THE EFFECTS OF STATE PERFORMANCE FUNDING POLICIES ON STUDENT DEBT AND REPAYMENT

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Introduction

Over the last two decades, student loan debt has become one of the most prominent concerns in American society. Outstanding student debt has more than quadrupled in inflation-adjusted dollars, approaching $1.6 trillion by mid-2021 (Federal Reserve Bank of New York, 2021). The share of students who ever default on their federal student loans has risen substantially over time, with much higher default rates among Black borrowers and students who did not complete college than other students (Houle & Addo, 2019; Scott-Clayton, 2018).

Default rates are reduced somewhat by the presence of income-driven repayment plans that reduce or eliminate payments if borrowers have low earnings (Karamcheva et al., 2020). However, income-driven repayment plans require annual certification of income and are confusing for many borrowers to navigate (Pew Charitable Trusts, 2020), meaning that many students fail to remain enrolled in the programs. And even if students are able to remain in income-driven repayment, the inability to repay loans is a serious policy concern. If students are unable to repay their loans without government assistance, it raises concerns about the economic return on their investment. Taxpayers are ultimately responsible for student loan balances that are not repaid, and the Congressional Budget Office projects that more than $200 billion in student loans disbursed in the 2020s will eventually be forgiven (Karamcheva et al., 2020).

Concerns about the value of higher education and its contribution to the public good have increased efforts to hold colleges accountable for student outcomes (Kelchen, 2018a). One prominent accountability effort is for states to tie a share of their funding for public colleges and universities to student outcomes. Thirty-two states used performance-based funding (PBF) to allocate at least some funding to public higher education in Fiscal Year 2020, and 41 states have done so at some point over the last 25 years (Rosinger et al., 2021).

Historically, the majority of PBF systems have rewarded colleges for the number of students who make progress towards earning a credential and eventually graduate. But as policymakers have become increasingly concerned about the return on an investment in higher education to students and society (Blagg & Blom, 2018; Kelchen, 2018a), a growing number of PBF policies have directly incentivized colleges based on the earnings or job placements of their former students or the number of students graduating in high-demand or STEM fields that tend to have higher earnings (Rosinger et al., 2021). During the 2010s, the share of states including workforce outcomes in their PBF systems increased from one-third of PBF states to two-thirds of PBF states (authors' calculations based on reviews of state policy documents).

A sizable body of literature has examined the effects of PBF policies on student access and completion (see Ortagus et al. (2020) for a review of the literature). Most research has found modest or no effects on enrollment and degree production, with some evidence that PBF has had unintended consequences for students from historically underrepresented groups. Research on post-college outcomes is scarce, and there is no published research examining whether PBF policies have affected student debt and repayment outcomes. These outcomes are particularly important from an equity perspective because institutional responses to PBF have often benefited students from higher-income families and white students at the expense of lower-income and racially minoritized students (Kelchen & Stedrak, 2016; Umbricht et al., 2017). If PBF policies benefit already-advantaged students while increasing repayment challenges for less-advantaged students, existing wealth gaps will continue to grow.

If PBF policies are effective in improving the quality of education that students receive and/or students' jobs placements or earnings, we would expect that student loan repayment rates would increase due to improved labor market outcomes. However, the hypothesized effects on student loan debt are less clear. If institutions focus on improving affordability to help more students have the financial means to complete their credentials, then student debt could decrease. On the other hand, if institutions instead invest in additional services to improve student outcomes and pass the charges along to students, then debt could increase. Another consideration would be a scenario in which institutions successfully respond to PBF incentives focused on student persistence but are unable to affect whether those same students actually complete a credential, as such a scenario could lead to increases in student debt levels for students who earn additional college credits but do not complete a degree. Chakrabarti et al. (2020) found a relationship between increased state funding and decreased student debt for four-year institutions, but increased state funding was associated with more debt and better repayment outcomes in the two-year sector. However, we do not know how state funding linked to student outcomes in PBF systems relates to these same outcomes.

In this paper, we leverage the most thorough source of data on states' PBF policies that includes information on the percent of funds tied to student outcomes and the existence of metrics based on workforce outcomes or

the success of historically underrepresented groups in higher education. Our research questions are the following:

1. To what extent does the presence of a funded PBF policy affect student debt and repayment outcomes?

2. To what extent do variations in state commitments to PBF affect student debt and repayment outcomes?

3. To what extent does the presence of workforce or equity metrics in state PBF policies affect student debt and repayment outcomes?

