



Unbundling For-Profit Higher Education: Relaxing the 90/10 Revenue Constraint

Zachary G. Davis¹

Published online: 3 February 2023
© EEA 2023

Abstract

In 2008, congress passed the Higher Education Opportunity Act. This act relaxed the 90/10 rule requiring for-profit institutions to earn at least 10 percent of their revenue from non-Title IV funds by revoking eligibility after 2 years of non-compliance instead of 1 year. To comply with the 90/10 rule, for-profit institutions bundle campuses together. Unbundling the campuses doubles the number of 1-year violations though the number of 2-year violations remains the same. For-profit institutions receive almost one billion dollars, or about 4.5 percent, more federal aid under the 2-year violation rule than the 1-year violation rule.

Keywords For-profit higher education · Regulatory compliance strategy · Title IV financial aid

Mathematics Subject Classification H52 · I23 · I28

Introduction

For-profit postsecondary institutions have become a large player in higher education in the past decade. Deming et al. (2012) and Gilpin et al. (2015) document and explain the large growth in the for-profit sector. Along with the growth in the for-profit sector, there has also been growth in scrutiny and regulation of the for-profit sector. One regulation, the 90/10 rule, has applied to for-profit postsecondary institutions in some form since 1992. Under the 90/10 rule, a for-profit school cannot receive more than 90 percent of their revenue from Title IV funds. Title IV funds are federal aid dollars disbursed by the Department of Education.

For-profit institutions are allowed to bundle separate campuses together as one entity in order to comply with the 90/10 rule. In 2008, congress passed a

✉ Zachary G. Davis
zachary.davis@stvincent.edu

¹ Alex G. McKenna School of Business, Economics, and Government, Saint Vincent College, Latrobe, USA



reauthorization of the Higher Education Act that relaxes the 90/10 violation policy on for-profit institutions. The policy change allows schools to violate the rule 2 years in a row instead of 1 year before losing eligibility for Federal Title IV aid. Executives at for-profit corporations actively considered bundling campuses when deciding on 90/10 rule compliance strategies. According to a 2012 Senate report from the Health, Education, Labor and Pensions (HELP) Committee, for-profit institutions use many different strategies, including bundling campuses, to comply with the 90/10 rule. An executive at Herzing University¹ wrote in an email in 2009:

“My initial thought is to match Toledo with Omaha because they are smaller enterprises and that way we can reserve Minneapolis for Akron if necessary. Right now the Toledo/Omaha rate would be . . . 72.6% . . . Right now Akron/Minneapolis would be . . . 78.5%. This group could in theory go up to the \$20,000,000.00 mark in combined revenue, with the current cash and still be under the 90% threshold.”

The Senate HELP Committee also documents that “EDMC discussed internally a consolidation and reorganization of its campuses in late 2009 in part to address concerns with 90/10 issues at some campuses.”² Executives at for-profit institutions base organizational decisions on the 90/10 rate at their various campuses.

I examine the impact of relaxing the 90/10 rule violation policy on the behavior of for-profit institutions and estimate the impact of the rule change on the amount of federal student aid received by for-profit institutions. I develop a theoretical model in which universities consider both the size of their campuses and the Title IV revenue percentages when making campus bundling decisions. I use the theoretical model to simulate the effect of moving from a 2-year violation rule to a 1-year violation rule. I also use the model to simulate the effect of moving to an 85/15 rule instead of a 90/10 rule. Using the Integrated Postsecondary Education Data System (IPEDS) and data from the Office of Postsecondary Education’s eZ-Audit system, I estimate the 90/10 revenue percentage for each campus of a for-profit institution. I show that relaxing the violation policy is associated with larger campus bundles and more revenue in for-profit institutions. I also estimate that relaxing the 90/10 rule violation policy is associated with an extra 900 million dollars in federal aid going to for-profit institutions.

The for-profit education sector is increasingly important to understand as they become a larger player in postsecondary education. For-profit postsecondary growth is driven by a number of factors. In one of the earliest papers studying for-profit institution growth, Cellini (2009) finds that 2-year for-profit institutions are a substitute for non-profit community colleges. She found that local communities in California voting to fund a public community college decreased the number of for-profit

¹ Herzing University converted to non-profit status in 2015, likely to avoid new and proposed “gainful employment” regulations on for-profit universities.

² See page 138 of the HELP Committee report. EDMC is the Education Management Corporation which ran Argosy University, The Art Institutes, Brown Mackie College, and South University. EDMC filed for bankruptcy in 2017.



institutions in the market, as well as private college enrollment, while increasing public college enrollment. In her 2010 paper, Cellini finds that increases in the Pell and Cal grant programs increase³ the number of public and for-profit institutions, though the increase in for-profit institutions is larger. Gilpin et al. (2015) find that occupation growth in the fields for-profit institutions offer explains some of the growth in for-profit sector. No matter the causes of the for-profit sector growth, a larger number of for-profit institutions mean more Title IV aid is directed to the for-profit sector, and any Title IV eligibility change will have a larger impact on both the students and the institutions.

Understanding the regulations on the higher education industry is crucial to understanding how these regulations affect the for-profit sector. These regulations include the different types of Title IV aid and the eligibility requirements to receive this aid. Losing Title IV eligibility requirements can cause institutions to close, which happened to ITT Tech and Corinthian for-profit institutions in 2016. Eligibility requirements differ between for-profit institutions and non-profit institutions. The 90/10 rule is an eligibility requirement only applied to for-profit institutions. It is meant to ensure that at least some students value the education at the for-profit institution enough to be willing to pay for it out of pocket. Also, universities are allowed to bundle together campuses when submitting compliance reports to the Department of Education. Because of the 90/10 rule, for-profit institutions have a strong incentive to bundle campuses together when submitting compliance reports.

Regulations on the Higher Education Industry

The Higher Education Act of 1965, under Title IV, created a number of student aid programs administered by the Department of Education. Title IV aid is awarded to students as grants, loans, or work study programs either directly from the Department of Education or indirectly as campus-based aid from the student's institution. Title IV aid distributed by the college is called campus-based aid. Students are not required to repay grants, but they are required to repay loans with interest.

Title IV grants include Pell grants, Federal Supplemental Education Opportunity (FSEO) grants, Teacher Education Assistance for College and Higher Education (TEACH) grants, and the Iraq/Afghan Service grant.⁴ Title IV loans included Direct Subsidized and Unsubsidized loans, Stafford Subsidized and Unsubsidized loans, Direct PLUS loans to parents or graduate students, and Federal Perkins loans. Perkins loans and FSEO grants are campus-based aid, while the rest of the grant and loan programs fund the student directly. Title IV work study programs are also campus-based aid.

Schools are eligible to receive Title IV aid as long as they meet certain requirements. For a for-profit institution, those requirements include offering programs that prepare students for gainful employment, accreditation by a recognized accrediting

³ It is worth noting that Kane (1995) shows that means tested aid, like Pell grants, may not increase enrollments.

⁴ This grant was created in the 2010–2011 academic year.



agency, operating for at least 2 years, and satisfying the 90/10 constraint. Cellini and Goldin (2014) gather data on Title IV ineligible for-profit institutions. According to them, over half of all for-profit institutions are ineligible for Title IV aid, and Title IV eligible for-profit institutions charge 78 percent more for tuition than Title IV ineligible institutions. Cellini and Goldin are not able to identify whether the higher tuition accounts for higher costs associated with attaining and maintaining eligibility or is used to capture some of the Title IV aid by the for-profit institution. Attaining and maintaining Title IV eligibility possibly increases the costs of operating a for-profit institution, so any change in the eligibility requirements may incentivize for-profit institutions to change their tuition setting or bundling behavior.

The 90/10 Rule

In the Higher Education Amendments of 1992, congress implemented the 85/15 rule to restrict the amount of federal funds for-profit postsecondary institutions could receive. The rule applied only to for-profit institutions and restricts them from earning more than 85 percent of their revenue from federal Title IV student aid. The rule is similar to a rule implemented by the Department of Veterans Affairs (VA), which states that not more than 85 percent of a program's students may receive benefits from the VA.⁵ While these 2 rules are similar, the 85/15 rule in the Higher Education Amendment of 1992 applies to revenue, while the VA's rule applies to the number of students in a program. The 85/15 rule was implemented to ensure federal dollars were going to a reputable program. Legislators thought that if at least fifteen percent of students were willing to pay out of pocket,⁶ then the program is valued enough to support with federal aid.

