

Did Gainful Employment Regulations Result in College and Program Closures? An Empirical Analysis

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Abstract: For decades, the federal government has expected vocationally-focused programs in higher education, especially among for-profit colleges, to lead to gainful employment in a profession. In the mid-2010s, the U.S. Department of Education developed gainful employment (GE) regulations that sought to tie a program's federal financial aid eligibility to graduates' debt-to-earnings ratios. We used a regression discontinuity design with hand-collected data on program statuses to examine whether for-profit programs' performance on GE was associated with the likelihood of closing the program or college. Although the regulations were repealed before any program lost federal funding, we found that passing GE was associated with a lower likelihood of a program or college closing.

During the late 1990s and 2000s, the private for-profit college sector rapidly expanded its role in American higher education. The percentage of all students enrolled in colleges participating in federal financial aid programs who were attending for-profit institutions rose from 3.5% in 1997 to 11.3% in 2010 (McFarland et al., 2018). As with prior expansions of the for-profit sector in the 1950s and 1980s (Investigation of GI Schools, 1951; Whitman, 2017), policymakers raised concerns about the quality of education received and whether students and taxpayers were receiving a return on their investment of time and resources. Senate Democrats launched an investigation into for-profit colleges' marketing practices and pricing strategies in 2010 (Committee on Health, Education, Labor, and Pensions, 2012), while a report by the United States Government Accountability Office (2010) found fraudulent and deceptive practices in the sector.

The Obama administration made heightened scrutiny of for-profit colleges one of its signature policy initiatives. A key component of that initiative was using existing provisions in the federal Higher Education Act that mentions "gainful employment in a recognized occupation" as a requirement of nearly all programs at for-profit colleges that wish to receive federal financial aid as well as certificate-granting programs at private nonprofit and public institutions (U.S. Department of Education, 2010). However, those provisions historically did not define what gainful employment meant and were historically not used for accountability purposes.

In 2010, the U.S. Department of Education released an initial set of gainful employment (GE) regulations that sought to tie individual programs' federal aid eligibility to performance on either a debt-to-earnings metric or a student loan repayment rate metric (Office of Postsecondary Education, 2010). This proposed set of regulations was successfully challenged in court by for-

profit colleges' main lobbying group in 2012 (Huckabee, 2012), requiring the Department of Education to promulgate the regulations again. The second set of GE regulations was released in late 2014 (Office of Postsecondary Education, 2014) and included two different sets debt-to-earnings ratios. The regulations survived a final legal challenge from for-profit colleges (Thomason, 2015), going into effect in July 2015.

Only one year of GE data were ever collected and made available to the general public. This release, which occurred in the final days of the Obama administration in January 2017, placed programs into three groups (passing, in an oversight zone, or failing) based on their performance on the better of the two debt-to-earnings metrics. Programs were scheduled to lose access to federal financial aid for three years if they remained in the oversight zone for four consecutive years or failed in two out of three years (Kelchen, 2018b). However, no programs ever lost federal financial aid access due to the Trump administration not enforcing and then repealing GE (Kreighbaum, 2018).

Most of the potential effects of gainful employment regulations are concentrated among for-profit colleges. In this sector, labor market outcomes tend to be poorer on average than other sectors after controlling for other characteristics (e.g., Armona, Chakrabarti, & Lovenheim, 2018; Cellini & Turner, 2018; Deming, Goldin, & Katz, 2012). Since for-profit colleges generally do not receive direct state subsidies or preferential tax treatment like their public and private nonprofit peers, students tend to take out more debt to attend for-profit institutions (Armona, Chakrabarti, & Lovenheim, 2018). As a result, for-profit colleges hosted 96% of the programs that did not receive a passing score and 99% of all programs that failed (authors' calculations using Federal Student Aid data).

There is a small body of literature exploring the implications of GE among for-profit colleges. Fountain (2019) found that for-profit colleges grew less quickly than public and private nonprofit colleges following the announcement of the 2010 GE regulations. A qualitative study by Hentschke and Perry (2015) reported that for-profit college leaders planned to make four main efforts in response to GE: reduce debt, raise admissions standards or allow trial enrollment periods, shorten programs and get students to enroll full-time, and hire additional staff members to support student services and job placement. Several other studies have raised concerns about GE reducing access to higher education among traditionally disadvantaged populations (Guida, Jr., & Figuli, 2012; Matsudaira, 2017; McDonough, 2017).

An empirically unexamined area of the GE regulations is whether it induced colleges to close low-performing programs—or even whether it contributed to owners deciding to close low-performing programs. In their press release releasing the final 2017 GE data, the U.S. Department of Education (2017) noted that the number of programs subject to GE fell by nearly 25% between 2014 and 2017. They then attributed this decline to institutional efforts to close poor-performing programs. There are anecdotal reports of this occurring in both the for-profit and nonprofit sectors following the implementation of GE (Carey, 2017; Haigney, 2017), but no empirical examination.

In this paper, we used a regression discontinuity research design to examine whether for-profit colleges closed struggling programs or colleges following the release of the 2017 gainful employment data. Our research questions are the following:

(1) Did programs or colleges that passed GE close at different rates than programs or colleges that did not pass?

(2) Did programs or colleges that were in the zone on GE close at different rates than programs or colleges that failed?

Theoretical Framework

The theoretical framework for our study is principal-agent theory (Spence & Zeckhauser, 1971), under which the principal holds the agent accountable for their outcomes. Principal-agent theory is based on the principal (here, the federal government) paying the agent (a college) based on meeting a performance benchmark (Jensen & Meckling, 1976). Since for-profit colleges are trying to generate economic returns for their owners, they may choose to close low-performing programs or campuses if meeting the federal government's performance requirements are viewed as being too onerous. They could also choose to continue operating these programs while opting out of the federal student loan program as an institution, as some community colleges have done in response to facing sanctions for high cohort default rates (Wiederspan, 2016). However, for-profit colleges may not be able to do so due to their heavy reliance of federal financial aid dollars (Lee & Looney, 2019).

Another important accountability pressure that colleges and programs face is through public scrutiny. One of the main goals of the federal government's accountability efforts (including GE) is to get prospective students and their families to vote with their feet and choose high-performing institutions over low-performing institutions (Kelchen, 2018b). The effectiveness of federal efforts that are not tied to federal financial aid eligibility, such as the College Scorecard and the College Affordability and Transparency Center, has been limited in affecting students' college choices (Baker, 2019; Hurwitz & Smith, 2018).

There is some evidence that providing students and their families with information about extremely poor outcomes influences student enrollment patterns. Cellini, Darolia, and Turner (forthcoming) examined for-profit colleges that received sanctions for high cohort default rates and found a large decrease in enrollment at those institutions along with declines at other local for-profit colleges that were not sanctioned. Rooney and Smith (2019) looked at the implications of scandals at elite American universities and found declines in the number of student applications in the following year, although this effect was short-lived and may apply to the for-profit sector (which has seen a number of scandals in recent years) in different ways.

Sample, Data, and Methods

In this paper, we used data on for-profit colleges' gainful employment outcomes merged onto institutional characteristics and a new dataset that we compiled on programs' operating status to examine whether GE outcomes were associated with future program or college closures. The following sections contain more information on our analytic sample, data sources, and research methods.

