

# Where Do Students Go when For-Profit Colleges Lose Federal Aid?\*

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## Abstract

The U.S. Department of Education recently revoked two large for-profit higher education institutions' eligibility to provide students with federal aid. The resulting campus closures impacted thousands of students and it is unclear whether these students will re-enroll elsewhere or forego a college education. We examine the enrollment impacts of similar sanctions imposed on over 1,200 primarily for-profit institutions in the 1990s. Using variation in regulations surrounding 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 competitors. We find that enrollment in a sanctioned for-profit college declines by 53 percent in the five years following a sanction. Other unsanctioned for-profit colleges in the county experience negative spillovers with small declines in enrollment. However, the enrollment losses in the for-profit sector are more than made up for by gains in enrollment in local community colleges, suggesting that virtually all students displaced from sanctioned for-profits continue their education in the public sector. 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 remarkable growth, for-profit higher education has faced intense scrutiny and declining enrollment in recent years.<sup>1</sup> For-profit colleges may 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 HELP Committee 2010). Since then, the U.S. Department of Education (ED) has imposed new “Gainful Employment” (GE) regulations that would likely restrict access federal student aid at many for-profit colleges and lead to the closure of others in the coming years (U.S. Department of Education 2010). ED has also investigated and sanctioned two large national for-profit chains – Corinthian Colleges and ITT Tech.<sup>2</sup> Both companies filed for bankruptcy, shuttering hundreds of campuses across the country and leaving behind tens of thousands of students (Fain 2014*b*; Stratford 2015; Smith 2016). Whether these students enroll in other institutions or forego their college education is critically important in assessing the potential welfare implications of federal sanctions and other policies, such as GE, that restrict federal student aid to for-profit colleges.

We assess the effect of federal student aid loss on enrollment by examining the impact of similar regulations implemented in the late 1980s and early 1990s. As in the case of GE, the previous round of sanctions – known as “Cohort Default Rate” (CDR) regulations – targeted institutions with high federal student loan default rates. While CDR regulations applied to all colleges, the vast majority of institutions threatened with sanctions were for-profit colleges. These sanctions led to widespread school closures and enrollment declines. We use a differences-in-differences identification strategy to estimate how these sanctions, which restricted for-profit institutions’ access to federal student aid, affected overall enrollment and the distribution of students across public, non profit, and for-profit schools within a local higher education market. We focus on low-income students considered especially vulnerable - federal Pell Grant recipients.

While sanctioned for-profit schools experienced a 53 percent decline in Pell Grant recipient enrollment in the following five years, community colleges in the same county as these sanctioned schools saw an 17 percent enrollment increase for Pell Grant recipients. We find evidence of negative enrollment spillovers within the for-profit sector, with unsanctioned for-profit schools experiencing a 15 percent decline in Pell Grant recipient enrollment following the sanction of a neighboring for-profit school. Back-of-the-envelope

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<sup>1</sup>For-profit institutions currently enroll over 1.5 million students, down from a peak of two million students in 2010. Authors’ calculations using Table 303.10 of U.S. Department of Education (2015).

<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.

calculations indicate that the increase in community college enrollment completely compensated for the drop in attendance in the for-profit sector, suggesting that for-profit institutions' loss of federal student aid did not reduce aggregate college enrollment.

To further explore the welfare effects of students switching from for-profit to public institutions, we present descriptive evidence on the correlation between sanctions and student borrowing and default. We find that sanctions are associated with sizable reductions in student borrowing and default in the for-profit sector. Despite increasing enrollment in the public sector in response to local competitors being sanctioned, we observe no increase in borrowing or default in the public sector. We further estimate that roughly 60 percent of the students induced to stop borrowing by switching sectors would have defaulted on their loans in the absence of sanctions.

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>3</sup> Using resume audit study experimental designs, Darolia et al. (2015) and Deming et al. 2016 do not find that for-profit attendance results in an increase in interview requests. The lack of employer interest corresponds to findings based on survey data that does not establish a wage premium at for-profit colleges that justifies higher costs for the average student (Cellini and Chaudhary 2012; Lang and Weinstein 2013). Cellini and Turner (2016) confirm the lack of benefits from for-profit attendance using administrative tax data on individual earnings.

Darolia (2013) finds that federal sanctions that result in loss of eligibility to disburse federal aid reduce enrollment at *sanctioned* schools. In order to fully assess the effects of these policies on students, however, we need to understand whether students who would have attended sanctioned schools ultimately switched schools or chose to forgo postsecondary education altogether. In this paper, we empirically measure the extent to which a local higher education market contains alternatives to sanctioned for-profit institutions using a broader set of institutions and by looking explicitly at impacts on federal student aid 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 (e.g., county). We can therefore assess the full consequences of school closures and the loss of federal student aid on the college-going of the most vulnerable students. We provide the first causal assessment of how restrictions on institutional eligibility for student aid affect access to higher education and the distribution of students across sectors in a local higher education market using comprehensive institution-level administrative data. Unlike previous research

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<sup>3</sup>For research on for-profit schools' business practices, see Breneman, Pusser and Turner (2006), Kinser (2007), and Tierney and Hentschke (2007). Rosenbaum, Deil-Amien and Person (2006) cover 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. Finally, Laband and Lentz (2004) and Cellini (2012) assess the costs related to receiving a for-profit postsecondary education.

on competition in the sub-baccalaureate market, we draw on national data on students who should be most affected by federal aid eligibility — students receiving federal Pell Grants. In this way, we directly examine whether vulnerable students, whose enrollment decisions may be especially tied to student aid access, are disproportionately harmed by federal regulation.

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 also independently important given the overlap in programs offered by two-year public and for-profit institutions (e.g., Cellini 2005; Cellini 2009), disparate costs (e.g., Laband and Lentz 2004; Cellini 2012), and lack of evidence that the earnings of for-profit students exceed those of similar community college students (e.g., Cellini and Chaudhary 2012; Lang and Weinstein 2013, Cellini and Turner 2016). 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 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., Epple, Figlio and Romano 2004; Bassok et al. 2014).

Finally, this study contributes to the broader literature on the effects of federal student aid policy. Research on the impact of federal student aid programs on students' enrollment and persistence decisions has produced mixed results. Pell Grant aid does not appear to increase college going among traditional-aged students (e.g., Kane 1995; Rubin 2011; Turner 2014; Carruthers and Welch 2015), although it may enhance enrolled students attainment (e.g., Marx and Turner 2015; Denning 2016) and older individuals' entry into college (Seftor and Turner 2002). Focusing on student loans, Dunlop (2013) and Wiederspan (2016) show that access to federal loan aid increases low-income community college students' educational attainment.

Several studies provide evidence that institutions respond to federal student aid by altering tuition or institutional discounts (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 schools may receive as much as 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 schools that are not eligible to disburse federal student aid. A deeper understanding of the for-profit sector's response to restrictions of federal student aid is essential for understanding the impacts of current and future aid policies that might expand or curtail aid to for-profit institutions.

The remainder of this paper proceeds as follows: the next section describes federal student aid programs

and the standards that institutions must meet to maintain eligibility to disburse federal aid. Section 3 discusses our data and sample and presents descriptive statistics, while Section 4 describes our identification strategy. Section 5 presents estimates of the impact of Title IV ineligibility on enrollment in sanctioned school and their competitors and Section 7 concludes.

## 2 Federal Student Aid and Institutional Eligibility Requirements

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. In recent years, 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 to be eligible to disburse Title IV aid to students. Until recent regulations passed under the Obama administration, the most stringent requirement was based on “cohort default rates” (CDRs). During the time period we study, CDRs were defined as the percentage of a school’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 any given year. In the absence of a successful appeal, institutions violating these threshold lose access to student loans, and possibly all federal aid, for at least the remainder of the year and the following two fiscal years.<sup>4</sup>

These 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-profit institutions 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 sanctions had been received by for-profit schools, along with a handful of schools in other sectors (Figure 1). In the years prior to the implementation of these regulations, the share of Pell Grant recipients attending for-profit institutions grew, peaking at 27 percent in 1988, while the share of these

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<sup>4</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 starting in with the 1997 cohort). Exceeding the 40 percent threshold results in “limitation, suspension, or termination” of all Title IV aid programs. These thresholds were higher in the early years of enforcement. For instance, in 1991, schools 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 Department of Education moved to a three-year CDR measure. Schools with CDRs exceeding 30 percent for three consecutive years lose eligibility to disburse both federal Pell Grants and federal loans, while schools with CDRs exceeding 40 percent in any single year lose access to federal loans. Appendix Figure B.1 displays the full set of sanction triggers and penalties by year.

students enrolled in public institutions fell from 70 to less than 60 percent (Figure 2). Following the release 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, with enrollment in public institutions increasing over this same period.<sup>5</sup> Aggregate Pell Grant recipient enrollment grew steadily over this period, suggesting that, as many for-profit institutions lost eligibility to disburse federal student aid due to high student loan default rates, students that would have enrolled in these institutions may have attended public schools instead.