The Higher Education Amendments of 1998 were more lenient to for-profit institutions, relaxing the 85/15 rule to the 90/10 rule. The 90/10 rule still applies only to for-profit institutions and restricts them from receiving more than 90 percent of their revenue from Title IV federal student aid. If the school violates the 90/10 rule for 1 year, it becomes provisionally certified. If the school is caught violating the 90/10 rule for 2 years in a row, the school loses Title IV eligibility. To regain eligibility, the school has to meet licensing, accreditation, and financial responsibility requirements for 2 years. Eight for-profit institutions have lost Title IV eligibility from 2008 to 2018 due to violating the 90/10 rule.⁷

Calculating the 90/10 revenue percentage is rather complex and allows for-profit institutions to employ various strategies to satisfy the constraint. In general, aid disbursed by the Department of Education is considered Title IV aid, though there are exceptions. The Department of Education disburses both subsidized and unsubsidized loans, but only subsidized loans and a portion of unsubsidized loans count as Title IV aid. Also, federal aid to veterans and active military are not Title IV aid and

⁵ The VA's rule was also implemented in 1992, though the 1952 Korean Conflict GI Bill includes similar language.

⁶ Or each student is willing to pay fifteen percent of the tuition out of pocket.

⁷ See Baird (2021) for more detail about 90/10 violations over this time period.



does not count toward Title IV revenue, incentivizing for-profit institutions to recruit students eligible for veteran and military benefits.⁸ While for-profit institutions have many strategies⁹ to comply with the 90/10 rule, I focus on how changes to the 90/10 rule in 2008 affect campus bundling behavior at for-profit institutions.

For-Profit “Bundling”

Bundling describes how a for-profit institution with many campuses combines different subsets of those campuses. Each subset, or bundle, submits its own financial statements that determine its 90/10 revenue percentage. Each campus at every post-secondary institution that receives Title IV funds is issued a unique numeric identifier called the “unitid” in the Integrated Postsecondary Education Data System (IPEDS) by the National Center for Education Statistics (NCES). Data collected by the NCES are not used to determine regulatory compliance. The Office of Postsecondary Education (OPE)¹⁰ issues a single numeric ID for each entity that receives Title IV funds, called an OPEID, in order to verify institutions are in compliance with Title IV regulations. While the unitid for a campus is tied to a specific geographic location, the OPEID does not necessarily have to be. At non-profit institutions in the IPEDS, each separate campus is associated with a specific OPEID, so the OPEID is tied to a unique geographic location. At for-profit institutions in the IPEDS, separate campuses from across the country can be associated with one OPEID. Institutions can also change which campuses are associated with an OPEID.

In 2008, ITT Tech had 43 different campuses across the USA. These 43 different campuses were split into 22 different bundles. Each of these bundles is associated with just one 90/10 revenue percentage. These bundles are determined by the company that owns ITT Tech, and are unrelated to the geographical proximity of the campuses. For example, one bundle includes campuses located in Washington, Kansas, and North Carolina. Another includes campuses in California, Missouri, and Georgia. Herzing University was considering pairings that included Toledo with Omaha and Akron with Minneapolis, even though Toledo and Akron are geographically closer.

Bundling campuses across states occurs relatively frequently in my data. The universities most frequently engaging in this type of bundling tend to be well known, publicly traded names such as ITT Tech, Everest College, and Brown Mackie College. Other for-profit institutions like the University of Phoenix, Bryant and Stratton College, and National American University bundle all their campuses together instead of dividing them into many smaller bundles. Since the 90/10 revenue percentage associated with a particular bundle of campuses cannot be tied to a specific geographic region, it is impossible to account for local economic and demographic

⁸ The American Rescue Plan Act of 2021 revised the language of the Higher Education Amendments so that all federal aid is included in the 90 percent. This language change removes for-profit institutions’ incentive to target veterans but does not go into effect until 2023.

⁹ These strategies are discussed in “[Endogeneity of the Bundling Decision](#)” section.

¹⁰ The NCES and the OPE are separate organizations within the Department of Education.



conditions and changes without first unbundling the revenue percentages. In Section "[Potential Effect of the HEOA Rule Change](#)", I unbundle for-profit institution's revenue percentages by calculating a revenue percentage for each individual campus.

Recent Regulatory Changes

President Bush signed the Higher Education Opportunity Act of 2008 (HEOA) on August 14th. It reauthorized the Higher Education Act of 1965, which must be renewed every four to six years. The HEOA expired in 2013, though the changes it made remain in place until congress passes a reauthorization bill. As Section 1.1.1 mentioned, the government began imposing accountability measures on for-profit institutions in 1992. The HEOA changed some of those accountability measures, as well as adding new ones.

The HEOA relaxed the 90/10 rule by moving the requirement into the program participation agreement instead of leaving it in the eligibility requirements. As an eligibility requirement, violating the 90/10 rule results in a loss of eligibility in the university's next fiscal year. Moving the rule into the program participation agreement gives for-profit institution a second year to come back into compliance with the 90/10 rule. Moving the language was effective on the date of signing in 2008, but the Code of Federal Regulations (CFR) was not updated until July 1st, 2010. I consider the rule change effective in 2010 though for-profit institutions undoubtedly anticipated the change.

The HEOA also contains changes to the calculation of the 90/10 revenue percentage. Before 2008, loan repayments counted as non-Title IV revenue but not the net present value of the loans. Between 2008 and 2012, the net present value of loans made by the for-profit institutions count as non-Title IV revenue. The calculation change increases the amount of non-Title IV revenue a for-profit institutions receives, effectively decreasing the revenue percentage if the institution does not change its behavior. The institution can accept more Title IV aid but, without a change in the 90/10 violation policy, the institution has no incentive to exceed their revenue percentage before the calculation change by increasing their Title IV revenue. Since the calculation change starts at the beginning of my data and expires near the end, it does not complicate my analysis of the violation rule change that occurs in the middle of my data.

During the Obama administration, the Department of Education worked toward requiring for-profit institutions to prove their students are gainfully employed to maintain Title IV eligibility. While "gainful employment" regulations have existed in the Higher Education Act since 1965, schools have not been required to provide proof that their alumni are gainfully employed. The Department of Education worked toward defining gainful employment using metrics like debt-to-income ratios, loan repayment rates, and completion and job placement rates. The gainful employment rule was originally proposed in July 2010, but a federal judge struck the metrics down in July 2012. The final gainful employment rules were finalized in 2015 (Fountain 2019). Fountain (2019) found that enrollment at for-profit institutions grew more slowly than at non-profit institutions. She attributes this decline



in growth to regulatory uncertainty surrounding gainful employment regulations. While regulatory uncertainty may affect for-profit institutions' behavior, I do not consider this potential effect on for-profit institutions' campus bundling behavior to keep my model tractable.

Bundling Theory

Economists have been studying for-profit postsecondary institutions for about a decade, though the bundling behavior of for-profit institutions has been overlooked. For-profit institutions can respond to regulatory changes by rearranging how their campuses are bundled with approval from the Department of Education, the college's accrediting agency, and state regulators. While these three entities normally approve of the changes, the process is costly and takes time.¹¹ The majority of campuses did not move to a different bundle between 2008 and 2013. Table 1 shows the total number of campuses and the number of campuses that were moved to a different bundle each year by highest degree offered. The most active bundle changing year was 2013 in which for-profit institutions moved just 3.9 percent of campuses to a different bundle. The bundle changing in 2013 was driven by campuses offering 2 year and less than 2-year degrees changing bundles.¹² From 2009 to 2011, campuses offering 4-year degrees comprised the majority of campuses changing bundles. Of the 4-year degree offering campuses, 13.4 percent changed bundles in 2009, 16.3 percent changed bundles in 2010, and 8.13 percent change bundles in 2011. Only 8 of the roughly 3000 campuses in my sample were moved to a different bundle 2 years in a row.