Sample

Our sample focused on for-profit colleges included in the U.S. Department of Education's January 2017 GE data release, which was provided to colleges in draft form in October 2016 (Eliadis, 2016). This release included 5,040 undergraduate programs (certificate, associate, and bachelor's) at 1,467 for-profit colleges (measured at the OPEID level instead of the UnitID level). We excluded graduate and professional programs because of the relatively small number of observations and because a smaller share of these programs did not receive a

passing score. We then eliminated 23 programs at four colleges for having been a public or private nonprofit college (in spite of having been coded as a for-profit institution) or not having available data on covariates in the 2015-16 academic year.

Our final sample restriction was based on our ability to replicate the Department of Education's gainful employment outcomes based on the underlying data provided in Federal Student Aid's spreadsheet. Thirteen programs received a passing score without having a debt-to-earnings ratio that passed, while six programs failed with debt-to-earnings ratios that did not meet the federal government's definition of failure. Because of the possibility that these programs received special treatment, we excluded them from the dataset. This resulted in a final analytic sample of 4,998 programs at 1,462 colleges.

Data

The key outcome of interest in this study is whether a college or program remained open following the announcement of GE results to the general public, using February 2019 as a threshold to allow institutions a sufficient amount of time to respond to the data release. We primarily identified colleges that closed using the Federal Student Aid database (2019) of closed schools that the U.S. Department of Education updates on a regular basis. But since no centralized source for program-level closure information exists, we compiled our own dataset using Internet searches.

Our search protocol consisted of Google searches for each college's name (in quotes) and the program name. The two authors both conducted a portion of searches and cross-checked some of each other's coding between September 2018 and February 2019, with a final set of cross-checking being done in February 2019. If a college was reported as closed in the Federal

Student Aid dataset, we checked at least one program for each of these institutions to confirm the closure. If the college was open, we conducted separate searches for each program within the institution. This typically led us to the college's website, although it occasionally led us to Facebook pages for some small for-profit colleges without websites.

If there was a valid website page or active Facebook page that mentioned the program, we counted it as being open. If there were mentions of other programs on the college's website or Facebook page but no mentions of the program of interest, we counted the program as being closed. In some cases, we supplemented the searches using the Wayback Machine, a service that archives previous versions of certain webpages, to see if the program was ever mentioned. If the program was mentioned on previous versions but not on the current version, it was coded as being closed.

Each program at a for-profit college with at least 30 graduates over a given period of time (either two or four years, depending on program size) was evaluated based on the debt-to-earnings ratio of their students who graduated no later than the 2011-12 academic year (Federal Student Aid, 2018). Programs were judged on two debt-to-earnings ratios: one that included all earnings and one that excluded discretionary earnings (below 150% of the federal poverty line).¹For both measures, a program was evaluated using the highest of mean or median earnings, with earnings consisting of wages reported to the Social Security Administration. The amortization period for debt varied by credential level, with certificate and associate programs having a ten-year period and bachelor's degree programs having a 15-year payback period (Federal Student Aid, n.d.).

¹ If the reported debt burden is higher than direct educational expenses (tuition/fees and books/supplies/equipment), the value for direct educational expenses was used in the gainful employment calculations (Federal Student Aid, 2018).

For the debt-to-total earnings ratio, a program with a ratio below 8% passed, a program that was between 8% and 12% was ‘in the zone,’ and a program that was over 12% failed. The percentages were higher for the debt-to-discretionary earnings ratio, with below 20% passing, between 20% and 30% being in the zone, and over 30% failing. If a program did not pass, the calculations were repeated using the debt burdens of a transitional cohort that graduated during 2014-15 to allow for programs to respond to the possibility of future sanctions. A program’s reported result on the GE test is based on the best rating of the up to four calculated measures (total or discretionary income with the initial and transactional cohorts, if necessary). For example, one passing score and three failing scores would result in an overall passing score (Federal Student Aid, n.d.).

Programs that failed twice in a three-year period or were unable to pass (with fail or zone scores) in four consecutive years were scheduled to be subject to the loss of federal financial aid dollars (Federal Student Aid, 2015). However, it was reasonable for colleges to expect that these sanctions would not be enforced when the data were first released given the incoming Trump administration’s proposals to remove the rule. This means that any observed effects are likely due to pressures from internal stakeholders, college owners, or the general public instead of from the federal government.

Table 1 shows the status of each college and program (college closed, college open but program closed, and program remained open) by their GE rating. Descriptively, there is a correlation between a program’s gainful employment rating and whether the program or college is still open. More than half of the 1,247 programs at colleges that have since closed were either in the zone or failed outright, with only a slightly higher pass rate among the 544 programs that closed while their college remained open. Finally, only about ten percent of the 3,207 programs

that remained open failed in the initial GE data release, while more than two-thirds of all programs passed.

[Insert Table 1 here]

We also included a number of institutional characteristics and two program-level characteristics that could potentially be associated with the likelihood of closure separately from the gainful employment rating. We used the three-year cohort default rate (CDR) and one-year student loan repayment rate from Federal Student Aid and reported in the College Scorecard as alternative measures of colleges' outcomes. The CDR was used for high-stakes accountability purposes, although relatively few colleges faced sanctions for their outcomes. The student loan repayment rate reflected the percentage of borrowers who were able to repay any principal one year after entering repayment. These measures are only somewhat correlated among for-profit colleges (Kelchen & Li, 2017), but both capture certain elements of students' post-college outcomes.

We captured student enrollment and demographic characteristics that could affect the risk of closure using data from the Integrated Postsecondary Education Data System (IPEDS). We used total FTE enrollment, the percentage of female students, and the percentage of black and Hispanic students. Institutional financial characteristics consisted of the percentage of revenue from federal Title IV financial aid (from Federal Student Aid) and per-FTE total revenue (from Federal Student Aid and IPEDS).

We included the college's accreditor in this analysis, as prior research has found differences in how accreditors sanction colleges for poor performance. A United States Government Accountability Office (2014) report found that regional accreditors are more likely

to sanction colleges with both poor academic outcomes and financial health, while national accreditors focused on financial measures when making decisions. Additionally, the Accrediting Council for Independent Colleges and Schools (ACICS), one of the largest national accreditors, faced scrutiny from advocacy groups and the Obama administration over poor outcomes at many of their institutions (Miller, 2016). This resulted in a U.S. Department of Education panel recommending that ACICS's ability to be a gatekeeper for federal financial aid be stripped in 2016 (Fain, 2016). While this decision was reversed by the Department of Education in 2018 without any colleges losing access to federal funds, many ACICS-accredited colleges have sought other accreditation options and some may have closed after not finding other suitable options (Kreighbaum, 2018; Miller & Flores, 2018).

We compiled information on the college's accreditor from information in the College Scorecard and the Department of Education's accreditation directory, using Internet searches to fill in a small number of remaining gaps. We divided accreditors into four categories based on their mission and size. All of the regional accreditors were combined into one category, and all specialized accreditors (for colleges focusing on programs such as nursing and massage therapy) were combined into another category. ACICS, the largest single accreditor of for-profit programs subject to GE, was analyzed separately, with all other national accreditors being combined into the final category.