The climate of rapid for-profit college growth, questionable practices in this sector, and subsequent regulation of the late 1980s and early 1990s bears a strong resemblance to the current U.S. higher education landscape. After rapid growth in the for-profit sector, renewed concern over student outcomes led to the 2014 Gainful Employment (GE) regulations. GE restricts eligibility for federal student aid programs based on graduates' loan payment-to-earnings ratios, calculated at the program level.<sup>6</sup> The Department of Education estimates that about 1,400 programs (99 percent of which are in for-profit colleges) will not pass the new GE standards and 840,000 students will be impacted.<sup>7</sup> 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*a*; Gleason and Mitchell 2014; Mitchell and Zibel 2014). An understanding of whether and how the loss of federal aid for for-profit colleges affects postsecondary enrollment is essential to predicting the impacts of GE and similar regulations targeted toward this 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 expected out-of-pocket price paid by the student  $P_{ij}$ , academic characteristics  $A_j$  (e.g., programs, quality, or reputation), and distance  $D_{ij}$  between the student and school. Prices may 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 school  $j$ . Both  $A$  and  $P$  are

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<sup>5</sup>Between 2003 and 2013, only 27 institutions received CDR-related sanctions and ultimately. 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. The Department of Education moved to a three-year cohort repayment rate with the 2012 cohort and in 2015, 18 schools were found to have violated the three-year CDR limits.

<sup>6</sup>Specifically, payment-to-income ratios are categorized either as pass (where 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 of any three consecutive years or are in the zone for four consecutive years.

<sup>7</sup>See <http://www.ed.gov/news/press-releases/obama-administration-announces-final-rules-protect-students-poor-performing-career-college-programs> for details.

functions of  $S$ , where  $S_j = 1$  when school  $j$  receives a CDR sanction and is unable to give out federal student aid. A school’s reputation may also depend on whether other schools in the same market and sector  $c \in \{pub, np, fp\}$  (public, nonprofit, and for-profit, respectively) 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 two main channels. First, sanctions may provide information to prospective students on the quality of a particular school or sector, with reducing perceived academic quality ( $A$ ) and lowering the potential utility from attendance for students who value school quality. Institutions sanctioned under the CDR regulations have, by definition, a high percentage of students who cannot repay their student loans. Prospective students, if they are aware of sanctions, may consider a sanction a sign of low quality and therefore estimate a lower probability of their own success and lower expected lifetime benefits. Such a calculation would lead to a lower probability of enrolling in college  $j$ , and will likely induce students to enroll in a competing institution, rather than forego education altogether, unless suitable alternative institutions or programs are unavailable elsewhere. These reputational effects of a sanction may also spillover onto similar schools—likely those in the same sector (e.g., for-profits) with similar characteristics (e.g., size, tuition, or field of study)—leading students to switch to local institutions in a different sector.<sup>8</sup>

Second, CDR sanctions may impact a students’ expected costs of attendance. A sanctioned school loses eligibility to disburse federal loans and, in some cases, Pell Grant and other federal aid. As a result, current and prospective students would experience an increase in their expected out-of-pocket college costs ( $P$ ). Students could either absorb these costs, for example, by taking on more expensive private student loans or increasing work hours. They may also choose to forego a college education, or they 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 enrolling in a threatened school.

Finally, sanctioned schools may be unable to support their operations if reductions in student enrollment are sufficiently large, resulting in the closure of some sanctioned schools, limiting prospective students’ choice sets, and inducing further switching to unsanctioned competitor institutions or out of higher education

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<sup>8</sup>It is also possible that branches of “chain” colleges would experience negative spillovers if another branch campus is sanctioned. 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 many fewer for-profit chains in the 1990s (Deming, Goldin and Katz 2012) and that chains would be unlikely 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.

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 two-year and less-than-two-year colleges - and approximate a student’s choice set with counties.<sup>9</sup>

The extent to which students are dissuaded from education or diverted to a different institution following a sanction depends on the availability of schools offering similar programs, prices at these schools, and whether students are fully informed of these alternatives. All 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. The Peltzman (1973) model provides a theoretical framework for modeling how higher education institutions compete for students in an environment with both federal subsidies (Pell Grant and federal loans) and state subsidies (direct funding for public schools). 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.

### 3 Data and Sample

We primarily rely on administrative data on Pell Grant recipients and institutions subject to cohort default rate (CDR) sanctions obtained from the U.S. Department of Education. 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. We consider Pell Grant recipient enrollment a reasonable proxy for the enrollment of financially vulnerable undergraduate college students. Students with low income and resources - as measured by the federal government’s calculation of need via the free application for federal student aid (FAFSA) - 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>10</sup>

Data on sanctioned institutions include the specific cohort default rate (CDR) threshold that was violated and the institution’s cohort default rate.<sup>11</sup> As noted above, institutions had to maintain CDRs less than 25 percent in any three year period and less than 40 percent each year.<sup>12</sup> Violation of these thresholds led to the

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<sup>9</sup>We include four-year colleges as a robustness check.

<sup>10</sup>The ratio of Pell Grant recipients to fall enrollment in the IPEDS is approximately 0.2 in two-year public institutions during the period we examine.

<sup>11</sup>Institution-level CDRs are not available before 1991.

<sup>12</sup>Institutions faced slightly higher threshold levels for pre-1992 repayment cohorts. See Appendix Figure B.1 for details.

loss of federal financial aid for a minimum of two academic years. Specifically, schools that were sanctioned due to three years of CDRs exceeding 25 percent lost eligibility to disburse federal loans, but maintained eligibility for grant programs. Schools that were sanctioned due to a single year’s CDR exceeding 40 percent could lose eligibility to disburse both grants and loans for an indefinite period. Following the Department of Education’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 stronger impact on enrollment than the loss of access to loans alone.

Typically, sanctions were effective immediately and applied to both current and prospective students. However, a sanctioned institution could appeal their case to the Department of Education in a process that typically lasted 1-2 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>13</sup> Thus, our main estimates can be thought of as “intent-to-treat” (ITT) effects that include both the impact of the actual loss of federal student aid (in cases where schools did not appeal or those that lost an appeal) and a threatened sanction with no subsequent loss of aid (due to a successful appeal) on students’ 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.

We supplement our administrative data with information on total enrollment between the 1988 and 2012 academic years from the Integrated Postsecondary Education Data System (IPEDS). As discussed in the data appendix A, the IPEDS excludes the majority of for-profit schools that participated in federal student aid programs in the late 1980s and early 1990s. Thus, our primary purpose for using IPEDS enrollment data is to validate our estimated impacts on Pell Grant recipient enrollment in the public and nonprofit sectors.

Our data do not include information on institutions that do not participate in Title IV federal student aid programs.<sup>14</sup> We therefore cannot distinguish between Pell Grant recipients who forego any college in response to a sanction and those that give up their Pell Grant to attend a nonparticipating school. To the extent that students leaving sanctioned schools enroll in these non-Title IV schools, our estimates of the will understate the extent to which unsanctioned schools absorb enrollment declines in sanctioned institutions.

We use counties to proxy for local higher education markets, as in Cellini (2009). We match institutions

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<sup>13</sup>Through a Freedom of Information Act request, we were able to obtain information on schools that unsuccessfully appealed their sanctions for the 1990 through 1994 repayment cohort related sanctions. However, this data does not allow us to distinguish between schools that successfully appealed their sanction and schools that never submitted an appeal, and thus, we cannot determine the set of institutions that were ultimately penalized in these years. We observe all appeals and outcomes starting with the 1995 repayment cohort.

<sup>14</sup>Cellini and Goldin (2014) document the large number of these institutions in the for-profit sector in more recent years.

with counties using their address or zip code, when available in the Pell Grant administrative data or CDR data.<sup>15</sup> For institutions that with missing location information in these data sets, we use the Postsecondary Education Participants System (PEPS) to link schools to counties.<sup>16</sup> PEPS also contains information on school closures for Title IV institutions. We keep all institutions that closed between 1988 and 2008 in our sample and assign them Pell enrollment equal to zero in the closed years.<sup>17</sup>

Finally, we limit our sample in a few ways. First, we focus primarily on sub-baccalaureate institutions (two-year and less-than-two-year institutions).<sup>18</sup> Few for-profit institutions offered baccalaureate degrees during this time period, and even fewer were sanctioned.<sup>19</sup> However, we show that our estimates are robust to the inclusion of four-year institutions. We also limit our analysis to look at the effects of sanctions imposed between 1991 and 2000, when the vast majority of schools were subject to federal student aid loss due to high CDRs, focusing on changes in enrollment between 1986 and 2005.<sup>20</sup> Our main sample also excludes the 15 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 in these markets.<sup>21</sup> Again, our estimates are robust to the inclusion of all counties in our analysis sample. Appendix A contains a detailed description of our data sources and sample.