Since for-profit institutions do not move campuses from one bundle to another each year, I construct a model in which for-profit institutions exist for two periods and must choose how their campuses are bundle before the first period begins to simplify this dynamic profit maximization problem. The two period model allows me to compare for-profit bundling behavior when they lose Title IV eligibility after violating the 90/10 rule after 1 year versus when they lose Title IV eligibility after violating the rule 2 years in a row.

The for-profit institutions in the model have the option of opening some number of campuses. Each campus has some Title IV revenue and some non-Title IV revenue. Since I focus on the bundling behavior of for-profit institutions, I abstract away from 90/10 compliance strategies that rely on changing the 90/10 ratio within an individual campus by assuming that the non-Title IV revenue is drawn from a known distribution and is not a random variable. Title IV revenue has a known component but also has a random component, so each institution does not know exactly how much Title IV revenue each campus will earn.

In deciding how to bundle their campuses, for-profit institutions care about the amount of Title IV and non-Title IV revenue each campus receives and the

¹¹ See page 138 of the 2012 Senate HELP Committee report.

¹² The least active year was 2012 when just 0.85 percent of campuses were moved to a different bundle.



Table 1 Number of campuses that changed bundles from 2009 to 2013 by sector

Year	All sectors		Four-year degrees		Two-year degrees		<Two-year degrees	
	Total	Change	Total	Change	Total	Change	Total	Change
2009	2731	82	537	72	882	7	1312	3
2010	2952	115	620	101	931	12	1401	2
2011	3131	105	701	57	966	29	1464	19
2012	3191	27	732	6	948	17	1511	4
2013	3160	124	733	7	931	41	1496	76

Sector is determined by the highest degree offered at a campus. Some for-profit institutions operate in multiple sectors. I am unable to determine whether a campus changed bundles from 2007 to 2008 since my data begin in 2008

resulting 90/10 percentage of the possible pairings. For-profit institutions can also choose to open or close some campuses. In my model, for-profit institutions have the option of opening a set number of campuses, though they do not have to open all of the possible campuses. The option of not opening all campuses simulates for-profit institutions' option of opening or closing campuses after the 90/10 violation rule changes.

The model does not have a closed-form solution. Therefore, I simulate the model in order to compare a change from the 1-year violation regime to the 2-year violation regime. The results are discussed in "[Simulation Results](#)".

Theoretical Model

Assume there is one for-profit institution with n campuses. All campuses are the same size and generate the same revenue. They only differ in the percentage of revenue derived from Title IV aid. There are two time periods, $t = \{1, 2\}$. Before the start of these two periods, the institution chooses its set of bundles. During these periods, the institution cannot change the configuration of the bundle set.

Each campus, i , has an associated average Title IV revenue percentage, $\rho_{i,t}$. The revenue percentage, $\rho_{i,t}$, is determined by three components: Title IV revenue, which has a fixed and a random component, and non-Title IV revenue.

Title IV revenue has a known, time-invariant, component, μ_i , and an unknown, time varying, random component, $\epsilon_{i,t}$, so that $TIV_{i,t} = \mu_i + \epsilon_{i,t}$, where $TIV_{i,t}$ is Title IV revenue at campus i in time t . The unknown component follows a mean zero bivariate normal distribution with covariance matrix Σ . Non-Title IV revenue is a known, campus-specific, time-invariant constant, η_i . The revenue percentage takes the form:

$$\rho_{i,t} = \frac{\mu_i + \epsilon_{i,t}}{\eta_i + \mu_i + \epsilon_{i,t}} \tag{1}$$

Note that the revenue percentage can be rearranged so that:



$$\frac{\rho_i}{1 - \rho_i} = \frac{\mu_i + \epsilon_{i,t}}{\eta_i} \quad (2)$$

The revenue percentage must be below a certain percentage, δ ; otherwise, the campus violates the δ rule and must shut down. Two possible versions of the rule exist. Under the 1-year rule, the institution must keep every campus below the δ revenue percentage *each* period. Under the 2-year rule, the institution must keep every campus below the δ revenue percentage *for at least one* period.

Under the 1-year rule, the institution is interested in the probability that a particular campus does not violate the δ rule in both periods:

$$\begin{aligned} Pr(\rho_{i,1} < \delta \cap \rho_{i,2} < \delta) &= Pr\left(\frac{\mu_i + \epsilon_{i,t}}{\eta_i + \mu_i + \epsilon_{i,t}} < \delta \cap \frac{\mu_i + \epsilon_{i,t}}{\eta_i + \mu_i + \epsilon_{i,t}} < \delta\right) \\ &= Pr\left(\epsilon_{i,1} < \frac{\delta\eta_i}{1 - \delta} - \mu_i \cap \epsilon_{i,2} < \frac{\delta\eta_i}{1 - \delta} - \mu_i\right) \quad (3) \\ &= \int_{-\infty}^{\frac{\delta\eta_i}{1-\delta} - \mu_i} \int_{-\infty}^{\frac{\delta\eta_i}{1-\delta} - \mu_i} \phi_i(\epsilon_{i,1}, \epsilon_{i,2}) d\epsilon_{i,1} d\epsilon_{i,2} \end{aligned}$$

Here, $\phi_i(\cdot)$ is the bivariate normal probability density function for campus i . Under the 2-year rule, the institution is interested in the probability that a particular campus does not violate the δ rule in at least one of the periods:

$$\begin{aligned} Pr(\rho_{i,1} < \delta \cup \rho_{i,2} < \delta) &= Pr\left(\frac{\mu_i + \epsilon_{i,t}}{\eta_i + \mu_i + \epsilon_{i,t}} < \delta \cup \frac{\mu_i + \epsilon_{i,t}}{\eta_i + \mu_i + \epsilon_{i,t}} < \delta\right) \\ &= Pr\left(\epsilon_{i,1} < \frac{\delta\eta_i}{1 - \delta} - \mu_i \cup \epsilon_{i,2} < \frac{\delta\eta_i}{1 - \delta} - \mu_i\right) \quad (4) \\ &= \int_{-\infty}^{\frac{\delta\eta_i}{1-\delta} - \mu_i} \int_{-\infty}^{\frac{\delta\eta_i}{1-\delta} - \mu_i} \phi_i(\epsilon_{i,1}, \epsilon_{i,2}) d\epsilon_{i,1} d\epsilon_{i,2} \\ &\quad + 2 \int_{-\infty}^{\frac{\delta\eta_i}{1-\delta} - \mu_i} \int_{-\infty}^{\frac{\delta\eta_i}{1-\delta} - \mu_i} \phi_i(\epsilon_{i,1}, \epsilon_{i,2}) d\epsilon_{i,1} d\epsilon_{i,2} \end{aligned}$$

Fig. 1 shows the different regions the integrals in Eqs. 3 and 4 cover. Since these regions do not depend on the distribution, the random Title IV time shocks do not need to be independent and I can allow for correlation over time, though I do not to simplify the simulation. The 1-year rule covers only region A in Fig. 1. The 2-year rule expands the coverage to region A + B + D. Since the area under $\phi_i(\epsilon_{i,1}, \epsilon_{i,2})$ expands, campuses have a higher probability of satisfying the revenue constraint under the 2-year rule than the 1-year rule.