The first available program-level characteristic is the 2010 Classification of Instructional Programs (CIP) code that was used to determine individual programs in the GE dataset. We divided programs into five categories based on their two-digit CIPs. Personal services (12), health (51), and business (52) were all common enough in our dataset to merit separate classifications. The personal services group is of particular interest because graduates in these

fields often receive tips that are often not reported as taxable income, and cosmetology programs won the ability to appeal their GE outcomes to the Department of Education on that basis (Kreighbaum, 2017). We created a set of skilled trades CIPs (10, 11, 14, 15, 46, 47, 48, and 49) that included fields such as information technology, engineering, construction, and precision manufacturing. Finally, the remaining classifications were put into an ‘other’ category. The other program-level characteristic is the level of the credential, with separate categories for certificates, associate degrees, and bachelor’s degrees.

Table 2 contains summary statistics of the dataset for the most recent year of data prior to the GE data release, with means and standard deviations presented across three groups: college closed, college open but program closed, and program open. There were substantial differences in the share of programs and colleges that were closed based on the institutional accreditor. More than half of all colleges that closed and 35% of closed programs at open colleges were accredited by ACICS, compared to just 14% of open colleges. A larger share of open programs was at the certificate level and in the personal services fields. Open programs also had slightly better performances on CDR and repayment rate metrics, had lower per-student revenues, and relied somewhat less on federal funds than colleges or programs that closed.

[Insert Table 2 here]

Methods

Because a program can have up to four debt-to-earnings ratios but is categorized based on its best ratio, we used the best ratio as the forcing variable for the regression discontinuity design. Further complicating our analysis is that the debt-to-earnings ratios are based on two different denominators: debt-to-total earnings and debt-to-discretionary earnings. This means

that it is easier to change the debt-to-discretionary earnings ratio than the debt-to-total earnings ratio because discretionary earnings is a smaller number than total earnings.

We addressed this issue by creating a new forcing variable that reflected the largest possible annual debt burden that would allow for a program to receive passing or zone status based on debt-to-earnings ratios. To provide an example of how this variable functions, consider the Worsham College of Mortuary Science's associate degree program in mortuary science and funeral services. With annual earnings of \$36,104 and discretionary earnings of \$18,449, the program would pass gainful employment with annual debt payments of below \$2,888 per year using total earnings and below \$3,690 using discretionary earnings. With an annual debt payment of \$1,795 in the GE dataset, the program was \$1,895 below the highest possible debt threshold that would allow the program to pass. We used two distance measures: distance to passing (including both zone and fail as the comparison) and distance to zone (including fail as the comparison).

We tested the key assumptions of our regression discontinuity design using guidance from Lee and Lemieux (2010). First, we tested for the continuity of each of our pre-treatment characteristics (as listed in Table 2) across both the pass/not pass and zone/fail thresholds. As graphically shown in Figure 1 and numerically shown in Appendix 1 for the pass/not pass thresholds, the most consistent continuity concerns across three different bandwidths (\$250, \$500, and \$1,000) were based on institutional accreditors. A substantially higher share of programs at ACICS-accredited colleges clustered just on the passing side of GE, while the opposite was true for programs with specialized accreditors. Percent Hispanic and per-FTE total revenue were also significant at $p < .10$ across each bandwidth, but these coefficients were much

smaller in magnitude. Along the zone/fail thresholds (Figure 2 and Appendix 1), there were no statistically significant differences across all bandwidths for any of the covariates.

[Insert Figure 1 here]

[Insert Figure 2 here]

Our next check was to conduct the McCrary (2008) test to check the continuity of the density of the forcing variable at the passing and zone thresholds. We did this using both the `rddensity` command in Stata from Cattaneo, Jansson, and Ma (2018) to calculate a t-statistic for differences across the threshold (Table 3) and visual graphics (Figure 3). Overall, the difference in density at both the \$500 and \$1,000 bandwidths was highly significant along the passing threshold before becoming insignificant for the \$250 bandwidth. Issues with lumping are generally concentrated among programs at ACICS-accredited colleges. Looking along the zone/fail threshold, there are no consistently significant differences in density across any of the bandwidths or accrediting agencies.

[Insert Table 3 here]

[Insert Figure 3 here]

Informed by the results of the RD density and continuity tests, our analyses consisted of a series of RD regressions conducted separately along the passing and zone thresholds. We ran blocked linear regressions using the same \$250, \$500, and \$1,000 bandwidths that were used for the RD suitability tests with OPEID-clustered standard errors. The first model had no covariates, and the second model added student demographics and outcomes. The third model included information on institutional accreditors, while the final model added information on a program's

CIP and the credential level. Because most of the concerns with the density and continuity tests were based on the program's accreditor, we also ran analyses separately by three types of institutional accreditors: ACICS, specialized accreditor, and other national/regional accreditors.

As an additional robustness check, we ran our analyses excluding the 123 programs (64 zone, 59 fail) that appealed their original GE outcome based on the appeal flag in the January 2017 data release, as these programs may have been less likely to close if they thought they could possibly end up with a better outcome than they originally received.² Removing these observations results in slightly larger (in absolute value) coefficients on most of our regressions, but with the same general pattern of results. We do not present these coefficients in the paper, although they are available upon request from the authors.

Limitations

While this analysis features a strong quasi-experimental research design and data for nearly all large programs at for-profit colleges, there are some important limitations. First, we were unable to determine exactly when programs closed. While the U.S. Department of Education publishes information on when each branch campus of each institution officially closed, they do not publish information on when programs closed. Since not all college or program websites were readily accessible through Internet archiving tools such as the Wayback Machine, we could not collect that information before our data collection efforts took place in late 2018 and early 2019.

² Some of the appeals are still pending with the U.S. Department of Education as of November 2019 (Federal Student Aid, n.d.).

Another complication is that if a college operated the same program at multiple sites, the data were aggregated to one measure with no information about which colleges that affected. This caused two issues with our analyses. First, local-level economic conditions could not be used as control variables. Second, we likely understated the number of program closures because some institutions may have stopped offering a program at certain locations while continuing to offer it elsewhere. The final noteworthy limitation is that some programs with an institutional accreditor may also have their own specialized accreditor at the program level. A college that is listed as having a specialized accreditor in our dataset likely focuses on a small number of courses of study, while a regional or national accreditor covers a larger number of programs.

Results

We began by examining whether a program passing GE affected the likelihood of a college closing across multiple bandwidth specifications and covariates. As Table 4 shows, there are few consistently significant differences based on whether a program passed or did not pass GE. Across most bandwidth and variable choices, passing GE was related to a five percent decline in the likelihood of the college closing for other (non-ACICS national and regional) accreditors. However, there were no differences across other accreditors, raising questions of whether these accrediting agencies placed colleges under different scrutiny based on GE outcomes relative to other accreditors.