### 3.1 Characteristics of schools and markets

Characteristics of the schools and markets that form the basis of our analytic sample are displayed in Table 1. Starting in 1991, a given school could potential receive a CDR-related sanction in each following year. Thus, for the purpose of describing our analysis sample, we create institution by sanction-year data. Panel A describes the schools and students in our sample: 80 percent of Pell Grant recipients in sanctioned institutions were enrolled in the for-profit sector and 17 percent attended public institutions. Only a small proportion (3 percent) of Pell Grant recipients in sanctioned schools were enrolled in a private nonprofit institution. Most Pell Grant recipients attending competitor schools, which we define as other unsanctioned two-year institutions within the same county as a sanctioned institution, were be enrolled in public institutions, with

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<sup>15</sup>Since our sample spans three decades, we use the 2010 county definitions to ensure that schools are consistently assigned to local markets.

<sup>16</sup>See <http://www2.ed.gov/offices/OSFAP/PEPS/index.html> for details.

<sup>17</sup>Note that each institution with an Office of Postsecondary Education Identification (OPEID) number is considered a separate institution for Title IV sanctions and in our data. We suspect that there were very few chains with multiple campuses in the same county, but how they are treated (as multiple institutions vs. a single entity) depends on their OPEID.

<sup>18</sup>The Pell Grant and CDR administrative data do not distinguish between two-year and less-than-two-year institutions.

<sup>19</sup>Of the 1,303 institutions that received CDR sanctions during this period, only 4 were baccalaureate granting public institutions, 23 were BA-granting nonprofits, and 10 were BA-granting for-profits. In the year prior to the release of the first set of CDR sanctions (1990), only 6 percent of for-profit colleges were classified as offering four-year degrees.

<sup>20</sup>Of the total number of threatened sanctions between 1991 and 2012, 99 percent fell within the years we examine.

<sup>21</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), Suffolk County (MA), Wayne County (MI), New York County (NY), Cuyahoga County (OH), Allegheny County (PA), Philadelphia County (PA), Dallas County (TX), Harris County (TX), and King County (WA). Robustness checks including these counties are can be found in the data appendix. Results are similar.

only 39 percent of these students attending for-profits. Pell Grant recipients enrolled in schools in markets that did not contain any sanctioned schools (labeled “other schools”) were the most likely to be enrolled in public institutions. Sanctioned, competitor, and other schools generally had similar levels of Pell Grant recipient enrollment before the imposition of a sanction. As would be expected, there is an approximately 30 percent decline in the average post-sanction count of Pell Grant recipients.<sup>22</sup> Conversely, competitor schools experience an average increase in post-sanction Pell Grant enrollment of about 6 percent.

Panel B of 1 describes the local higher education markets which we use as the setting for our analysis. Markets that contain at least one sanctioned school have, on average, 17 to 25 total two-year institutions. Markets with sanctioned schools typically had three to four sanctioned schools and unsanctioned competitors from all three sectors. Therefore, when a student faced the prospect of no longer being able to access federal financial aid at their preferred school, there were ostensibly available local substitutes in the public, private non-profit, and for-profit sectors. On average, when a public or private non-profit school was sanctioned, there were also two local sanctioned for-profits. Markets with a sanctioned for-profit also typically also contain sanctioned public and private nonprofit schools.

### 3.2 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), when the overall number of Pell Grant recipients was weakly increasing, the share of these students 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 schools enrolled an increasing percentage of recipients. Total Pell Grant recipient enrollment increased continuously until 1993 and remained constant for the next nine years.

These patterns are even more pronounced among public and for-profit two-year institutions, which experienced the majority of sanctions and/or competitor sanctions (i.e., Figure 1). 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.

Since the federal sanctions we examine were explicitly linked to student loan default rates, we also examine changes in the number of borrowers and CDRs across sectors since 1992 in (Figure 4). Unfortunately, sector-specific CDRs are not available before 1992. Panel A of Figure 4 displays the total number of federal borrowers (solid line, right y-axis) and the share of federal borrowers entering repayment by sector and

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<sup>22</sup>One might expect the number of Pell Grant recipients to fall further in sanctioned institutions, but note that not all sanctioned institutions lost grant aid – many lost only loan eligibility.

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. The share of borrowers entering repayment from public institutions increased and the share leaving for-profit institutions fell. As shown in Panel B, the cohort default rates 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 non-profit sectors.

Finally, we present trends in school closures over this period. Figure 5 shows the total number of schools reported as closed by sector between 1986 and 2012.<sup>23</sup> A large number of for-profit schools closed their doors beginning in 1989, the first year that institution-specific CDRs were released. During the next decade, over 2,000 Title IV for-profit institutions closed.<sup>24</sup> To further investigate the correlation between federal sanctions and changes in school closure rates, we estimate descriptive hazard model:

$$\Pr(\text{closed}_{jt} = 1 | \text{closed}_{jt-1} = 0) = \sum_{k=0}^5 (\gamma_k^c \text{sanct}_{j,t-k}^c) + \delta_c + \delta_t + \delta_m + \nu_{jmt} \quad (2)$$

Here, we model the hazard that school  $j$  closes in year  $t$  (conditional on remaining open until year  $t - 1$ ) as a function of the school’s sector  $c \in \{\text{pub}, \text{np}, \text{fp}\}$  (public, nonprofit, and for-profit, respectively) in year ( $t$ ), market ( $m$ ), and being sanctioned in current or past five years ( $k$ ).<sup>25</sup> We include fixed effects for each sector  $\delta_c$ , year  $\delta_t$ , and market  $\delta_m$ .

Figure 6 displays impact of a sanction on cumulative hazard of closure in 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. Sanctioned nonprofit schools also have an increased hazard of closure, while public schools appear to be unaffected. These results suggest that the “treatment” of having a competitor sanctioned likely affects schools 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 (primarily in the for-profit sector).

### 3.3 Descriptive market-level regressions

Next, we examine the extent to which the reallocation of Pell Grant recipients across sectors that occurred in the early 1990s (e.g., Figures 2 and 3) is correlated with the prevalence of sanctions within a given

<sup>23</sup>Our measure of closure comes from the PEPS data, which only contains information on Title IV schools. Thus, we do not observe any closures that occur after a given school stops participating in Title IV programs. To the extent that sanctioned schools leave Title IV before closing, our estimates will represent an underestimate of the correlation between threatened sanctions and closure.

<sup>24</sup>The PEPs data allows us to distinguish between closures and mergers. However, we do not observe closures among schools that exit the Title IV program prior to closing. Thus, to the extent that CDR-related federal regulations induced schools to leave Title IV, Figure 5 may underestimate the number of closures during this period.

<sup>25</sup>We have estimated models that include up to 7 years of lags but only first 5 years following a sanction have a statistically significant association with school closure.

local higher education market. To do so, we first estimate descriptive regressions in which we measure the correlation between enrollment at the market level and the number of schools receiving sanctions in the market. These estimates will not allow us to observe any reallocation of students across schools within a sector in response to sanctions, but will allow us to test whether sanctions to for-profit institutions were correlated with changes in public sector enrollment. Specifically, we regress Pell Grant recipient enrollment on the number of institutions in market  $m$  and sector  $c$  that had ever been sanctioned as of year  $t$  and market and year fixed effects:

$$enrollment_{mt}^c = \gamma_{mt}^c \mathbf{N\ ever\ sanctioned}_{mt}^c + \delta_m + \delta_t + \nu_{mt} \quad (3)$$

We examine both enrollment across all sectors of higher education and enrollment in a given sector. We restrict the period of analysis to the 1988 through 2005 academic years to be able to compare estimated changes in Pell Grant recipient enrollment to estimated changes in total undergraduate enrollment in the IPEDS; results are quite similar if the 1986 and 1987 academic years are included.<sup>26</sup>

As shown in Table 2, an additional school receiving a sanction in the market is correlated with an insignificant 34 student increase in enrollment (representing a 4 percent increase over baseline enrollment). Sanctions received by for-profit and nonprofit institutions are significantly correlated with market enrollment. An additional for-profit sanction is correlated with a 107 student (19 percent) increase in public schools' enrollment and a 66 student (19 percent) decrease in for-profit enrollment. Nonprofit sanctions are also correlated with a fall in for-profit enrollment. These results provide suggestive evidence of spillovers from sanctioned for-profits to competitor institutions in other sectors and do not provide any evidence that sanctions to for-profit schools decrease aggregate enrollment.<sup>27</sup>

## 4 Empirical Framework

We examine the causal impact of the threat of losing Title IV eligibility on sanctioned schools' own enrollment using a generalized differences-in-differences framework:

$$\ln(enrollment)_{jy\tau} = \beta_1 s_{j\tau} + \beta_2 (s_{j\tau} \times post_{y\tau}) + \alpha_j + \alpha_y + \alpha_\tau + \alpha_t + t \times \alpha_y + \epsilon_{jmy\tau} \quad (4)$$

<sup>26</sup>IPEDS enrollment data is not reliable prior to 1988.