Suppose the institution combines the campuses into bundles with N being the set of all bundles and $|N| \leq n$. There are a number of ways to aggregate campuses. I sum the Title IV and non-Title IV revenues separately to account for size differences across campuses. Consider a bundle $J \subseteq N$ that has $|J| > 1$. Using Eq. 2, note that:



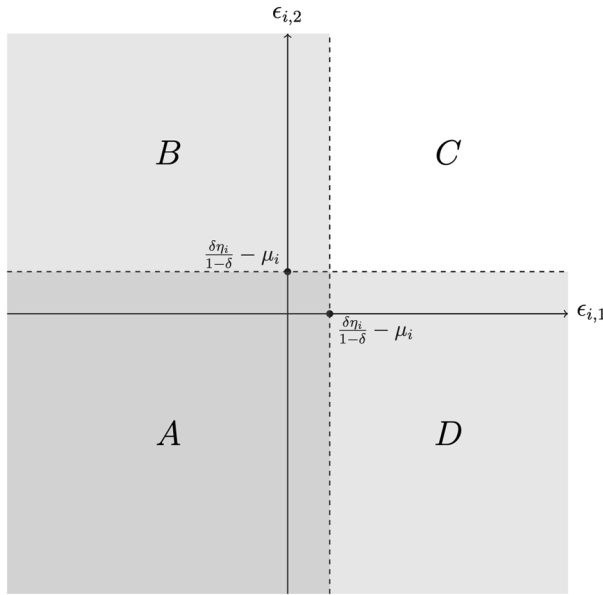


Fig. 1 Probability areas for the distribution of $\epsilon_{i_1}, \epsilon_{i_2}$. Notes: Under the 1-year violation rule, the institution must get draws of ϵ_{i_1} and ϵ_{i_2} from area A. Under the 1-year violation rule, the institution can get draws of ϵ_{i_1} and ϵ_{i_2} from areas A, B, and D. 2 draws from area C

$$\begin{aligned} \frac{\rho_J}{1 - \rho_J} &= \frac{\sum_{\forall j \in J} (\mu_j + \epsilon_j)}{\sum_{\forall j \in J} \eta_j} \\ &= \frac{\sum_{\forall j \in J} \mu_j}{\sum_{\forall j \in J} \eta_j} + \frac{\sum_{\forall j \in J} \epsilon_j}{\sum_{\forall j \in J} \eta_j} \end{aligned}$$

and that

$$\sigma_J = \frac{\sum_{\forall j \in J} \sigma_j^2}{(\sum_{\forall j \in J} \eta_j)^2}$$

which assumes ϵ_j are independent $\forall j$. Therefore, we get:

$$\epsilon_J \sim N(0, \sigma_J)$$

Also, note that $\sigma_J^2 \leq \sigma_j^2$ for all $j \in J$ so

$$1 - \Phi_J\left(\frac{\delta\eta_J}{1 - \delta} - \mu_J\right) \leq 1 - \Phi_j\left(\frac{\delta\eta_j}{1 - \delta} - \mu_j\right) \quad \forall j \in J$$

Here, Φ is the cumulative distribution function associated with Eqs. 3 and 4. An institution decreases their probability of violating the revenue percentage rule by bundling their campuses together.



Assuming that ϵ_j are independent $\forall j$ simplifies calculating the variance of a bundle's revenue percentage. It is also a reasonable assumption to make. Bundles can, and do, include campuses from many different states. While shocks to the national economy may affect revenue percentages of all campuses, regional shocks may differ because the universities are located hundreds or thousands of miles apart. If regional shocks are relatively uncorrelated, my model does not lose anything by assuming independence across shocks to different campuses.

Every campus in the institution earns a revenue of $\mu_i + \epsilon_i + \eta_i$ and incurs a cost of c_i while it is operating. The realized profit for each campus is $\pi_i = \mu_i + \epsilon_i + \eta_i - c_i$. If an institution violates the rule, the institution does not earn any profit. The expected profit of a single campus is $\Pi_i = \Phi_i(\frac{\delta\eta_i}{1-\delta} - \mu_i)(\mu_i + \eta_i - c_i)$. The expected profit of a bundle, J , is $\Pi_J = \Phi_J(\frac{\delta\eta_J}{1-\delta} - \mu_J) \sum_{j=1}^{|J|} (\mu_j + \eta_j - c_j)$ where j denotes an individual campus in the bundle. The expected profit for the institution is the sum of the expected profits of each bundle, or

$$\Pi = \sum_{J=1}^{|N|} \Pi_J = \sum_{J=1}^{|N|} \Phi_J \left(\frac{\delta\eta_J}{1-\delta} - \mu_J \right) \left(\sum_{j=1}^{|J|} (\mu_j + \eta_j - c_j) - C_{|J|} \right)$$

Here, I use $C_{|J|}$ to denote the administrative cost to operating $|J|$ number of bundles.

The institution's problem is:

$$\max_N \sum_{J=1}^{|N|} \Pi_J \quad (5)$$

Each university must:

1. Choose how many campuses to open
2. Choose the set of bundles, conditioning on which campuses it decides to open

when maximizing profits.

If the institution bundles all their campuses together, their probability of violating the revenue percentage is minimized. But if they do violate the revenue percentage, the entire institution is shut down and they lose their entire profit. On the other hand, if they do not bundle, each campus has higher chance of violating the rule but only that campus loses its profit if it violates the rule.

Simulating the Theory

There is no analytical solution to Eq. 5. I report the distribution of choices from simulated universities. To fix ideas about the simulation, consider a university that has the option of opening two campuses. The possible sets of campuses the university can open are:



$$\begin{aligned}
 1 &: \{\emptyset\} \\
 2 &: \{1\} \qquad 3 : \{2\} \\
 4 &: \{1\}, \{2\} \quad 5 : \{1, 2\}
 \end{aligned}$$

Even though the university can open two campuses, it may choose not to if the expected profit for that combination is less than zero. If the university does choose to open two campuses, it then needs to choose whether it should open the campuses as two separate bundles or to bundle the two campuses together. Depending on the expected average Title IV revenue percentage is for each campus, different universities will choose different sets of bundles even if they are opening the same number of campuses.

To illustrate the effect of the rule change, I simulate 10,000 universities. While there are not 10,000 for-profit universities, simulating many universities approximates the true distribution of university entry and bundling decisions for the chosen parameters. Each university has the option of opening four campuses, which means there are 52 possible sets of bundles, including the empty set (non-entry in the market).¹³ The campus parameters are:

$$\begin{aligned}
 \delta &= \{0.85, 0.9\} \\
 \mu_i &\sim N(120,000, 30,000^2) \\
 \eta_i &\sim N(16,000, 4000^2) \\
 \sigma_i^2 &= 100,000 \\
 c_i &= \mu_i + \eta_i + \zeta_i \\
 \zeta_i &\sim N(-1000, 1000^2)
 \end{aligned}$$

These parameters are chosen to illustrate the effect of the rule change and are not calibrated to the data. Under these parameters, the average Title IV revenue percentage using these values is about 88.2. Figure 2 shows the simulated distribution of expected Title IV revenue percentages for one campus at each university. The true distribution in Fig. 2 is not known. The average revenue percentage in Fig. 2 is higher than the average revenue percentage in the data because the revenue percentages in the data are observed after for-profit institutions have worked to comply with the revenue constraint. I assume the true campus revenue percentage distribution has a higher mean than observed, since otherwise there would be no need to bundle to comply with the revenue constraint. The simulation illustrates one possible mechanism to explain the observed change in for-profit institution’s bundling behavior.

The cost parameter, c_i , determines entry into the market. If the cost is set sufficiently low by giving ζ_i a low mean, every university will choose to open all four campuses. The administrative cost, $C_{|J|}$, is an additive combination of the costs of each campus in the bundle. For example, if there are three campuses with costs c_1 , c_2 , and c_3 and each campus is its own bundle J with a Φ_J probability of not violating

¹³ I limit the number of campuses a university can open to 4 to keep the simulation tractable. Allowing universities to open a fifth campuses increases the possible sets of bundles to 233.



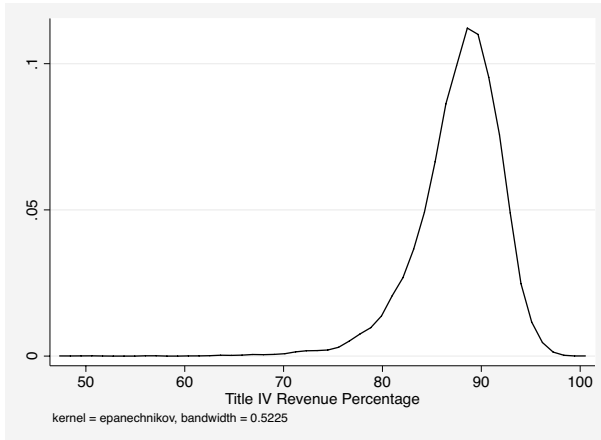


Fig. 2 Simulated Title IV revenue percentages for 100,000 campuses Notes: The distribution above is for one campus from each university. There are 400,000 possible campuses. The revenue percentage distribution is the same for the other campuses in each university

the revenue constraint, then $C_{|J|} = c_1\Phi_1 + c_2\Phi_2 + c_3\Phi_3$. If campuses 1 and 2 are bundled together and campus 3 is its own bundle, then $C_{|J|} = (c_1 + c_2)\Phi_1 + c_3\Phi_2$.¹⁴ If all three campuses are bundled together, then $C_{|J|} = 0$ since I assume there is no extra administrative cost to running only one bundle.