[Insert Table 4 here]

Moving to program-level closures unconditional on the college remaining open (Panel A of Table 5), the relationship between passing GE and being less likely to close was again

strongest for non-ACICS national and regional accreditors. This relationship was around nine percentage points across bandwidths and covariates included for programs accredited by the agencies. The point estimates for ACICS were negative but not statistically significant, while there was no consistent direction of the relationship for specialized accreditors. Combining all programs into one analysis, the relationship was generally between three and five percentage points and statistically significant.

[Insert Table 5 here]

The pattern of results changed markedly when looking at the probability of a program closing conditional on the college remaining open (Panel B of Table 5). While the likelihood of program closure for all colleges was similar to the unconditional results (again, around three to five percentage points), there were major changes when breaking down programs by their institutional accreditor. The largest effects were among ACICS-accredited colleges, which saw effects of between ten and twenty percentage points across bandwidths and model specifications. Other national and regional accreditors had the next largest coefficients (around five percentage points), while there was no relationship between specialized accreditor status and the likelihood of program closure.

We then repeated the above analyses along the zone/fail margin. Table 6 shows the results with the college closing as the outcome of interest. There was a sizable decline in the likelihood of closure if a program was in the less punitive zone category relative to failing outright when using the largest bandwidth (within \$1,000 in annual debt of the zone/fail margin), with the magnitude being six percentage points when including all covariates and programs. However, unlike the previous comparisons along the passing threshold, these coefficients rapidly

approached zero as the bandwidth got tighter. This suggests a lack of conclusive evidence that the zone/fail margin truly influenced the likelihood of a college closing.

[Insert Table 6 here]

Finally, we examined the effects of being in the zone versus failing on program closures in Table 7, with Panel A not conditioning on the college remaining open and Panel B limiting the sample to colleges that were open as of February 2019. The pattern of results was broadly similar to the college-level closures discussed above, with sizable negative coefficients generally approaching zero as the bandwidths tightened. For the conditional models in Panel B, the strongest relationship was with specialized accreditors, although the coefficient was no longer significant when adding all covariates using the tightest bandwidth. This was different than along the passing threshold, where the largest effects were among ACICS-accredited institutions.

[Insert Table 7 here]

Discussion and Future Work

Although the Obama-era gainful employment regulations were repealed by the Trump administration, there is deep interest among federal policymakers in holding colleges accountable for their outcomes (Kelchen, 2018b). While Democrats generally want to restore the previous GE regulations that disproportionately affected for-profit colleges, many Republicans are interested in expanding GE to all programs regardless of tax status (e.g., U.S. Department of Education, 2018). There are also a number of efforts to push accountability to the program level, as student outcomes differ considerably across programs within institutions and systems (e.g.,

Altonji& Zimmerman, 2017; Webber, 2016). There have been multiple proposals in Congress to tie student loan eligibility to program-level default or repayment outcomes (Kelchen, 2018a), and new College Scorecard data will soon allow for debt-to-earnings ratios to be calculated at the program level across public, nonprofit, and for-profit colleges.

In this paper, we provide the first empirical examination of whether the release of program-level outcomes data under GE led for-profit colleges to close low-performing programs or even entire institutions. While colleges likely did not expect these programs to lose federal financial aid eligibility by the time data were publicly released in January 2017 due to the Trump administration's public statements opposed to the regulations, it is clear that the data release did affect the likelihood of program and college closure. The effects differed substantially by institutional accretor, with regional and non-ACICS national accretor having larger effects on college closures in some cases and the beleaguered ACICS accrediting agency having larger effects on program closures after excluding closed colleges.

This pattern of results, with effects generally being larger on the passing margin than the zone margin and with significant differences by accretor, raises a number of important future research questions. Interviews with college leaders would provide useful context into whether for-profit colleges based college or program closure decisions based on GE outcomes. Some of the closures could potentially be due to pressure from the two non-federal portions of the regulatory triad: state authorizing agencies and accrediting bodies. The role of state agencies in regulating for-profit colleges has been the focus of little research (Tandberg, Bruecker, & Weeden, 2019), and accrediting agencies have faced additional scrutiny by federal policymakers in recent years (United States Government Accountability Office, 2014).

An interesting research and policy question is whether colleges saw market opportunities based on whether a program performed poorly on the GE metric. Colleges in the same area with high-performing programs may wish to expand their programs if a competing program performed poorly on GE, and other institutions may have examined starting new programs if they saw an opening. There is some evidence of this occurring when colleges faced sanctions for cohort default rates (Cellini et al., forthcoming), and this could be explored at the program level using a combination of Internet searches and IPEDS completion data by CIP code.

Finally, the impending release of program-level earnings data in the College Scorecard will create an opportunity to examine whether there is a relationship between program-level earnings, debt, and repayment outcomes and program or college closures. Our findings suggest that for-profit institutions are responsive to receiving additional information on student outcomes, matching prior research on the flexibility of for-profit colleges (Deming et al., 2012). However, public and private nonprofit colleges may not be able to respond as quickly due to shared governance and tenure policies in these sectors.

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Figure 1: Continuity checks along the passing threshold