<sup>27</sup>We replicate this exercise using IPEDS fall enrollment data; results are contained in Appendix Table B.2. An additional for-profit threatened with a sanction is correlated with a 89 student increase in two-year public schools' fall undergraduate enrollment. This point estimate is not statistically distinguishable from the change in Pell Grant recipient enrollment suggesting that the majority of enrollment responses to for-profit sanctions likely occur among Pell recipients.

Where  $j$  indexes schools,  $y$  indexes calendar years,  $\tau$  indexes potential sanction years (hereafter “sanction-years”), and  $m$  indexes local labor markets (counties). Our dependent variable is the natural log of Pell recipient enrollment. To address school closures, we set Pell recipient enrollment equal to zero, and allow our dependent variable to equal  $\ln(enrollment + 1)$ . The variable  $s_{j\tau} = \mathbf{1}[sanctioned]_{j\tau}$  indicates whether school  $j$  was sanctioned in sanction-year  $\tau$  and  $post_{y\tau} \mathbf{1}[y \geq \tau]$  indicates whether the calendar year is greater than or equal to the sanction-year. We include observations encompassing the five years before and after the potential sanction. We include a linear time trend that varies by sanction-year,  $t \times \alpha_y$ , where  $t = y - \tau$ . The  $\alpha$  terms represent school, calendar year, years pre/post sanction, and sanction-year fixed effects, and  $\epsilon_{jmy\tau}$  is a composite error term. The coefficient of interest is  $\beta_2$ , which indicates the magnitude of the enrollment change in the years after a school is sanctioned.  $\beta_2$ , identifies the causal impact of receiving a sanction on enrollment under the identifying assumption that no other factors affecting enrollment coincided with the timing of the sanction. This assumption will be violated if schools endogenously adjust their recruitment, tuition, and institutional aid practices in anticipation of being sanctioned.

The model in equation (4) measures enrollment effects on a sanctioned school, but does not account for spillovers from sanctioned schools to unsanctioned “competitor” schools in the same market. In particular, if students in sanctioned schools do not drop out, but instead transfer to competitor schools (which we define as unsanctioned institutions in the same county),  $\beta_2$ , will overestimate the impact of sanctions on postsecondary enrollment. We therefore allow for an additional “treatment”: whether any competitor school in the local market was sanctioned ( $s_{-jm\tau} = \mathbf{1}[sanctioned]_{-jm\tau}$ ). Since a given school may be “treated” with a sanction in a given year and have a competitor institution sanctioned in a different year, we “stack” our data, so that each observation represents a unique school-year-sanction-year combination.

$$\begin{aligned} \ln(enrollment)_{jy\tau} = & \beta_1 s_{j\tau} + \beta_2 (s_{j\tau} \times post_{y\tau}) + \gamma_1 s_{-jm\tau} + \gamma_2 (s_{-jm\tau} \times post_{y\tau}) \\ & + \alpha_j + \alpha_y + \alpha_\tau + \alpha_t + t \times \alpha_y + \epsilon_{jmy\tau} \end{aligned} \quad (5)$$

The additional coefficient of interest is  $\gamma_2$  which represents the estimated impact of a sanctioned local competitor on an institution’s own enrollment.

We are also interested in assessing whether the impact of sanctions differentially affect public, nonprofit, and for-profit schools’ own enrollment and whether the enrollment spillovers due to a competitor’s sanction depends on interactions between own and competitor sectors. The latter allows us to test explicitly whether for-profit students switch to public institutions in response to institutional aid loss. To do so, we estimate equation (6):

$$\ln(enrollment)_{jy\tau} = \beta_1^c s_{j\tau}^c + \beta_2^c (s_{j\tau}^c \times \mathbf{post}_{y\tau}) + \sum_d \left\{ \gamma_{1,d}^c s_{-jdm\tau}^c + \gamma_{2,d}^c (s_{-jdm\tau}^c \times \mathbf{post}_{y\tau}) \right\} \quad (6)$$

$$\alpha_j + \alpha_y + \alpha_\tau + \alpha_t + t\alpha_y + \epsilon_{jmy\tau}$$

Where  $c \in \{pub, no, fp\}$  indicates the sector (public, nonprofit, and for-profit, respectively) that institution  $j$  belongs to and bold terms represent vectors. Likewise,  $d \in \{pub, np, fp\}$  represents the sector of the sanctioned competitor,  $s_{-jdm\tau}$  indicates whether any competitor of school  $j$  that belonged to sector  $d$  was sanctioned in sanction-year  $\tau$ . Here, the coefficient of interest is  $\gamma_{2,d}^c$ , which represents the estimated impact of a sanction on a sector  $d$  competitor institution on own enrollment of a school in sector  $c$ , (e.g.,  $\gamma_{2,fp}^{pub}$  represents the impact of a sanctioned for-profit institution on the enrollment of unsanctioned public schools in the local higher education market). To test whether the threat of Title IV ineligible has different impacts on schools in different sectors, we can test the equality of the  $\beta_2^c$  coefficients. Likewise, to test for cross-sector spillovers between sanctioned schools and their competitors within a given local market, we can test the equality of the  $\gamma_{2,d}^{pub}$ ,  $\gamma_{2,d}^{np}$ , and  $\gamma_{2,d}^{fp}$  coefficients for a given sector  $d$ . Again, our identifying assumption is that no other factors affecting enrollment in either the sanctioned or competitor schools were contemporaneous with the timing of the sanction. However, in contrast to the examination of own enrollment in equation (4), the identifying assumption is much more plausible in this context when looking at competitors' enrollment. It is unlikely that competitors anticipate and preemptively adjust to sanctions that will be imposed on neighboring schools in future years.

## 5 The Impact of Sanctions on Enrollment

Table 3 presents empirical results from a model that pools sanctioned and competitor institutions across sectors. In column (1), we estimate the effect of the threat of Title IV ineligibility on sanctioned schools' own enrollment via equation (4). As expected, Pell enrollment in sanctioned schools declines significantly, by about 70 log points (50 percent) over the five years following a sanction. Based on the average enrollment of sanctioned schools, these declines translate to a drop of 86 students in the market, a 5 percent reduction relative to county-wide enrollment prior to the sanction.

As noted above, these own-enrollment effects do not take into account spillovers from sanctioned schools to their unsanctioned competitors and this is critically important to assessing the welfare of students who are attending, or would have attended sanctioned schools. In column (2), we add estimated enrollment effects on competitor schools (of any sector) in the same county, as described in equation (5). We find that enrollment in competitor institutions decreases by 16 log points (15 percent) following the threat of a sanction applied to

other local institutions. The decrease is somewhat surprising, but may indicate that competitor institutions of the same sector (particularly in the for-profit sector) are impacted by negative reputational effects, a point we explore further below. Taking into account both direct effects and spillovers, sanction threats lead to a decrease of about 336 Pell Grant recipients in two-year colleges (an 18 percent decline relative to baseline market enrollment).

Table 4 displays estimates from our preferred specification - equation (6) - which includes a full set of interactions between the sector of the sanctioned schools and the sector of competitors. As shown in columns (1) and (2), public and nonprofit institutions experience modest declines in own enrollment after sanction receipt, but there is no statistically significant impact on competitor enrollment in any sector. In contrast, for-profit colleges see large declines in own enrollment of 75 log points (53 percent) and both public and for-profit competitors experience changes in enrollment. Importantly, local public competitors see enrollment gains of 16 log points (17 percent) when for-profit institutions face the threat of federal aid loss. Considering the size of public sector competitors, the enrollment gain in the public sector more than offsets the decline in sanctioned for-profit enrollment. On average, 212 additional students enroll in public community colleges, relative to a loss of 79 students from sanctioned institutions.

In contrast to public competitors, however, for-profit competitor institutions appear to experience negative spillovers when another local for-profit is sanctioned. These institutions experience enrollment declines of 16 log points (15 percent) in response to a sanction, representing a loss of 72 students. One explanation for this negative spillover is that – not unlike today – the reputation of the sector as a whole was tarnished as individual institutions were sanctioned. It is also possible that sanctions improved student information about the quality and costs of colleges in this sector, leading students to make more informed choices. Finally, competitor institutions offering similar fields as those offered by sanctioned institutions (e.g., cosmetology, information technology) may have been more likely to experience these reputational or informational spillovers, while the more diversified public institutions absorbed students. Finally, it is also possible, although unlikely, that some of these effects are driven by chain institutions. However, as noted earlier, there were relatively few for-profit colleges with multiple campuses in the 1990s, and those that did exist were unlikely to have branches in the same county. Considering the total enrollment losses in both sanctioned and competitor for-profit colleges, the for-profit sector loses about 151 students, but these losses are more than offset by the 212 students gained in the public sector.<sup>28</sup>

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<sup>28</sup>As shown in Appendix Table B.3, estimated impacts of own and competitor sanctions on enrollment *levels* yield similar findings.