Violating the revenue constraint at a campus causes the university to lose the campus, and the profit associated with that campus. Suppose a university has two campuses, campus 1 and campus 2. Suppose campus 1 has a revenue percentage of 92 percent the first year and 88 percent the second year, and campus 2 has a revenue percentage of 88 both years. Under both the 1-year rule and the 2-year rule, campus 2 is below the 90 percent constraint and the university earns all profits associated with campus 2. On the other hand, campus 1 violates the constraint in the first year. Under the 1-year rule, campus 1 shuts down and the university only profits from campus 2. On the other hand, campus 1 does not violate the constraint in the second year. Under the 2-year rule, the university profits from campus 1 and campus 2.

Simulation Results

In Table 2, I report the results of the simulation in four different regulatory environments. The first environment is a 1-year violation rule versus a 2-year violation rule. The second environment is a 90 percent upper limit for Title IV revenue versus an 85 percent upper limit for Title IV revenue. Columns one and two show the results under the 85/15 rule for the one- and two-year violation rules. Columns three and four show the results under the 90/10 rule for the one- and 2-year violation rules. I use the same set of simulated campuses for all regulatory environments.

¹⁴ Here, campuses 1 and 2 are in bundle 1 and campus 3 is in bundle 2 since there are only two bundles.



Table 2 Simulation results for different Title IV revenue constraint violation rules

	85/15 Rule		90/10 Rule	
	1 Yr	2 Yr	1 Yr	2 Yr
	(1)	(2)	(3)	(4)
All bundles				
Avg bundle size	2.41	2.91	3.21	3.38
Δ Avg bundle size	0.5		0.17	
Avg revenue percentage	86.4	87.3	87.3	87.9
Δ Avg revenue percentage	0.9		0.6	
Bundles with at least two campuses				
Avg bundle size	2.43	2.91	3.22	3.38
Δ Avg bundle size	0.48		0.16	
Avg revenue percentage	86.4	87.3	87.3	87.9
Δ Avg revenue percentage	0.9		0.6	
Avg university profit	1286	4659	4246	7535
Δ Avg university profit	3373		3289	

I report the average size of a bundle, the average revenue percentage, and the average university profit in Table 2. Under both the 90/10 constraint and the 85/15 constraint, the average bundle size increases under the 2-year violation rule due to a lower probability of violating the rule and a lower administrative cost. The average revenue percentage in the simulations is higher under the 2-year violation rule regardless of whether universities are constrained by the 85/15 rule or the 90/10 rule.

Comparing the bundle size and average revenue percentages between the 90/10 simulation and the 85/15 simulation, universities under the 85/15 rule are more cautious. They do not open as many high revenue percentage campuses as they would under the 90/10 constraint, which decreases the size of the average bundle.

I also calculate average university profit in Table 2. In the simulations, I find that universities are more profitable under the 90/10 constraint than the 85/15 constraint. I also find that, under both constraints, universities are more profitable under the 2-year violation rule than the 1-year violation rule.

Since the HEOA occurs while the 90/10 rule is in effect, I focus on the results under the 90/10 rule. For the 90/10 rule, expected profits and bundle sizes are both higher under the two-year violation rule. My model and simulation suggest that after switching to the 2-year rule, I should observe larger bundle sizes and each institution should have fewer bundles. I test these predictions in Section "[Potential Effect of the HEOA Rule Change](#)".

The model takes the amount of revenue each campus earns as exogenous. In reality, for-profit universities may manipulate their recruiting or advertising to change their average revenue percentage. Since the probability of violating the rule is smaller under the 2-year rule, universities have an incentive to increase the average amount of Title IV funds received at each campus or engage in activities that could increase the variance of Title IV funds received by each campus over time.



Since for-profit institutions have multiple ways to respond to a change from a one-year violation rule to a 2-year violation rule and the rule change affects all for-profit institutions simultaneously, identifying the causal effect of the rule change on an institution's bundle composition is challenging. In Section "[Empirical Results on Bundling](#)", I discuss these challenges.

Endogeneity of the Bundling Decision

The estimated changes in bundle sizes may be endogenous. The endogeneity arises from two main categories. First, for-profit institutions use multiple strategies to comply with the 90/10 constraint. Without controlling for compliance strategies other than bundling, the estimates are only suggestive. Second, the higher education industry faced regulatory changes aside from the change in the 90/10 rule enforcement as well as changing economic conditions between 2008 and 2013. Without a suitable control group for for-profit institutions, identifying the causal effect of the HEOA on bundling is not possible.

Multiple Compliance Strategies

For-profit institutions use many strategies to comply with the 90/10 rule which complicates identifying the effect of the enforcement change in the 90/10 rule on bundling behavior. As one Herzing University executive wrote, "90/10 is a multi-front battle, like cancer - we won't find one single solution other than abolition."¹⁵ For-profit institutions can change the way their campuses are bundled, stop disbursing Title IV funds to a bundle of campuses, require students to pay up front in cash, increase tuition, make it difficult for students to receive living expense stipends, pursue students who are veterans or active military who have access to GI Bill educational funds,¹⁶ and convert to non-profit status if the situation becomes dire.¹⁷

Ideally, all strategies to comply with the 90/10 rule, other than changing campus bundles, would be held constant when estimating the causal effect of relaxing the enforcement of the 90/10 rule on for-profit bundling behavior. I do not have data on when Title IV funds are disbursed, requirements for students to pay in cash up front, or whether campuses are deterring students from receiving living expense stipends though relaxing the 90/10 rule provides less of an incentive for using these strategies. Since I do not have data on these strategies, I cannot control for them. I do have data on students using GI Bill educational funds to finance at least part of their education. While the number of students at for-profit institutions using GI

¹⁵ The 2012 Senate HELP committee report relied on many different sources for information including emails written by Herzing University employees.

¹⁶ See Kofoed (2020) for a more detailed discussion of this incentive.

¹⁷ There was also a period from 2008 to 2012 during which 50 percent of the value of institutional loans counted as non-Title IV revenue that were made during that fiscal year, instead of only the cash repayments made during that fiscal year counted as non-Title IV revenue.



Bill educational funds increased from 2008 to 2012, relaxing the rule decreases the incentive for for-profit institutions to actively recruit these students.

There is mixed evidence of for-profit institutions increasing tuition as a 90/10 compliance strategy. Ward (2019) finds little evidence that violating the 90/10 rule is associated with an increase in tuition the next year, but Baird et al. (2020) find for-profit institutions increase tuition in response to an increase in GI Bill educational assistance in 2010. Since GI Bill funds are not Title IV funds, for-profit institutions may have increased tuition in 2010 to substitute veteran students for non-veteran students in order to comply with the 90/10 rule.

For-profit institutions may also convert to non-profit status. From 2017 to 2021, fourteen for-profit institutions have applied for non-profit status at the Department of Education. Eleven of those for-profit to non-profit conversions were granted. While possible, converting to non-profit status is not always granted and few for-profit institutions use this strategy.

Relaxing enforcement reduces for-profit institutions' need to rely on the previously mentioned strategies, but this relaxation does not *remove* their need to rely on those strategies. Since each of these strategies is used by for-profit universities simultaneously and the 90/10 rule applies to all for-profit institutions on which I have data, my estimates of bundle size before and after the rule change cannot be considered causal.