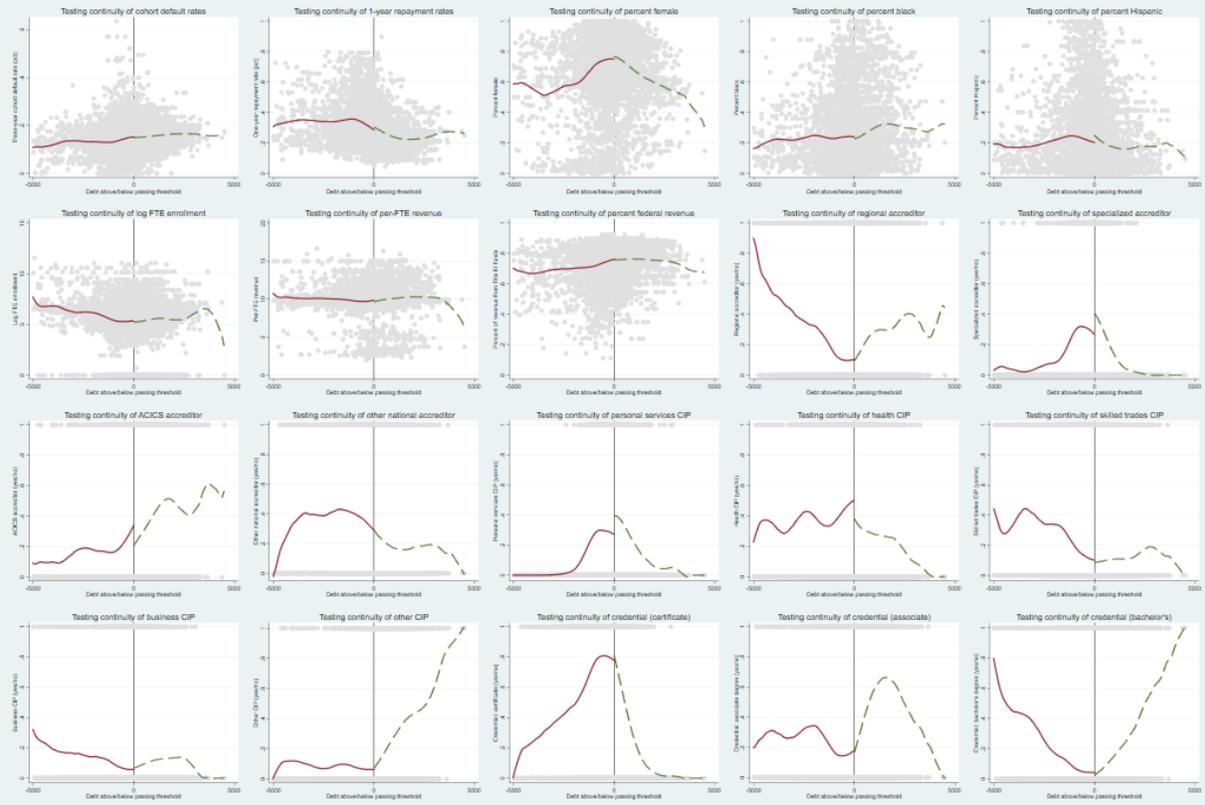


Figure 2: Continuity checks along the zone threshold

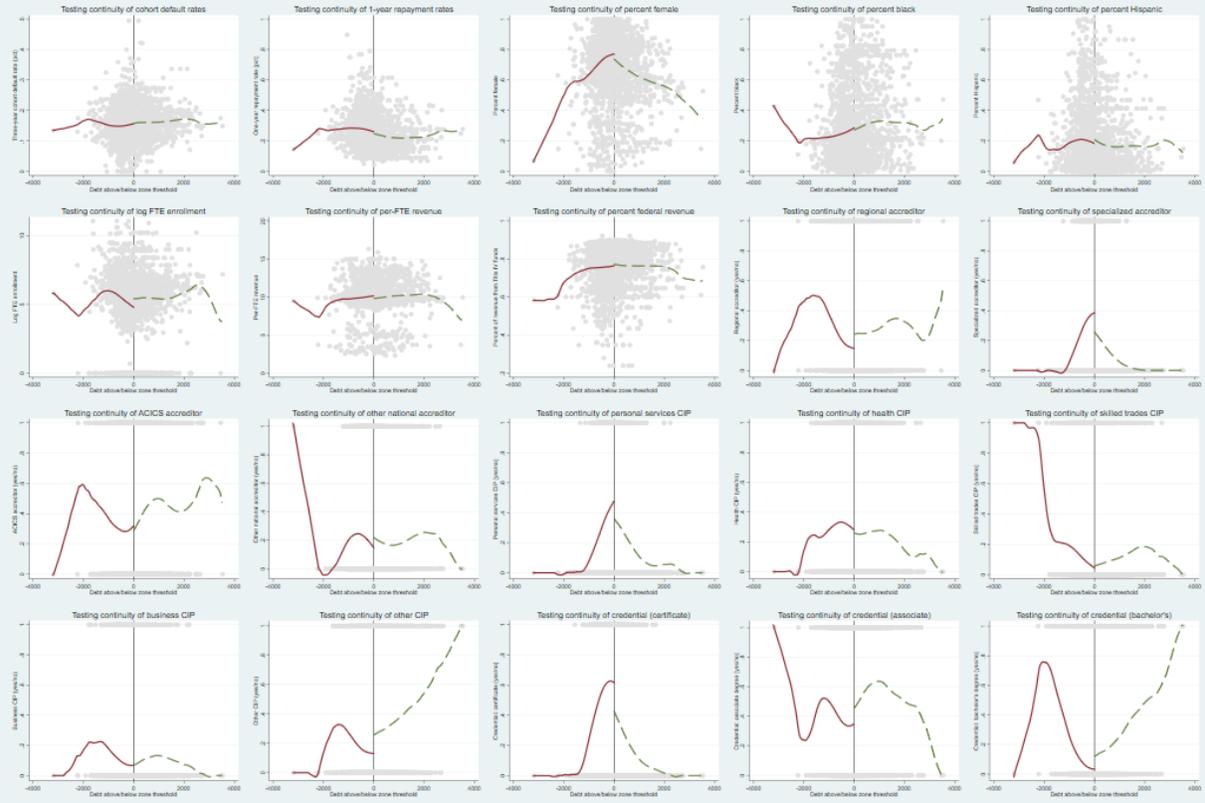


Figure 3: McCrary density tests

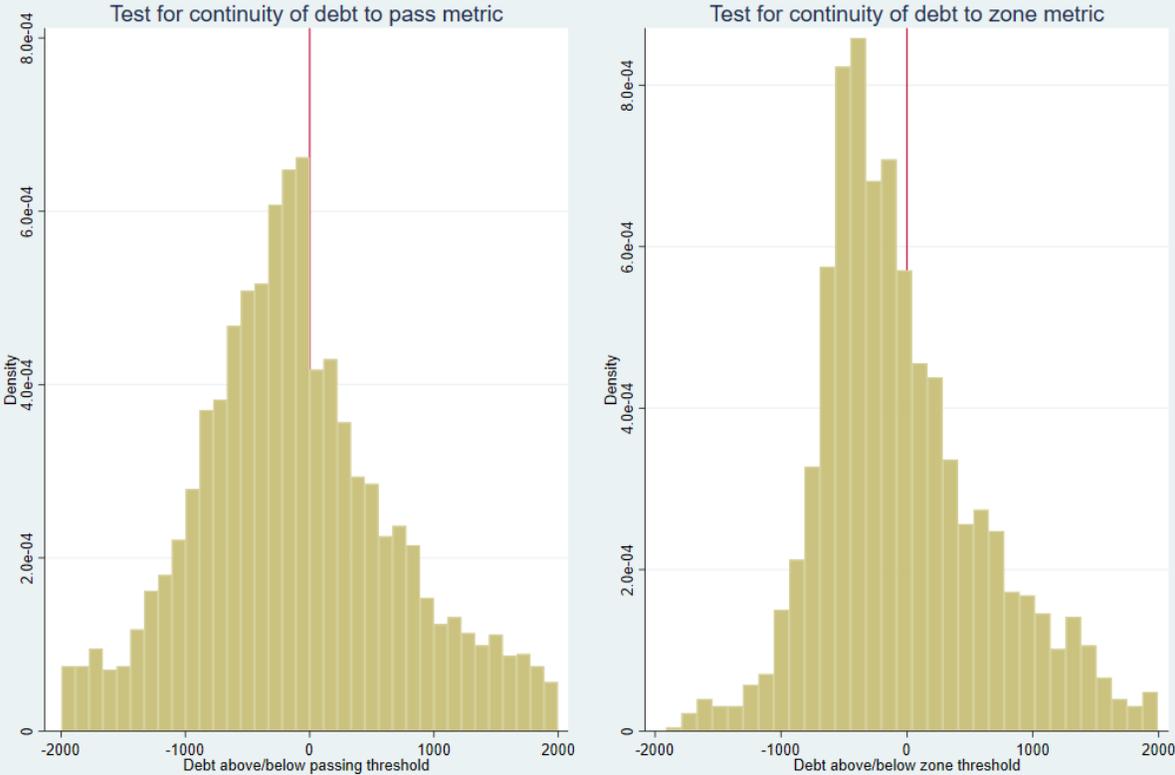


Table 1: Program status (as of February 2019) by 2017 GE result.