## 5.1 Heterogeneity and Robustness Checks

Our effects thus far combine schools threatened with the loss of access to student loans with those subject to loss of all Title IV aid, including Pell Grants. 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 Table 5. None of the estimated direct or spillover effects are significantly different between types of sanction with the exception of nonprofit competitors of sanctioned for-profits ( $p < 0.05$ ). These results suggest that the type of aid lost may be less important than the signal of low quality that comes with a threatened sanction.

We next explore heterogeneity by year of sanction (Appendix Table B.4). Here we see the strongest own enrollment effects for all sectors in 1991, the first year that sanctions were imposed. Own enrollment effects generally decline in the subsequent years, with some exceptions for later years when the number of sanctions was low. In Panel C, the temporal pattern of negative spillovers to for-profit competitors (when a local for-profit 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, then become weaker in later sanction years, as fewer schools are sanctioned and (presumably) potential students already have more information about the sector as a whole.

We further test the robustness of our results by including broader sets of institutions and counties. 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 B.5). Relative to our baseline results, we find slightly larger positive enrollment effects among public competitors of sanctioned for-profits, but slightly smaller negative spillovers among for-profit competitors. Finally, we add four-year institutions to our sample. We have little reason to believe that four-year college enrollment will react to sanctions that are primarily targeted at two-year institutions, especially given the small number of four-year for-profits in the 1990s. Nonetheless, we check to be sure our results are unaffected by the inclusion of these institutions (Appendix Table B.6). Replicating our analysis with this broader group of institutions yields estimates that are very similar to our main analyses of two-year institutions. However, due to the larger average size of four-year public competitor institutions, we find a larger number of students (403) potentially drawn into the public sector when a for-profit is sanctioned.

## 6 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 schools 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 borrowing and defaults across sectors in response to sanctions. Specifically, we estimate market-level regressions of the form specified in equation (3) where the dependent variable is now the total number of borrowers or defaulters within a market. We examine whether the changes in enrollment that occurred following for-profit sanctions are correlated with changes in borrowing and repayment. Because entry into repayment lags enrollment, we lag our measure of the number of schools 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 prior sanctions.

As shown in Panel A of Table 6, the number of borrowers in a local higher education market significantly decreased following each additional school receiving a sanction. 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 sanction in these same sectors. Specifically, 26 fewer nonprofit students borrowed following a nonprofit sanction and 59 fewer for-profit students borrowed in response to 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 school were also shifted out of borrowing. The decline in borrowing in nonprofit schools 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 6, 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 school receiving a sanction results in 31 fewer borrowers defaulting within two years. Own sector sanctions result in significant reductions in defaults across

all three types of institutions. Despite the small increase in the number of borrowers in 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.

## 7 Conclusions

In recent years, increased scrutiny of the for-profit sector has led to new regulations, investigations, restrictions on federal student aid, and highly publicized subsequent closures of several large for-profit college chains. To shed light on how these changes might shift students across sectors, this study draws on data from the 1980s and 90s to assess whether and how student enrollment shifts within and across sectors when institutions lost eligibility for federal student aid due to federal sanctions.

As documented in previous research, we find that when for-profit institutions are threatened with federal sanctions their own enrollment falls (Darolia 2013). Extending the literature, our results reveal that when a for-profit college is sanctioned, enrollment in other local competitor for-profit colleges also declines. While the reasons for this negative spillover are unclear, it may be that – much like today – the whole sector suffers the reputational impacts of federal sanctions.

More importantly, we find evidence that all of the students that exit the for-profit sector are absorbed by local public institutions: increased enrollment in the public sector more than offsets the decline for-profit enrollment. Our finding that enrollment gains outside of the for-profit sector in response to for-profit sanctions exceed the declines in enrollment within for-profit schools could be rationalized if students who are induced to switch from for-profit to other schools in response to sanctions are less likely to drop out or enroll in longer degree programs.

Overall, our results suggest several important implications for the sub-baccalaureate market. First, it is evident that students in sanctioned for-profit institutions can and do find programs to fit their needs in the public sector. Our results confirm 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, it appears that capacity constraints in public institutions are not a concern in our context, as public schools are fully able to accommodate students who switch sectors in response to federal sanctions. Finally, and perhaps

most importantly, our findings suggest that new regulations on federal student aid in the for-profit sector are unlikely to reduce the overall enrollment of low-income students. Assuming that community colleges still have the capacity to expand enrollment, these students will likely shift to the public sector.

But does this change represent a welfare-enhancing shift in the distribution of students? We provide descriptive evidence that students shifted into public schools by for-profit sanctions are less likely to borrow and even less likely to default on their federal loans. However, a more comprehensive answer to this question would require a comparison of the cost and quality of education received in each sector by students affected by federal sanctions. On the cost side, two-year public institutions charge about one-fifth the tuition of two-year for-profits, and public sector students are less likely to borrow to cover the cost of college (U.S. Department of Education 2015). On the quality side, recent studies of earnings gains report that the for-profit sector has the same or lower returns than the public sector (e.g., Deming, Goldin and Katz 2012; Cellini and Chaudhary 2012; Cellini and Turner 2016). Recent studies on employers' perceptions of students also find that for-profit students fare the same or slightly worse than public sector students (Darolia et al. 2015; Deming et al. 2016). Considering the lower costs in the public sector, and (in a best case) similar student outcomes, our results suggest that restrictions of federal student aid to low-performing for-profit colleges may indeed be welfare-enhancing.

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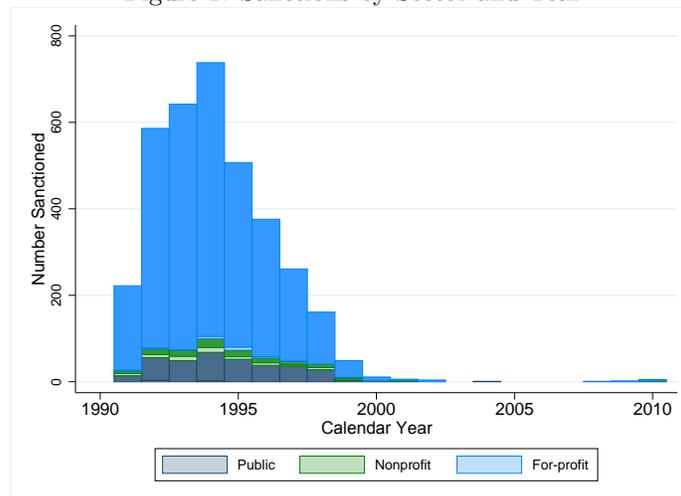
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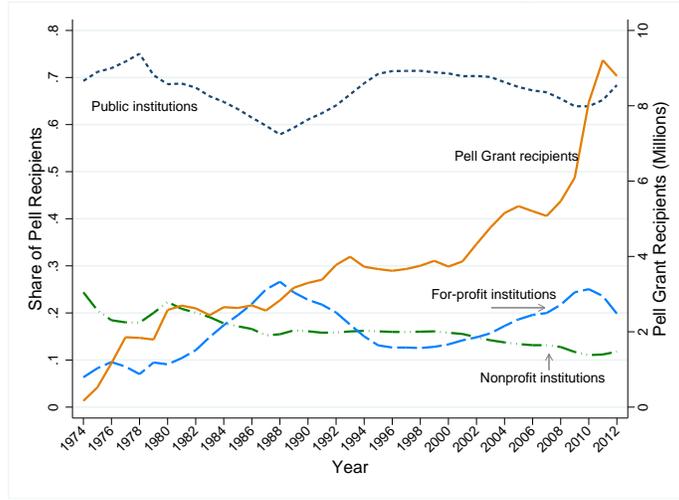
## Figures and Tables

Figure 1: Sanctions by Sector and Year



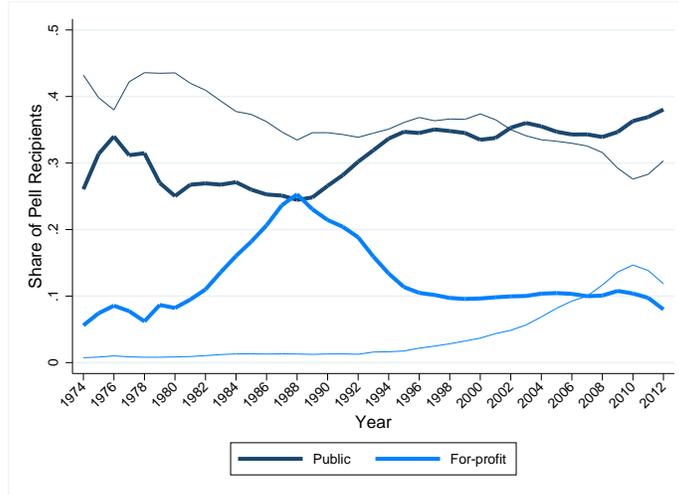
*Source:* Sanction administrative data. *Notes:* Sample includes all two- and four-year schools with federal borrowers entering repayment. Dark bars represent two-year schools, light bars represent four-year schools.