Changes in Regulatory and Economic Conditions

Identifying the causal effect of relaxing enforcement of the 90/10 rule is also confounded by other regulatory changes and economic changes occurring simultaneously. Fountain (2019) argues that public discussion of gainful employment regulations beginning in 2010, which created uncertainty about the requirements and implementation of these regulations, slowed the growth of enrollment at for-profit institutions relative to public and non-profit institutions. In addition to the gainful employment regulations, for-profit institutions were once again banned from compensating employees based on recruitment and changes to program approval requirements were implemented in 2010.¹⁸ Since these changes occurred in 2010, disentangling their effect from the relaxation of the 90/10 rule enforcement on for-profit institutions' bundling behavior requires a suitable control group for for-profit institutions.

Fountain uses a difference-in-difference methodology to estimate causal effects of regulatory changes at for-profit institutions. Non-profit and public institutions are the control group used to estimate the causal effect of regulatory uncertainty on for-profit institutions' enrollment growth. Non-profit and public institutions are a suitable control group for for-profit institutions since they provide similar services and enrollment varies over time at all three categories. Using non-profit and public

¹⁸ For-profit institutions were banned from compensating employees based on recruitment in 1992. This "incentive compensation" ban was effectively removed in 2002 and reinstated in 2010. For a complete list of regulatory changes in 2010, see footnote 605 on page 135 of the 2012 Senate HELP report.



institutions as a control group to estimate a causal effect of the 90/10 rule on for-profit institutions' bundling behavior is not viable since non-profit and public institutions do not bundle campuses under the same OPEID. Bundle size only varies over time at for-profit institutions.

Between 2008 and 2014, the US economy experienced a recession with a tepid recovery.¹⁹ More students rely on Title IV funds to help pay tuition since incomes likely decrease during a recession. Since skill acquisition is countercyclical,²⁰ students may rely more on Title IV funds to pay for higher education during and after a recession. Students' increased reliance on Title IV aid could cause for-profit institutions to see an overall increase in their 90/10 ratios. Figure 3 shows the distribution of actual revenue percentages by year, which shows an increase in 90/10 ratios. Instead of detecting a response to the government relaxing 90/10 rule enforcement, for-profit institutions may be altering their bundling behavior in response to economic conditions.

Empirical Results on Bundling

To test the predictions implied by my theory, I need data on revenue percentages for every for-profit campus before and after the rule change in 2010. Since campus-specific data on Title IV revenue applied only to tuition and education-related expenses do not exist, unbundling requires constructing an alternative measure of the 90/10 revenue percentage. The Office of Postsecondary Education (OPE) within the Department of Education collects the 90/10 revenue percentage data which is used to enforce the regulations. The OPEID, issued by the OPE to each entity that receives Title IV funds, is assigned to each campus within a bundle. The Institute of Education Sciences (IES) operates the National Center for Education Statistics (NCES), which produces the Integrated Postsecondary Education Data System (IPEDS).²¹ The IPEDS data are not used to enforce compliance with the 90/10 rule or any other regulation and assigns each individual campus a unique identifier called a "unitid." Using the OPEID and the unitid, which are both included in the IPEDS data, I create both campus-specific and bundle-specific proxy revenue percentages. I compare my measures to the actual revenue percentage data produced by the OPE and downloaded from studentaid.ed.gov.

The IPEDS includes all postsecondary schools that accept Title IV aid and is reported for each separate campus within an institution. Institutions that are ineligible for Title IV funds are not included in my data and would make a poor control group since they are not required to submit compliance reports to the Department of

¹⁹ See Fernald et al. (2017) for more detail.

²⁰ See DeJong and Ingram (2001), Sakellaris and Spilimbergo (2000), and Dellas and Koubi (2003) for more detail.

²¹ The OPE operates under the supervision of the Office of the Undersecretary of Education. The IES operates under the supervision of the Secretary of Education. The OPE and the IES are separate organizations within the Department of Education and collect data on postsecondary institutions for different purposes.



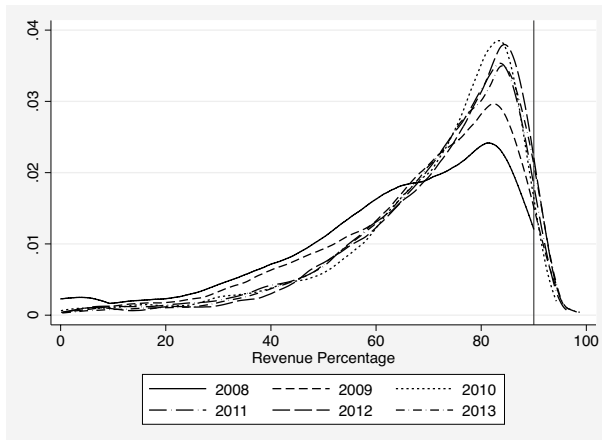


Fig. 3 Actual 90/10 revenue percentage distributions in for-profit universities by year Notes: The vertical line is at the 90 percent cutoff

Education. Gilpin et al. (2015) note that the current for-profit higher education literature focuses on 2-year schools that mainly grant associates degrees. Since the 90/10 rule applies to all for-profit institutions, I include four-year, 2-year, and less than 2-year schools in my analysis. Some for-profit institutions include different types of schools in the same bundle, so excluding any type of for-profit institution could bias my results. Though I observe each campus' revenues, expenditures, and enrollments, I do not observe to which institution each campus belongs. Ownership of for-profit campuses matters because my theory predicts a for-profit institution will open fewer campuses and increase the size of the bundle. Since I do not observe ownership, I can only test whether bundle size increases.

The reported revenue percentage is taken from the EZ-Audit system through which universities report their financial data to the Office of Postsecondary Education to ensure regulatory compliance. The Institute for Education Sciences (IES), which is the institute that collects the IPEDS, is entirely separate from the Office of Postsecondary Education (OPE) within the Department of Education, though they collect similar data. The OPE has released the 90/10 revenue percentages on the studentaid.ed.gov site from the 2007–2008 academic year to the 2012 to 2013 academic year. The OPE only reports revenue percentages for each bundle, not each campus within the bundle. So to estimate a revenue percentage for each campus, I merge the IPEDS data with the revenue percentage data.

Methodology

Ideally, I would take the total amount of Title IV aid each for-profit campus receives and divide it by its tuition and fee revenue. The IPEDS does not include each campus' total Title IV revenue, but it does contain components of Title IV revenue such as total Pell grants. I use Pell grant revenue as a proxy for Title IV aid because it is the largest Title IV grant program and is positively correlated with the total amount of Title IV



funds an institution receives. The IPEDS does not contain data on total Title IV aid revenue or even Title IV subsidized government loans.

In the IPEDS, there are unique identifiers for both campuses and bundles. Using the campus level data, I construct my revenue percentage proxy, \widehat{revpct} , at both the campus level and the bundle level. Since Pell grants are only a portion of the Title IV revenue a institution receives, \widehat{revpct} is generally much lower than the observed 90/10 revenue percentages, and so it is not directly comparable to the actual revenue percentage. Understanding the effect of unbundling for-profit institutions requires a measure of an unbundled 90/10 percentage that is directly comparable to the bundled revenue percentage.

To unbundle the revenue percentage to the campus level, I estimate a revenue percentage, $\widehat{revpct}_{t,i}$ for each campus, i , using $\widehat{revpct}_{t,i}$. To do this, I first estimate the equation:

$$revpct_j = \alpha_0 + \sum_{l=1}^4 \alpha_l \widehat{revpct}_{t,j}^l + \gamma_{1,j} + \gamma_{2,j} \cdot I(year \geq 2010) + \varphi_{t,j} \quad (6)$$

where $\gamma_{1,j}$ and $\gamma_{2,j}$ are bundle fixed effects for before 2010 and after 2010, respectively. The indicator function $I(year \geq 2010)$ is one when the year is 2010 or later and zero otherwise. Equation 6 is estimated at the bundle level. Here, $revpct_j$ is the observed revenue percentage for each bundle and $\widehat{revpct}_{t,j}$ is the 90/10 percentage proxy calculated for each bundle. I fit Eq. 6 using a quartic in \widehat{revpct}_b to capture any possible nonlinearities in the relationship between the proxy and the actual value. I predict $\widehat{revpct}_{t,i}$ using the equation:

$$\widehat{revpct}_{t,i} = \hat{\alpha}_0 + \sum_{l=1}^4 \hat{\alpha}_l \widehat{revpct}_{t,i}^l + \hat{\gamma}_{1,j} + \hat{\gamma}_{2,j} \cdot I(year \geq 2010) \quad (7)$$

Equation 7 predicts revenue percentages for each campus allowing the bundle composition to change with the rule change. The predicted campus revenue percentages are deviations from that campus's bundles' average revenue percentage. The direction of the deviation is determined by the magnitude of the proxy, $\widehat{revpct}_{t,i}$.