GE result	College closed	College open, program closed	College open, program open	Number of programs
Pass	610	296	2,204	3,110
Zone	310	143	682	1,135
Fail	327	105	321	753
Number of programs	1,247	544	3,207	4,998

Sources: Authors' examinations of institutional websites, Federal Student Aid data on college closures and gainful employment ratings.

Table 2: Summary statistics by program and college closure status.

Characteristic	College closed		College open, program closed		College open, program open	
	Mean/ median	(SD)	Mean/ median	(SD)	Mean/ median	(SD)
Mean values						
Gainful employment pass (pct)	48.9	(50.0)	54.4	(49.9)	68.7	(46.4)
Gainful employment zone (pct)	24.9	(43.2)	26.3	(44.1)	21.3	(40.9)
Gainful employment fail (pct)	26.2	(44.0)	19.3	(39.5)	10.0	(30.0)
Certificate program (pct)	46.8	(49.9)	53.5	(49.9)	66.4	(47.2)
Associate degree program (pct)	38.0	(48.6)	37.1	(48.4)	22.8	(42.0)
Bachelor's degree program (pct)	15.2	(36.0)	9.4	(29.2)	10.8	(31.0)
Accreditor: regional (pct)	13.6	(34.3)	22.6	(41.9)	20.6	(40.4)
Accreditor: specialized (pct)	13.2	(33.8)	10.3	(30.4)	31.1	(46.3)
Accreditor: ACICS (pct)	55.8	(49.7)	34.9	(47.7)	13.6	(34.2)
Accreditor: other national (pct)	17.4	(37.9)	32.9	(47.0)	34.7	(47.6)
CIP: personal services (pct)	19.2	(39.4)	9.7	(29.7)	30.0	(45.8)
CIP: health (pct)	34.6	(47.6)	38.8	(48.8)	38.3	(48.6)
CIP: skilled trades (pct)	15.2	(35.9)	17.3	(37.8)	14.4	(35.1)
CIP: business (pct)	10.4	(30.6)	12.1	(32.7)	8.1	(27.3)
CIP: other (pct)	20.7	(40.5)	22.1	(41.5)	9.2	(28.9)
Median values						
3-year default rate (pct)	16.7	(6.1)	13.7	(6.8)	12.9	(7.0)
1-year repayment rate (pct)	22.8	(11.6)	25.0	(13.2)	29.7	(14.1)
Pct female	76.8	(22.3)	72.8	(22.9)	78.8	(26.1)
Pct black	23.3	(25.1)	16.2	(22.4)	16.0	(21.8)
Pct Hispanic	9.9	(22.4)	10.8	(23.0)	12.5	(23.6)
FTE enrollment	244	(484)	441	(5,579)	340	(6,510)
Per-FTE total revenue	18,204	(107,505)	22,256	(1,048,313)	16,052	(424,339)
Pct revenue from Title IV	79.5	(10.1)	80.9	(10.9)	76.4	(13.5)
Number of colleges	247		223		1,195	
Number of programs	1,247		544		3,208	

Sources: Federal Student Aid (GE results, CIPs, accreditors, default and repayment rates, and revenue from Title IV), IPEDS (all other measures).

Notes:

- (1) Gainful employment results, CIP code, and credential level are all at the program level. The rest of the data are at the institutional level.
- (2) Data are primarily from the 2015-16 academic year, with default and repayment rates coming from the 2014-15 academic year because they are not known to the college until the 2015-16 academic year.
- (3) If a program or college did not have data from the most recent year, we substituted in data from one of the two preceding years.

Table 3: Density tests of the forcing variable along the pass/zone and zone/fail thresholds.

Comparison	Bandwidth 1000		Bandwidth 500		Bandwidth 250	
	T-stat	P-value	T-stat	P-value	T-stat	P-value
Pass vs. zone						
All programs	-4.096	<0.001	-2.550	0.011	-1.529	0.126
Accreditor: ACICS	-4.232	<0.001	-3.884	<0.001	-1.733	0.083
Accreditor: Specialized	-1.548	0.122	1.029	0.304	-0.031	0.975
Accreditor: Other	-1.734	0.083	-1.670	0.095	-0.976	0.329
Zone vs fail						
All programs	1.085	0.278	-1.936	0.053	0.295	0.768
Accreditor: ACICS	-0.809	0.418	-1.863	0.063	0.121	0.904
Accreditor: Specialized	0.914	0.361	-1.704	0.089	-0.293	0.770
Accreditor: Other	2.157	0.031	0.300	0.764	0.730	0.466

Notes:

- (1) Results are from the rddensity command in Stata.
- (2) The "other" accreditor category includes regional accreditors and non-ACICS specialized accreditors.
- (3) The zone vs. fail measure excludes all programs that passed GE.

Table 4: RD results estimating the effect of passing GE on likelihood of the college closing.

Model	Bandwidth 1000		Bandwidth 500		Bandwidth 250	
	Coeff.	(SE)	Coeff.	(SE)	Coeff.	(SE)
Empty model						
All programs	-0.043**	(0.021)	0.000	(0.023)	0.008	(0.028)
Accreditor: ACICS	0.057	(0.047)	0.088*	(0.053)	0.026	(0.069)
Accreditor: Specialized	-0.015	(0.023)	-0.017	(0.027)	-0.024	(0.033)
Accreditor: Other	-0.081**	(0.034)	-0.063**	(0.030)	-0.047	(0.035)
Adding demographics and outcomes						
All programs	-0.034*	(0.019)	0.002	(0.021)	0.008	(0.028)
Accreditor: ACICS	0.049	(0.043)	0.060	(0.051)	0.031	(0.071)
Accreditor: Specialized	0.039*	(0.022)	0.023	(0.023)	0.013	(0.028)
Accreditor: Other	-0.102***	(0.029)	-0.077***	(0.026)	-0.087***	(0.031)
Adding accreditor type						
All programs	-0.017	(0.020)	-0.009	(0.020)	-0.019	(0.024)
Adding program-level information						
All programs	-0.004	(0.020)	0.001	(0.019)	-0.007	(0.023)
Accreditor: ACICS	0.067	(0.043)	0.077	(0.053)	0.051	(0.071)
Accreditor: Specialized	0.036	(0.023)	0.012	(0.023)	0.004	(0.028)
Accreditor: Other	-0.075**	(0.030)	-0.052**	(0.024)	-0.053*	(0.027)

Notes:

- (1) Each row represents the results of a separate regression.
- (2) * represents $p < .10$, ** represents $p < .05$, and *** represents $p < .01$.
- (3) Standard errors are clustered at the opeid level.

Table 5: RD results estimating the effect of passing GE on likelihood of the program closing.

