: Pell Grant, CDR, sanction, and PEPS administrative data. Notes: See Table 3 for specification. Sample includes two-year institutions with a Title IV program participation agreement in 1980 through 2010. Robust standard errors clustered by county in parentheses; \*\* p<0.01, \* p<0.05, + p<0.1.

## **D Selected Quotations from Local News Sources on For-Profit College Sanctions**

### **Palm Beach Post, July 18, 1991:**

Five West Palm Beach trade schools were named Wednesday by the U.S. Department of Education as having default rates on guaranteed student loans higher than 35 percent, the maximum permitted. . . Hair-dressing schools also are prevalent on state and national lists.

### **St. Louis Post-Dispatch, May 16, 1991:**

Vatterott College in St. Ann will take over the instruction of students stranded by the closure of Draughon Business College in Springfield, Joplin and Independence, Mo., the head of Vatterott College said Wednesday. . . The agreement between the Vatterott and Draughon involves no fee paid by either party, John Vatterott said. But "we think it's a good business move" for Vatterott and good for the image of the trade and career school industry, "which has taken a pretty heavy beating," he said. "Any damage to any private career school affects every other school," he said.

### **Daily Oklahoman, August 11, 1992:**

Nearly 600 schools in 40 states and the District of Columbia - including three in Oklahoma - will lose some federal financial aid or loan programs due to high rates of defaulted student loans, the Department of Education said Friday. . . In Oklahoma, the following privately owned trade schools were on the list: - American Technical Institute of Tulsa, where 76.9 percent of its student loans were in default in fiscal 1990. -Oklahoma Junior College of Business and Technology, Tulsa, with a 41.8 percent default rate. -Paul's Beauty College, Oklahoma City, with a 68.1 percent default rate.

### **New York Times, July 10, 1990:**

The largest chain of private trade schools in New York City has agreed to pay \$850,000 for recruiting violations, the largest penalty ever assessed on a trade-school operator in the state. . . East Coast Schools operates 10 schools in New York, among them the Metropolitan Career Institute, the International Career Institute, the Empire Technical School and the Albert Merrill School. Two schools operated under the Empire name will be closed under the agreement announced here today.

### **Newsday (city edition), July 18, 1991:**

The U.S. Department of Education has notified 178 trade schools, including 14 in New York City, that they

stand to lose their eligibility to participate in the federal student loan program because more than one-third of their students defaulted on their government-guaranteed loans three years in a row. Many of the schools are beauty schools - also known as "academies of cosmetology" - but others train truck drivers, bartenders, secretaries and even card dealers. Many are so dependent on the federal loan program that losing eligibility may force them out of business.