I check Eq. 6's fit by predicting bundle level revenue percentages using the equation:

$$\widehat{revpct}_{t,j} = \hat{\alpha}_0 + \sum_{l=1}^4 \hat{\alpha}_l \widehat{revpct}_{t,j}^l + \hat{\gamma}_{1,j} + \hat{\gamma}_{2,j} \cdot I(year \geq 2010) \quad (8)$$

Note that Eq. 7 is calculated using the campus level proxy, while Eq. 8 is calculated using the bundle level proxy. The distributions of the actual revenue percentages and the two predicted revenue percentages from Eqs. 7 and 8 are shown in Fig. 4 along with the distribution of true revenue percentages. The predicted revenue percentages for the bundles follow the actual revenue percentages pretty closely. Equation 6's R^2 is 0.85, so much of the variation in the actual revenue percentages is explained. The main difference is that at revenue percentages above 60, the predicted percentages are shifted away from the actual percentages. Overall, the model fits the data well.



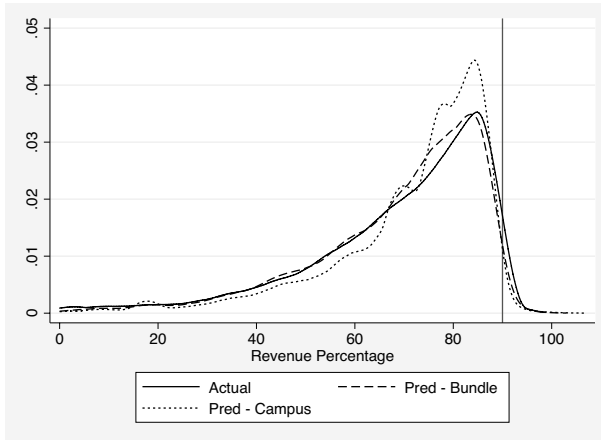


Fig. 4 Estimated and actual 90/10 revenue percentage distributions in for-profit universities Notes: The vertical line is at the 90 percent cutoff

Bundle Size

My theoretical model predicts that switching from a 1-year to a 2-year 90/10 violation rule will incentivize for-profit institutions to bundle more of their campuses together. Column 4 of Table 3 shows the average bundle size of for-profit campuses that were included in a bundle from 2008 to 2013. During the six years in my sample, the average bundle size has monotonically increased from 3.57 in 2008 to 4.86 in 2013. The increase in average bundle size is consistent with the model’s simulations.

While the increase in bundle size has been relatively steady throughout my sample as opposed to one large increase in 2010, the increase still provides support for my theory. Since the violation rule change in the HEOA was effective the day it was signed in August of 2008, for-profit institutions were anticipating the rules change in the CFR in 2010. The 2-year lag between the date of the

Table 3 Campus and bundle summary statistics and predicted revenue percentages

Year	Campuses (1)	Bundles (2)	Size>2 (3)	Avg Size (4)	Avg revpctj (5)	Avg Pr(revpctj) (6)
2008	2645	1969	263	3.57	63	65.6
2009	2731	2013	268	3.68	67.5	65.9
2010	2952	2094	274	4.13	70.6	72.1
2011	3131	2136	316	4.15	70.3	71.2
2012	3191	2149	326	4.2	71.9	70.6
2013	3160	2059	285	4.86	71.4	69.7

Columns 1, 2, and 3 show the total number of campuses, bundles of campuses, and bundles with a size greater than one campus. Column 4 shows the average size of a bundle if that bundle contains at least 2 campuses. Columns 5 and 6 compare the average revenue percentage observed in the data and the average predicted revenue percentage across bundles



signing of the reauthorization to the CFR update allowed for-profit institutions time to adjust to the policy change. So I observe a steady increase in bundle size as opposed to one large increase.

Rule Violations

Table 4 shows the predicted number of campuses and bundles violating the 90/10 rule. The rise in revenue percentages causes an increase in the number of potential 90/10 rule violations. Using the estimated revenue percentages for the bundles, I find that the number of 1-year violations at the bundle level increased after 2010 in column 1 of Table 4, reflecting an increase in the revenue percentages. Two-year violations shown in column 2 of Table 4 increased in 2011, since it takes an extra year after the policy change to violate this rule.

Columns 3 and 4 in Table 4 show the number of campuses violating the one and 2-year 90/10 rules. Unbundling the campuses approximately doubles the number of 1-year violators after 2010, though the number of 2-year violators remains roughly the same. I predict many more campuses violating the 1-year rule before 2010, when the 1-year rule was in effect, than after 2010. Column 5 in Table 4 shows that most of these violations occur in campuses that are bundled with other campuses. For 2-year rule violators, before 2010 most of the violations were at campuses that were bundled. Afterward, bundled campuses were less likely to violate the 2-year rule.

By allowing for-profit institutions to bundle campuses together when submitting regulatory compliance reports, the Department of Education is decreasing the effectiveness of the 90/10 rule. More campuses would lose eligibility if for-profit institutions were forced to unbundle.

Table 4 Campus and bundle 90/10 rule violations

	Bundled		Unbundled		In a Bundle	
	1 Year	2 Year	1 Year	2 Year	1 Year	2 Year
	≥90	≥90	≥90	≥90	≥90	≥90
	(1)	(2)	(3)	(4)	(5)	(6)
2008	11		86		76	
2009	17	3	67	32	51	31
2010	32	5	81	42	52	38
2011	33	16	50	17	21	3
2012	28	15	35	16	8	2
2013	19	8	21	8	3	0

I use predicted revenue percentages for all violation calculations. Columns 1 and 2 show the total number of bundles violating the 90/10 rule. Columns 3 and 4 show the total number of campuses violating the 90/10 rule. Columns 5 and 6 show the total number of the unbundled campuses that violate the 90/10 rule and are also bundled with at least one other campus



Potential Effect of the HEOA Rule Change

Though my theoretical model does not address the change in Title IV revenue for-profit institutions accept, the change in the 90/10 violation rules does offer an incentive to for-profit institutions to increase Title IV revenue. I estimate the effect of the rule change in the HEOA on the amount of Title IV funds directed to for-profit institutions. After estimating Eq. 6 and predicting revenue percentages for each campus in Eq. 7, I predict revenue percentages holding bundle fixed effects constant before 2010 using the equation:

$$\widehat{revpct}'_{t,i} = \hat{\alpha}_0 + \sum_{l=1}^4 \hat{\alpha}_l \widehat{revpct}'_{t,i} + \hat{\gamma}_{1,j} \tag{9}$$

The difference between Eq. 7 and Eq. 9 is that I force $I(year \geq 2010)$ equal to zero for the entire sample in Eq. 9. The predicted revenue percentages from Eq. 9 are the campus revenue percentages we would have observed if the rule had not changed. This requires that I assume $\hat{\gamma}_{2,j}$ captures only the effect of the change from a 1-year to a 2-year rule violation. The HEOA also changed the way for-profit institutions calculate their 90/10 revenue percentages, allowing for-profit institutions to count additional revenues as non-Title IV. These changes were also implemented in 2010 and would cause revenue percentages to decrease if universities do not change in response. If universities respond to the revenue percentage calculation change, they would have no incentive to increase revenue percentages above what they were under the 1-year violation rule.