Model	Bandwidth 1000		Bandwidth 500		Bandwidth 250	
	Coeff.	(SE)	Coeff.	(SE)	Coeff.	(SE)
Panel A: Not conditional on the college remaining open.						
Empty model						
All programs	-0.089***	(0.021)	-0.045*	(0.023)	-0.033	(0.030)
Accreditor: ACICS	-0.057	(0.040)	-0.059	(0.047)	-0.107*	(0.060)
Accreditor: Specialized	-0.009	(0.026)	-0.002	(0.029)	-0.019	(0.036)
Accreditor: Other	-0.121***	(0.034)	-0.108***	(0.034)	-0.086**	(0.042)
Adding demographics and outcomes						
All programs	-0.066***	(0.020)	-0.040*	(0.023)	-0.038	(0.031)
Accreditor: ACICS	-0.054	(0.038)	-0.068	(0.047)	-0.098	(0.064)
Accreditor: Specialized	0.047*	(0.026)	0.036	(0.026)	0.013	(0.032)
Accreditor: Other	-0.134***	(0.030)	-0.116***	(0.032)	-0.125***	(0.042)
Adding accreditor type						
All programs	-0.053***	(0.019)	-0.054***	(0.020)	-0.066***	(0.025)
Adding program-level information						
All programs	-0.038**	(0.019)	-0.039**	(0.020)	-0.053**	(0.025)
Accreditor: ACICS	-0.042	(0.038)	-0.037	(0.048)	-0.078	(0.065)
Accreditor: Specialized	0.032	(0.025)	0.016	(0.027)	-0.009	(0.033)
Accreditor: Other	-0.099***	(0.032)	-0.090***	(0.032)	-0.087**	(0.040)

Model	Bandwidth 1000		Bandwidth 500		Bandwidth 250	
	Coeff.	(SE)	Coeff.	(SE)	Coeff.	(SE)
Panel B: Conditional on the college remaining open.						
Empty model						
All programs	-0.057***	(0.017)	-0.043**	(0.019)	-0.039	(0.025)
Accreditor: ACICS	-0.107**	(0.047)	-0.141**	(0.055)	-0.191**	(0.083)
Accreditor:						
Specialized	0.006	(0.017)	0.017	(0.016)	0.004	(0.018)
Accreditor: Other	-0.061**	(0.024)	-0.062**	(0.028)	-0.055	(0.037)
Adding demographics and outcomes						
All programs	-0.039**	(0.016)	-0.041**	(0.018)	-0.043*	(0.024)
Accreditor: ACICS	-0.111**	(0.046)	-0.146**	(0.058)	-0.195**	(0.085)
Accreditor:						
Specialized	0.008	(0.015)	0.014	(0.015)	-0.002	(0.018)
Accreditor: Other	-0.057**	(0.023)	-0.059**	(0.028)	-0.055	(0.038)
Adding accreditor type						
All programs	-0.036**	(0.015)	-0.042**	(0.017)	-0.050**	(0.022)
Adding program-level information						
All programs	-0.039***	(0.015)	-0.043**	(0.018)	-0.051**	(0.023)
Accreditor: ACICS	-0.138***	(0.049)	-0.136**	(0.057)	-0.198**	(0.082)
Accreditor:						
Specialized	-0.004	(0.014)	0.006	(0.015)	-0.014	(0.018)
Accreditor: Other	-0.045*	(0.024)	-0.056*	(0.030)	-0.050	(0.038)

Notes:

- (1) Each row represents the results of a separate regression.
- (2) * represents $p < .10$, ** represents $p < .05$, and *** represents $p < .01$.
- (3) Standard errors are clustered at the opeid level.

Table 6: RD results estimating the effect of being in the zone on GE (versus failing) on likelihood of the college closing.

Model	Bandwidth 1000		Bandwidth 500		Bandwidth 250	
	Coeff.	(SE)	Coeff.	(SE)	Coeff.	(SE)
Empty model						
All programs	-0.142***	(0.036)	-0.061*	(0.032)	-0.021	(0.040)
Accreditor: ACICS	-0.148**	(0.058)	-0.095	(0.058)	-0.084	(0.075)
Accreditor: Specialized	-0.041	(0.056)	0.046	(0.047)	0.108	(0.066)
Accreditor: Other	-0.079*	(0.042)	-0.018	(0.040)	-0.033	(0.052)
Adding demographics and outcomes						
All programs	-0.115***	(0.035)	-0.054*	(0.030)	-0.026	(0.039)
Accreditor: ACICS	-0.109**	(0.048)	-0.077	(0.054)	-0.080	(0.069)
Accreditor: Specialized	-0.028	(0.051)	0.034	(0.043)	0.065	(0.052)
Accreditor: Other	-0.061	(0.037)	-0.013	(0.037)	-0.006	(0.051)
Adding accreditor type						
All programs	-0.082***	(0.029)	-0.030	(0.028)	-0.019	(0.037)
Adding program-level information						
All programs	-0.062**	(0.028)	-0.013	(0.027)	-0.005	(0.035)
Accreditor: ACICS	-0.075	(0.050)	-0.048	(0.052)	-0.056	(0.068)
Accreditor: Specialized	0.026	(0.042)	0.062	(0.039)	0.083	(0.053)
Accreditor: Other	-0.044	(0.037)	-0.003	(0.040)	0.002	(0.049)

Notes:

- (1) Each row represents the results of a separate regression.
- (2) * represents $p < .10$, ** represents $p < .05$, and *** represents $p < .01$.
- (3) Standard errors are clustered at the opeid level.

Table 7: RD results estimating the effect of being in the zone on GE (versus failing) on likelihood of the program closing.

Model	Bandwidth 1000		Bandwidth 500		Bandwidth 250	
	Coeff.	(SE)	Coeff.	(SE)	Coeff.	(SE)
Panel A: Not conditional on the college remaining open.						
Empty model						
All programs	-0.167***	(0.032)	-0.083**	(0.033)	-0.009	(0.044)
Accreditor: ACICS	-0.090**	(0.045)	-0.046	(0.055)	0.004	(0.076)
Accreditor: Specialized	-0.126**	(0.058)	-0.043	(0.055)	0.021	(0.077)
Accreditor: Other	-0.114**	(0.044)	-0.018	(0.047)	0.010	(0.067)
Adding demographics and outcomes						
All programs	-0.135***	(0.031)	-0.069**	(0.032)	-0.003	(0.045)
Accreditor: ACICS	-0.061	(0.042)	-0.044	(0.050)	-0.010	(0.078)
Accreditor: Specialized	-0.103*	(0.056)	-0.042	(0.054)	0.010	(0.067)
Accreditor: Other	-0.106***	(0.039)	-0.020	(0.045)	0.035	(0.068)
Adding accreditor type						
All programs	-0.093***	(0.027)	-0.036	(0.030)	0.012	(0.043)
Adding program-level information						
All programs	-0.080***	(0.027)	-0.019	(0.031)	0.014	(0.042)
Accreditor: ACICS	-0.053	(0.043)	-0.027	(0.052)	0.001	(0.076)
Accreditor: Specialized	-0.062	(0.049)	-0.014	(0.050)	0.029	(0.064)
Accreditor: Other	-0.070*	(0.040)	0.011	(0.048)	0.046	(0.069)