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



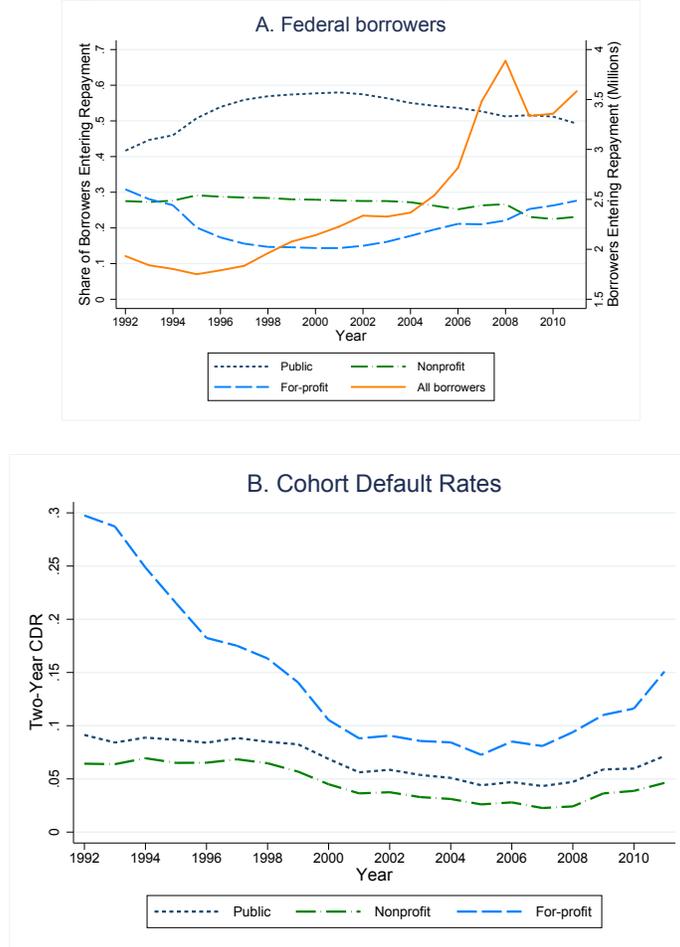
Source: Pell Grant administrative data. Notes: Sample includes two- and four-year schools with Pell Grant enrollment in the specified academic year. The solid orange line represents total Pell Grant recipients (in millions, on right y-axis), the short-dashed dark blue line represents the share of Pell 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 non-profit institutions (on left y-axis).

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



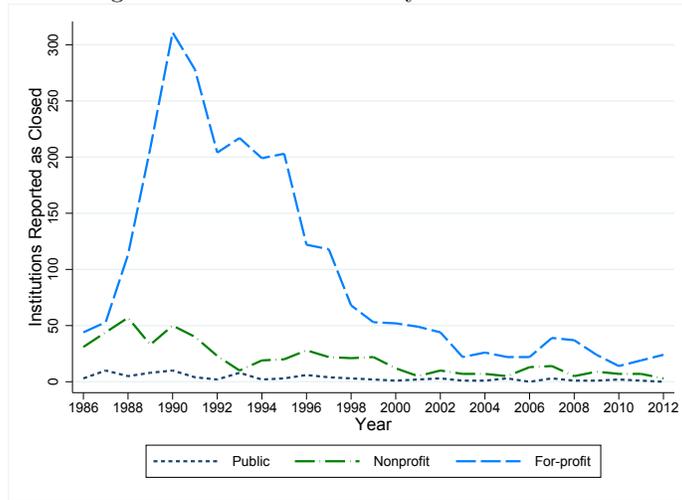
Source: Pell Grant administrative data. Notes: Sample includes two- and four-year public and for-profit institutions with Pell Grant enrollment in the specified academic year. Thick lines represent two-year schools (including less than two-year schools), thin lines represent four-year schools. Nonprofit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

Figure 4: Borrowers and CDRs by Sector and Year



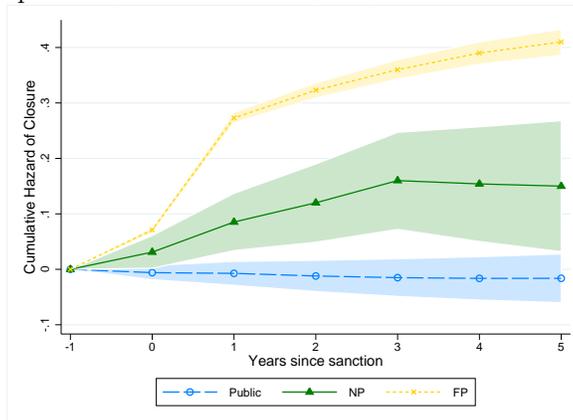
*Source:* Cohort default rate administrative data. *Notes:* Sample includes two- and four-year schools with cohort default rate data. Panel A displays the total number of federal borrowers entering repayment in the specified cohort-year. Panel B displays the ratio of total federal borrowers who defaulted within two years of entering repayment to the total number of federal borrowers who entered repayment in the specified cohort-year.

Figure 5: School 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.

Figure 6: 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. See Section 3.2 for details.

Table 1: Characteristics of Schools and Markets

<i>A. Schools</i>				
	(1) Sanctioned	(2) Competitor	(3) Other schools	
Pell Grant recipient enrollment				
Pre-sanction ( $t-5$ to $t-1$ )	244	197	190	
Post-sanction ( $t=0$ to $t+5$ )	165	209	223	
Sector (enrollment weighted)				
Public	0.17	0.57	0.77	
Nonprofit	0.03	0.04	0.04	
For-profit	0.79	0.39	0.19	
Observations (school by sanction year)	2,662	17,013	39,458	
<i>B. Markets</i>				
	(1) Any Sanctioned Public	(2) Any Sanctioned Nonprofit	(3) Any Sanctioned For-profit	(4) No Sanctioned Schools
Total schools	17	25	18	6
Number of sanctioned schools				
Public	1	1	1	--
Nonprofit	1	1	1	--
For-profit	2	2	2	--
Number of unsanctioned schools				
Public	2	3	2	1
Nonprofit	3	5	3	2
For-profit	8	13	9	3
Pre-sanction Pell enrollment	3,882	7,720	4,353	1,018
Enrollment in sanctioned schools				
Public	367	3,174	662	--
Nonprofit	40	295	297	--
For-profit	553	680	373	--
Enrollment in unsanctioned schools				
Public	1,877	1,757	1,784	687
Nonprofit	173	276	205	110
For-profit	872	1,538	1,032	221
Observations (county by sanction-year)	308	74	1,375	12,262

*Source:* Pell Grant, CDR, sanction, and PEPS administrative data. *Notes:* Sample includes two-year institutions participating in Title IV programs between 1988 and 2003. Competitor institutions are other two-year schools in the local higher education market (county).

Table 2: Correlations between Market-level Pell Recipient Enrollment and Sanctions

<i>Dependent variable = Pell enrollment in sector</i>	<i>(1) All</i>	<i>(2) Public</i>	<i>(3) Nonprofit</i>	<i>(4) For-profit</i>
Baseline enrollment (1990)	947	569	34	344
Number of sanctioned schools				
All sectors	34 (21)			
Public		72 (57)	-0.5 (4)	4 (39)
Nonprofit		-72 (80)	-5 (11)	-173 (78)*
For-profit		107 (18)**	-0.6 (1)	-66 (9)**
Observations	23,616	23,616	23,616	23,616

*Source:* Pell Grant, CDR, sanction, and PEPS administrative data. *Notes:* Sample includes all counties with Pell Grant recipient enrollment in any year between 1988 and 2005. Each point estimate represents the correlation between the number of two-year institutions in the specified sector that had ever been sanctioned by year  $t$  and Pell Grant recipient enrollment in two-year institutions within the sector specified in the column in year  $t$ . All regressions include county and year fixed effects. Robust standard errors clustered by county; \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$ .

Table 3: The Impact of Sanctions on Enrollment in Sanctioned and Competitor Institutions

	(1)	(2)
Post x Threatened sanction	-0.697 (0.053)**	-0.758 (0.055)**
Post x Competitor threatened with sanction		-0.160 (0.027)**
Total pre-sanction enrollment in market		
Threatened sanction		172
Competitor		1,652
Predicted change in county enrollment	<b>-86</b>	<b>-336</b>
% change in total enrollment	-5%	-18%
Counties	1,421	1,421
Institutions	6,835	6,835
Observations	751,850	751,850

*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 1986 through 2005. Closed school enrollment is set to zero. Dependent variable is  $\log(\text{Pell Grant recipient enrollment} + 1)$ . Each observation represents a school by year by potential sanction year. Estimates from a regression of enrollment on whether the school received a sanction in the sanction year, interacted with post-sanction receipt, school fixed effects, year fixed effects, sanction year fixed effects, and sanction-year linear trends. Column (2) includes an indicator for whether a competitor institution received a sanction in the sanction year and post-sanction receipt for competitor institutions. see Section 4 for additional details. Robust standard errors clustered by institution in parentheses; \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$ . Sample is limited to schools in counties with fewer than 50 schools (on average, across years).