Figure 5 shows the distribution of the predicted campus revenue percentages with the rule change, $\widehat{revpct}_{t,i}$, versus the distribution of the predicted campus revenue percentage without the rule change, $\widehat{revpct}'_{t,i}$. With the rule change, campus revenue percentages tend to cluster just below the 90 percent cutoff, which mirrors the actual

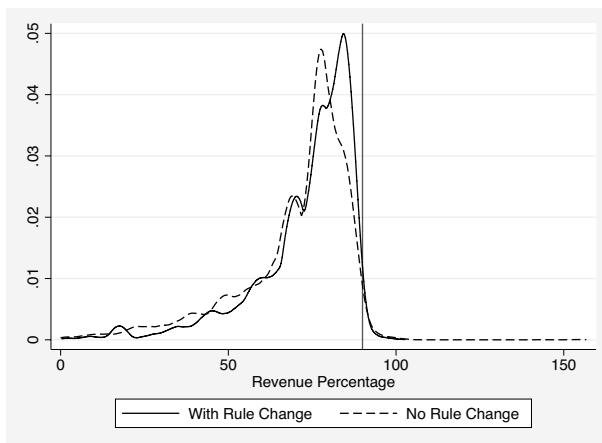


Fig. 5 Estimated 90/10 revenue percentage distributions in for-profit universities after 2010 Notes: The vertical line is at the 90 percent cutoff



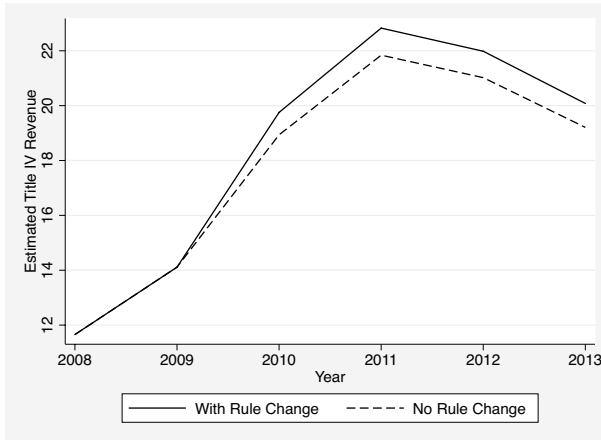


Fig. 6 Estimated Title IV revenue for-profit universities accept with and without the rule change Notes: The solid line is the observed estimated Title IV revenue. The dashed line is the estimated Title IV revenue without the switch to the 2-year violation rule. The difference between the solid and dashed lines is roughly 0.9 billion dollars. I estimate for-profit universities receive about 4.5 percent more Title IV aid in revenue due to the rule change

revenue percentage distribution. Without the rule change, the revenue percentage distribution shifted away from the 90 percent cutoff. The switch to the 2-year violation rule allows for-profit institutions to accept more Title IV revenue than they previously had, incentivizing campuses to increase their revenue percentages or universities to open new campuses in areas that are accessible to lower income students.

I calculate the estimated amount of Title IV revenue at each campus by multiplying the estimated revenue percentage and the total tuition and fee revenue. I then sum the estimated Title IV revenue across for-profit campuses for each year. Figure 6 shows the estimated Title IV revenue for-profit institutions accept with the rule change and without the rule change. I only include campuses that are in my sample for all six years when calculating the estimated revenue percentages. I find that the rule change can account for roughly 0.9 billion extra dollars in Title IV aid going to for-profit institutions each year. Considering that the for-profit institutions in my sample are generally receiving between 20 and 23 billion dollars in Title IV aid between 2010 and 2013, the extra 0.9 billion dollars are about 4.5 percent more Title IV aid than they would have otherwise received.

Conclusion

Congress passed the Higher Education Opportunity Act in 2008, which relaxed the Title IV aid eligibility requirements on for-profit institutions. Beginning in 2010, for-profit institutions lose eligibility by violating the 90/10 rule for two consecutive years instead of losing eligibility after violating it once. The 90/10 rule requires for-profit institutions to receive at least ten percent of their revenue from non-Title IV sources. Relaxing the 90/10 constraint allows for-profit institutions to collect more



Title IV revenue from their students. After predicting a revenue percentage for each campus, I find that the number of 1-year 90/10 rule violations would double if the Department of Education counted every campus as an individual entity when submitting regulatory compliance reports, instead of allowing for-profit institutions to bundle campuses together.

Further research is needed to understand the impact on students attending for-profits that violate the 90/10 rule. If a for-profit institution closes, it is required to find a suitable alternative for its students, but there may not be any suitable alternatives in the area. To understand the impact of an unbundling policy on the students, defining and quantifying the number of suitable alternatives in the vicinity of for-profit institutions that violate the 90/10 rule is necessary.

I also find that relaxing the 90/10 violation rule caused for-profit institutions to include more campuses in a bundle and to accept more Title IV aid revenue. The average bundle size increased from about 3.5 to 4.8 among campuses that are bundled. I estimate that for-profit institutions in my sample receive about \$900 million, or 4.5 percent, more Title IV aid revenue under the 2-year rule than they would under the 1-year rule. Further research is needed to understand the characteristics of for-profit institutions that benefit from having the 90/10 violation rule relaxed.

Acknowledgements I would like to thank Kevin Mumford, Jack Barron, Justin Tobias, Brian Roberson, and two anonymous reviewers for their many useful comments and suggestions.

References

- Baird, Matthew, Kofoed, Michael S., Miller, Trey, Wenger, Jennie. 2020. Veteran educators of for-profiters? Tuition responses to changes in the Post 9/11 GI Bill. In IZA Discussion Paper Series No. 13701.
- Baird, Alexandra. 2021. The 90/10 Rule Under HEA Title IV: Background and Issues. Congressional Research Service.
- Cellini, Stephanie Riegg. 2009. Crowded colleges and college crowd-out: The impact of public subsidies on the two-year college market. *American Economic Journal: Economic Policy* 1 (2): 1–30.
- Cellini, Stephanie Riegg. 2010. Financial aid and for-profit colleges: Does aid encourage entry. *Journal of Policy Analysis and Management* 29 (3): 526–552.
- Cellini, Stephanie Riegg, and Claudia Goldin. 2014. Does federal student aid raise tuition? New evidence on for-profit colleges. *American Economic Journal: Economic Policy* 6 (4): 174–206.
- DeJong, David N., and Beth F. Ingram. 2001. The cyclical behavior of skill acquisition. *Review of Economic Dynamics* 4: 536–561.
- Dellas, Harris, and Vally Koubi. 2003. Business cycles and schooling. *European Journal of Political Economy* 19: 843–859.
- Deming, David J., Claudia Goldin, and Lawrence F. Katz. 2012. The for-profit postsecondary school sector: Nimble critters or agile predators. *Journal of Economic Perspectives* 26 (1): 139–164.
- Fernald, John G., Robert E. Hall, James H. Stock, and Mark W. Watson. 2017. The Disappointing Recovery of Output after 2009. In *Brookings Papers on Economic Activity*, 1: 1–89.
- Fountain, Joselynn Hawkins. 2019. The effect of the gainful employment regulatory uncertainty on student enrollment at for-profit institutions of higher education. *Research in Higher Education* 60 (8): 1065–1089.
- Gilpin, Gregory A., Joseph Saunders, and Christiana Stoddard. 2015. Why has for-profit colleges' share of higher education expanded so rapidly? Estimating the responsiveness to labor market changes. *Economics of Education Review* 45: 53–63.
- Kane, Thomas J. 1995. Rising public college tuition and college entry: How well do public subsidies promote access to college? In National Bureau of Economic Research Working Paper 5164.



- Kofoed, Michael S. 2020. Where have all the GI Bill dollars gone? Veteran usage and expenditure of the Post-9/11 GI Bill. In *Brookings Economic Studies*, 1.
- Sakellaris, Plutarchos, and Antonio Spilimbergo. 2000. Business cycles and investment in human capital: international evidence on higher education. In *Carnegie-Rochester Conference Series on Public Policy*, 52: 221–256.
- Senate, U.S. 2012. For Profit Higher Education: The Failure to Safeguard the Federal Investment and Ensure Student Success. Education, Labor and Pensions Congressional Committee: Report of the Health.
- Ward, James D. 2019. Intended and Unintended Consequences of For-Profit College Regulation: Examining the 90/10 Rule. In *Journal of Student Financial Aid*, 48(3): Article 4.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.