Model	Bandwidth 1000		Bandwidth 500		Bandwidth 250	
	Coeff.	(SE)	Coeff.	(SE)	Coeff.	(SE)
Panel B: Conditional on the college remaining open.						
Empty model						
All programs	-0.079***	(0.028)	-0.045	(0.028)	-0.011	(0.041)
Accreditor: ACICS	0.021	(0.065)	0.042	(0.074)	0.109	(0.106)
Accreditor:						
Specialized	-0.107***	(0.038)	-0.100**	(0.039)	-0.096*	(0.055)
Accreditor: Other	-0.068*	(0.038)	-0.005	(0.043)	0.044	(0.064)
Adding demographics and outcomes						
All programs	-0.066**	(0.028)	-0.036	(0.030)	0.026	(0.043)
Accreditor: ACICS	0.015	(0.067)	0.033	(0.069)	0.075	(0.098)
Accreditor:						
Specialized	-0.095**	(0.038)	-0.086**	(0.039)	-0.065	(0.056)
Accreditor: Other	-0.075**	(0.036)	-0.016	(0.044)	0.061	(0.068)
Adding accreditor type						
All programs	-0.048*	(0.027)	-0.019	(0.029)	0.033	(0.043)
Adding program-level information						
All programs	-0.050*	(0.028)	-0.011	(0.030)	0.032	(0.041)
Accreditor: ACICS	-0.014	(0.068)	0.023	(0.068)	0.044	(0.095)
Accreditor:						
Specialized	-0.103***	(0.036)	-0.085**	(0.037)	-0.053	(0.051)
Accreditor: Other	-0.052	(0.038)	0.017	(0.045)	0.069	(0.067)

Notes:

- (1) Each row represents the results of a separate regression.
- (2) * represents $p < .10$, ** represents $p < .05$, and *** represents $p < .01$.
- (3) Standard errors are clustered at the opeid level.

Appendix 1: Baseline continuity tests of covariates (pass versus zone).

Variable	\$250 bandwidth		\$500 bandwidth		\$1,000 bandwidth	
	Coeff.	(SE)	Coeff.	(SE)	Coeff.	(SE)
3-year default rate (pct)	-0.007	(0.010)	-0.001	(0.007)	-0.003	(0.005)
1-year repayment rate (pct)	0.017	(0.019)	0.013	(0.014)	0.018*	(0.011)
Pct female	0.019	(0.029)	0.010	(0.021)	0.015	(0.015)
Pct black	0.013	(0.032)	0.007	(0.025)	-0.013	(0.019)
Pct Hispanic	0.069*	(0.035)	0.056**	(0.025)	0.047***	(0.017)
Log FTE enrollment	-0.148	(0.270)	-0.002	(0.182)	-0.139	(0.136)
Log per-FTE total revenue	-0.431*	(0.252)	-0.439**	(0.183)	-0.240*	(0.144)
Pct revenue from Title IV	0.013	(0.013)	0.006	(0.010)	-0.002	(0.008)
Accreditor: regional	-0.017	(0.039)	0.026	(0.031)	-0.010	(0.022)
Accreditor: specialized	0.141**	(0.060)	0.117***	(0.045)	0.138***	(0.033)
Accreditor: ACICS	-0.162***	(0.061)	-0.153***	(0.045)	-0.132***	(0.035)
Accreditor: other national	0.037	(0.062)	0.009	(0.044)	0.003	(0.033)
CIP: personal services	0.096	(0.061)	0.083*	(0.044)	0.124***	(0.033)
CIP: health	-0.056	(0.068)	-0.072	(0.049)	-0.122***	(0.037)
CIP: skilled trades	-0.057	(0.039)	-0.030	(0.029)	-0.017	(0.021)
CIP: business	0.004	(0.035)	-0.006	(0.024)	0.007	(0.017)
CIP: other	0.014	(0.038)	0.025	(0.026)	0.007	(0.019)
Certificate program	0.078	(0.062)	0.030	(0.044)	0.033	(0.032)
Associate degree program	-0.034	(0.057)	-0.016	(0.042)	-0.013	(0.031)
Bachelor's degree program	-0.044*	(0.026)	-0.014	(0.017)	-0.020	(0.012)
Number of observations	1,181		2,148		3,486	

Sources: See Table 2.

Notes:

(1) * signifies $p < .10$, ** signifies $p < .05$, and *** signifies $p < .01$.

(2) All variables are measured in the 2015-16 or 2014-15 academic year as noted in Table 2. For a small number of observations, data for preceding years were used.

(3) Positive values mean that the variable is larger for programs in the zone relative to those that passed, since the measure is based on debt burdens away from passing.

Appendix 2: Baseline continuity tests of covariates (zone versus fail).

Variable	\$250 bandwidth		\$500 bandwidth		\$1,000 bandwidth	
	Coeff.	(SE)	Coeff.	(SE)	Coeff.	(SE)
3-year default rate (pct)	-0.012	(0.012)	-0.008	(0.009)	0.001	(0.006)
1-year repayment rate (pct)	0.000	(0.019)	-0.008	(0.015)	-0.012	(0.011)
Pct female	-0.034	(0.038)	0.003	(0.026)	-0.031	(0.020)
Pct black	-0.022	(0.052)	-0.022	(0.036)	-0.014	(0.026)
Pct Hispanic	0.045	(0.045)	0.045	(0.032)	0.026	(0.023)
Log FTE enrollment	0.932**	(0.438)	0.505	(0.318)	0.611***	(0.233)
Log per-FTE total revenue	0.017	(0.363)	-0.180	(0.282)	-0.333	(0.231)
Pct revenue from Title IV	-0.003	(0.020)	-0.009	(0.015)	0.008	(0.011)
Accreditor: regional	0.094	(0.066)	0.065	(0.054)	0.095**	(0.043)
Accreditor: specialized	-0.061	(0.081)	-0.061	(0.059)	-0.127***	(0.045)
Accreditor: ACICS	-0.039	(0.091)	-0.064	(0.065)	-0.032	(0.047)
Accreditor: other national	0.018	(0.074)	0.068	(0.054)	0.073*	(0.040)
CIP: personal services	-0.082	(0.093)	-0.083	(0.066)	-0.116**	(0.048)
CIP: health	-0.035	(0.085)	0.009	(0.063)	-0.019	(0.045)
CIP: skilled trades	0.009	(0.033)	0.005	(0.027)	0.010	(0.024)
CIP: business	0.010	(0.058)	-0.020	(0.040)	0.000	(0.028)
CIP: other	0.098	(0.070)	0.089*	(0.051)	0.126***	(0.045)
Certificate program	-0.114	(0.097)	-0.121*	(0.071)	-0.187***	(0.052)
Associate degree program	0.117	(0.099)	0.085	(0.074)	0.101*	(0.055)
Bachelor's degree program	-0.002	(0.052)	0.036	(0.038)	0.086***	(0.032)
Number of observations	518		1,066		2,326	

Sources: See Table 2.

Notes:

(1) * signifies $p < .10$, ** signifies $p < .05$, and *** signifies $p < .01$.

(2) All variables are measured in the 2015-16 or 2014-15 academic year as noted in Table 2. For a small number of observations, data for preceding years were used.

(3) Positive values mean that the variable is larger for programs in the zone relative to those that passed, since the measure is based on debt burdens away from passing.