Table 4: Impact of Threatened Sanctions on Pell Grant Recipient Enrollment: Heterogeneity by 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)
Post x Threatened sanction	-0.197 (0.087)*	-0.636 (0.339)+	-0.748 (0.062)**	<0.001
Post x Competitor with threatened sanction				
x Public	-0.007 (0.087)	-0.004 (0.101)	0.158 (0.048)**	0.147
x Nonprofit	-0.141 (0.086)+	0.004 (0.112)	0.036 (0.036)	0.189
x For-profit	-0.101 (0.096)	-0.092 (0.079)	-0.166 (0.033)**	0.620
Test of equality ( <i>p</i> -value)	0.444	0.552	<0.001	
Total pre-sanction enrollment in market				
Threatened sanction	311	259	150	
Public competitor	1,478	2,077	1,240	
NP competitor	157	244	122	
FP competitor	610	1,197	469	
Predicted change in county enrollment				
Threatened sanction	<b>-56</b>	-122	<b>-79</b>	
Public competitor	-10	-8	<b>212</b>	
NP competitor	-21	1	17	
FP competitor	-59	-105	<b>-72</b>	
% change: total enrollment	-6%	-6%	4%	
Institutions		1,421		
Counties		6,835		
Observations		751,850		

Source: Pell Grant, CDR, sanction, and PEPS administrative data. Notes: See Table 3 for sample and specification description.

Table 5: The Impact of Threatened 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	-0.141 (0.114)	-0.572 (0.330)+	-0.544 (0.067)**	0.007
Post x Competitor with threatened loss of loans				
x Public	0.130 (0.071)+	-0.056 (0.104)	0.071 (0.050)	0.262
x Nonprofit	-0.072 (0.104)	0.001 (0.106)	0.051 (0.037)	0.506
x For-profit	0.028 (0.116)	-0.220 (0.083)**	-0.082 (0.031)**	0.192
Total pre-sanction enrollment in market				
Threatened sanction	332	307	154	
Public competitor	1,824	2,397	1,376	
NP competitor	178	164	138	
FP competitor	789	1,401	568	
Predicted change in county enrollment				
% change: total enrollment	7%	-13%	0%	
Post x Threatened loss of T4	-0.179 (0.106)+	-0.376 (0.411)	-0.489 (0.073)**	0.064
Post x Competitor threatened loss of T4				
x Public	-0.143 (0.129)	-0.019 (0.121)	0.143 (0.043)**	0.071
x Nonprofit	-0.116 (0.102)	-0.005 (0.102)	-0.008 (0.040)	0.628
x For-profit	-0.078 (0.117)	0.115 (0.075)	-0.130 (0.036)**	0.012
Total pre-sanction enrollment in market				
Threatened sanction	286	133	150	
Public competitor	1,491	1,624	1,367	
NP competitor	143	321	150	
FP competitor	702	1,148	706	
Predicted change in county enrollment				
% change: total enrollment	-12%	2%	3%	
Counties		1,421		
Institutions		6,835		
Observations		751,850		

Source: Pell Grant, CDR, sanction, and PEPS administrative data. Notes: See Table 3 for sample and specification description.

Table 6: Correlations between Federal 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 schools participating in Title IV that enrolled Pell Grant recipients at any point between 1988 and 2005. OLS 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. There is one original file for every year, where each of these files contains information on the school (name, address, type), the program, and the default rates for the last 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. We thus kept the information that appears in the 2003 original 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 school-cohort year for the set of institutions that had at least one borrower entering repayment in the cohort year. This data includes the reason for the sanction by school and year.
3. *Data on Pell Grant recipients* and total amount disbursed per school and year, for the academic years 1974 through 2012. There is one original file for every year and each file contains information on the school’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, and closure date (if participating in Title IV programs at the time of closure). Covers all institutions that ever participated in Title IV programs. This data also allows us to construct a crosswalk between earlier school identifiers (“Pell IDs”) and modern school identifiers (“OPEIDS”).

### A.2 Analysis data set construction

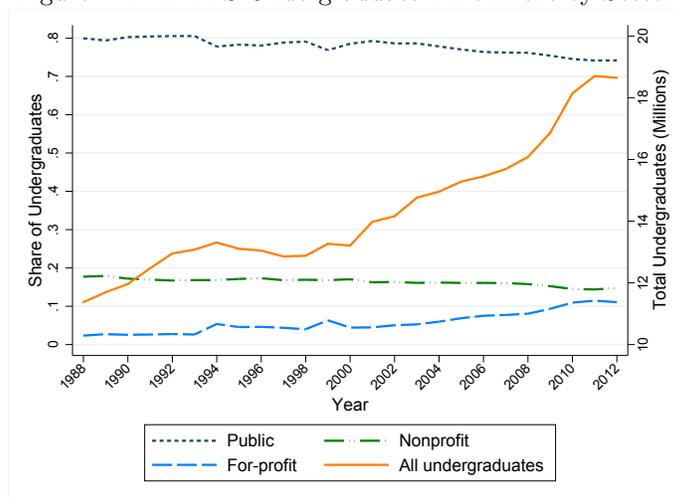
We first created the single file containing the yearly CDR information for all schools and a single file containing the yearly information on sanctions due to CDR violations for all schools. We cleaned the PEPS crosswalk data and created the single file containing the Pell Grant recipient information for all schools, and matched it with the crosswalk data in order to add pre-2000 OPEIDS that are missing in the original Pell Grant data (which has Pell IDs instead of OPEIDS for all years preceding 2000). We cleaned the Pell Grant data (fixed missing information, arranged level and control variables, dropped observations not in US 50+DC, fixed zip codes, and dropped branch campuses and duplicates). We added the information on CDR and sanctions to the Pell Grant data. We cleaned and added the data on school closures data to fill in the missing zip codes.

We cleaned and added the information on Title IV participation (using PEPS data). We linked schools to county FIPS codes using a zip code – FIPS code crosswalk. We manually entered FIPS codes for 153 institutions that don't match any crosswalk.

### A.3 IPEDS data set construction

We use data from the annual fall enrollment and institutional characteristics (IC) IPEDS files to measure total undergraduate enrollment by sector, county, and year. Institutions are 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) is used to allocated institutions to sectors. Fall enrollment is 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).

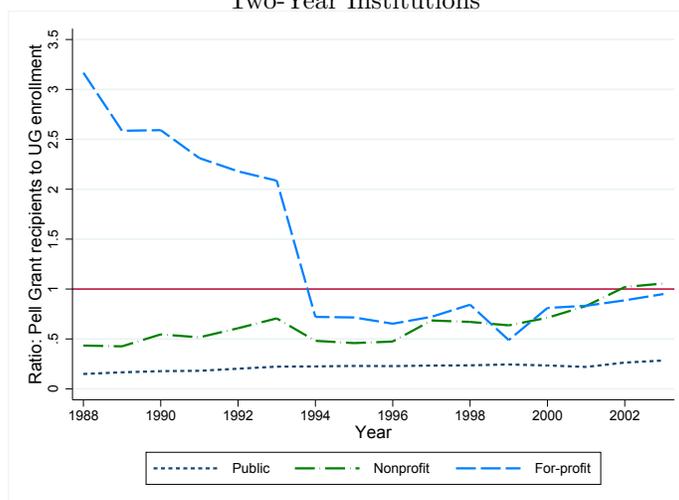
### A.4 Pre-2000 representation of for-profit institutions with Pell Grant recipients in IPEDS

Theoretically, the IPEDS universe includes all schools in a given year that participated in Title IV programs. However, prior to 2001, the IPEDS data omits a large number of for-profit schools 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 schools enrolled in 1988 by more than 300 percent.<sup>29</sup> For-profit schools that were sanctioned and/or closed in the early 1990s are the most likely to be missing from the IPEDS.

Public and non-profit 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 schools in the Pell Grant administrative data. For example, in 1988, the IPEDS data reports 1,673 nonprofit schools and 1,591 public schools, while the Pell Grant administrative data contains 1,752 nonprofits and 1,825 public institutions. Due to the large amount of measurement error in the IPEDS data relating to for-profit schools, we limit our analyses that use IPEDS data to focus on public and non-profit 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.

## B Additional Tables and Figures

<sup>29</sup>Results are quite similar when the sample is expanded to include four-year institutions. This is because very few for-profit schools in the 1980s and 1990s were classified as four-years.

Table B.1: Sanction Triggers and Penalties

Cohort year	Year informed of sanction	Range of aid loss if app. immed.	Trigger	Penalty
1989	1991	1991-1993	>=35% in 1987, 1988, 1989 >60% for 1989	Immediate loss of loans Limitation, suspension, or termination of Title IV
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
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
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
1993	1995	1995-1997	>=25% in 1991, 1992, 1993 >40% in 1993	Immediate loss of loans Limitation, suspension, or termination of Title IV
1994	1996	1996-1998	>=25% in 1992, 1993, 1994 >40% in 1994	Immediate loss of loans Limitation, suspension, or termination of Title IV
1995	1997	1997-1999	>=25% in 1993, 1994, 1995 >40% in 1995	Immediate loss of loans Limitation, suspension, or termination of Title IV
1996	1998	1998-2000	>=25% in 1994, 1995, 1996 >40% in 1996	Immediate loss of loans Limitation, suspension, or termination of Title IV
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
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
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
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
2002	2004	2004-2006	>=25% in 2000, 2001, 2002	Immediate loss of loans and Pell
2006	2008	2008-2010	>40% in 2006	Immediate loss of loans
2007	2009	2009-2011	>40% in 2007	Immediate loss of loans
2008	2010	2010-2012	>=25% in 2006, 2007, 2008 >40% in 2008	Immediate loss of loans and pell Immediate loss of loans
2009	2011	2011-2013	>=25% in 2007, 2008, 2009 >40% in 2009	Immediate loss of loans and Pell Immediate loss of loans
2010	2012	2012-2014	>=25% in 2008, 2009, 2010 >40% in 2010	Immediate loss of loans and Pell Immediate loss of loans
2011	2013	2013-2015	>=25% in 2009, 2010, 2011 >40% in 2011	Immediate loss of loans and Pell Immediate loss of loans
<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

Source: CDR and sanction administrative data. Notes: No schools triggered sanction threats for the 2001, 2003, 2004, and 2005 cohorts.

Table B.2: Correlations between Market-level Undergraduate Enrollment and Sanctions

<i>Dependent variable = undergraduate enrollment</i>	(1) Public	(2) Nonprofit
Baseline enrollment (1990)	3,688	91
Number of sanctioned schools		
Public	456 (688)	-21 (53)
Nonprofit	-982 (778)	122 (142)
For-profit	552 (245)*	29 (22)
Observations	21,504	21,504

*Source:* IPEDS institutional characteristics and fall enrollment files. *Notes:* Sample includes all counties with Pell Grant recipient enrollment in any year between 1988 and 2005. Each point estimate represents the estimated correlation between the number of two-year institutions in the specified sector that had ever been threatened with a sanction by year  $t$  and fall undergraduate enrollment (IPEDS data) in two-year institutions within the sector specified in the column. All regressions include county and year fixed effects. Robust standard errors clustered by county in parentheses; \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$ .

Table B.3: The Impact of Threatened Sanctions by Sector of Sanctioned and Competitor Institutions on Pell Grant Recipient Enrollment Levels

<i>Sanctioned sector:</i>	<i>1. Public</i>	<i>2. Nonprofit</i>	<i>3. For-profit</i>	Test of equality ( $p$ -value)
Post x Threatened sanction	-50 (35)	-57 (20)**	-82 (10)**	0.367
Post x Competitor with threatened sanction				
x Public	37 (39)	2 (82)	142 (21)**	0.047
x Nonprofit	11 (7)	11 (6)+	7 (5)	0.926
x For-profit	-12 (9)	-12 (16)	-15 (4)**	0.954
Test of equality ( $p$ -value)	0.038	0.368	<0.001	
Counties		1,421		
Institutions		6,835		
Observations		757,790		

*Source:* Pell Grant, CDR, sanction, and PEPS administrative data. *Notes:* Dependent variable is Pell Grant recipient enrollment. See Table 3 for sample and specification description.

Table B.4: Impact of Threatened Sanctions on Pell Grant Recipient Enrollment: Heterogeneity by Sanction Year

<i>Year sanction threat released:</i>	(1) 1991	(2) 1992	(3) 1993	(4) 1994	(5) 1995	(6) 1996	(7) 1997	(8) 1998	(9) 1999	(10) 2000
Total threatened sanctions										
Public	11	47	45	64	50	38	36	29	4	1
Nonprofit	5	10	14	16	13	8	9	5	2	0
For-profit	141	378	428	481	312	233	159	89	31	8
Post x Threatened sanction										
x Public	-0.366 (0.090)**	-0.316 (0.175)+	-0.211 (0.141)	-0.167 (0.110)	-0.118 (0.154)	-0.347 (0.154)*	-0.277 (0.153)+	-0.659 (0.302)*	0.229 (0.168)	0.202 (0.032)**
x Nonprofit	-0.889 (0.726)	-0.324 (0.790)	-0.319 (0.520)	-0.580 (0.483)	-0.785 (0.341)*	-0.748 (0.662)	-1.867 (0.574)**	0.652 (0.490)	-1.680 (1.071)	--
x For-profit	-1.849 (0.181)**	-0.777 (0.107)**	-0.890 (0.103)**	-0.635 (0.097)**	-0.454 (0.114)**	-0.476 (0.119)**	-0.372 (0.148)*	-0.167 (0.170)	-1.625 (0.366)**	-1.491 (0.973)
Post x For-profit competitor w/ threatened sanction										
x Public	-0.071 (0.096)	0.086 (0.071)	0.091 (0.073)	0.153 (0.069)*	0.144 (0.069)*	0.122 (0.070)+	0.091 (0.073)	-0.025 (0.089)	-0.163 (0.162)	0.219 (0.096)*
x Nonprofit	0.116 (0.087)	0.063 (0.068)	0.035 (0.060)	0.008 (0.062)	-0.003 (0.065)	-0.063 (0.069)	-0.069 (0.078)	-0.031 (0.105)	0.143 (0.170)	0.493 (0.349)
x For-profit	-0.164 (0.082)*	-0.216 (0.069)**	-0.194 (0.063)**	-0.231 (0.060)**	-0.147 (0.062)*	-0.066 (0.063)	-0.035 (0.060)	0.005 (0.057)	-0.124 (0.077)	0.118 (0.096)

Source: Pell Grant, CDR, sanction, and PEPS administrative data. Notes: See Table 3 for sample and specification description.

Table B.5: Robustness of the Impact of Threatened Sanctions on Institutions and Competitors: 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	-0.201 (0.083)*	-0.432 (0.325)	-0.740 (0.066)**	<0.001
Post x Competitor with threatened sanction				
x Public	0.0004 (0.072)	-0.065 (0.110)	0.198 (0.046)**	0.055
x Nonprofit	-0.052 (0.075)	0.062 (0.060)	0.058 (0.033)+	0.403
x For-profit	-0.112 (0.115)	-0.070 (0.069)	-0.122 (0.039)**	0.83
Test of equality ( <i>p</i> -value)	0.416	0.080	<0.001	
Total pre-sanction enrollment in market				
Threatened sanction	318	323	156	
Public competitor	2,082	4,019	1,480	
NP competitor	212	380	150	
FP competitor	1,152	3,144	726	
Predicted change in county enrollment				
Threatened sanction	<b>-58</b>	-113	<b>-82</b>	
Public competitor	1	-253	<b>324</b>	
NP competitor	-11	24	43	
FP competitor	-122	-213	<b>-83</b>	
% change: total enrollment	-5%	-7%	8%	
Institutions		1,435		
Counties		8,450		
Observations		929,500		

Source: Pell Grant, CDR, sanction, and PEPS administrative data. Notes: See Table 3 for sample and specification description.

Table B.6: Impact of Threatened 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	-0.210 (0.087)*	-0.980 (0.306)**	-0.762 (0.061)**	<0.001
Post x Competitor with threatened sanction				
x Public	-0.003 (0.068)	0.017 (0.066)	0.137 (0.035)**	0.069
x Nonprofit	0.008 (0.054)	-0.087 (0.088)	0.031 (0.033)	0.288
x For-profit	-0.080 (0.088)	-0.073 (0.053)	-0.145 (0.030)**	0.481
Total pre-sanction enrollment in market				
Threatened sanction	319	424	153	
Public competitor	3,203	3,902	2,743	
NP competitor	1,032	1,895	940	
FP competitor	751	1,282	613	
Predicted change in county enrollment				
Threatened sanction	<b>-60</b>	<b>-265</b>	<b>-82</b>	
Public competitor	-10	67	<b>403</b>	
NP competitor	8	-158	30	
FP competitor	-58	-90	<b>-83</b>	
% change: total enrollment	-2%	-6%	6%	
Counties		1,421		
Institutions		8,984		
Observations		988,240		

Source: Pell Grant, CDR, sanction, and PEPS administrative data. Notes: See Table 3 for sample and specification description.