4. Do the effects of PBF policy design vary between all students and historically underrepresented groups of students?

Conceptual Framework and Literature Review

The concept of performance funding in higher education is an outgrowth of the New Public Management movement in public administration, in which public-sector organizations were required to meet explicit performance metrics in an effort to improve organizational accountability (Osborne & Gaebler, 1992). The logical rationale of introducing performance metrics is underpinned by principal-agent theory, which postulates that organizations will respond to financial incentives from funders and make changes as needed to meet performance metrics (Jensen & Meckling, 1976; Spence & Zeckhauser, 1971). However, a large body of literature has found that these accountability systems throughout public management have generally been ineffective in improving outcomes and have actually led to some unintended consequences (Denhardt & Denhardt, 2015; Moynihan, 2006; Radin, 2000).

In the case of PBF, state governments have incentivized colleges and universities to focus on student outcomes, such as completing credentials, since Tennessee adopted the first PBF system in 1979 (Ortagus et al., 2020). Quasi-experimental research has generally showed a mix of null and modest positive or negative effects of PBF policies on the number of associate and bachelor's degrees awarded (Boland, 2020; Favero & Rutherford, 2020; Hillman et al., 2014; Hillman et al., 2015; Hillman et al., 2018; Li & Kennedy, 2019; Li & Ortagus, 2019; Ortagus et al., 2021b; Tandberg et al., 2014; Ward & Ost, 2021). However, there is also some evidence that longstanding PBF programs may be more effective in improving student outcomes as institutions are able to better respond after building capacity (Tandberg & Hillman, 2014).

While PBF remains firmly ensconced in the higher education finance landscape, there is broad recognition that funding based on student outcomes can lead to unintended consequences on students from historically marginalized groups in higher education. Prior research has found negative effects of PBF on racially

minoritized students, minority-serving and lesser-resourced institutions, and Pell recipients due to institutions becoming more selective or otherwise trying to shape their student body in a way that will generate more funds (Gándara & Rutherford, 2020; Hagood, 2019; Hillman & Corral, 2017; McKinney & Hagedorn, 2017; Umbricht et al., 2017). Advocacy groups and researchers now generally consider equity metrics that reward colleges for graduating underrepresented student groups to be a best practice in PBF systems (Cielinski & Pham, 2017; Elliott et al., 2021), and there is some evidence that including equity metrics may help to reduce the unintended consequences associated with PBF (Gándara & Rutherford, 2018; Kelchen, 2018b).

There have been both intended and unintended effects of PBF policies on credentials awarded that could potentially affect students' post-college outcomes, such as student loan debt and repayment. One intended effect of some states' PBF systems is to encourage students to major in STEM, as these fields tend to produce graduates who outearn students in other fields (Melguizo & Wolniak, 2012; Webber, 2014). Li (2020) showed that PBF policies that incentivize colleges to produce more STEM graduates are successful in achieving that outcome. However, several studies have also found that community colleges have increased short-term certificate production as a result of PBF at the expense of associate degrees with higher labor market returns (Hillman et al., 2015; Hillman et al., 2018; Li & Ortagus, 2019). The prioritization of short-term certificates in response to a PBF system could result in less debt for students, but such a response would also likely reduce student loan repayment rates.

Tying a share of state funding directly to the earnings of former students or other labor market outcomes is becoming an increasingly popular component of PBF systems (Rosinger et al., 2021). Beginning in 2013, the Texas State Technical College system had 85% of its formula funding for instruction tied to the extent to which former students earn more than the minimum wage (Selingo & Van Der Werf, 2016). Florida adopted legislation in 2021 that tied all state funding for workforce-oriented programs at community colleges to job placement and earnings, with a bonus for improving the earnings of historically underserved groups of students (Fain, 2021). The only research to consider the effect of PBF policies on earnings was Kelchen et al. (2021), which found some positive effects of PBF on earnings in the four-year sector and no effects in the two-year sector. Yet we do not know how PBF policies influence related student outcomes such as student debt and loan repayment.

Sample, Data, and Methods

We used the first comprehensive longitudinal dataset of state performance funding policy details combined with data from the U.S. Department of Education on student outcomes and institutional characteristics to examine our research questions. The following section contains details on our sample, data, and methods.

Sample

We analyzed degree-granting two-year and four-year public colleges and universities that operated at some point between Fiscal Years 1997 and 2019, classifying institutions by level using the most recent Carnegie basic classification available. This means that community colleges with a small number of baccalaureate degree programs are included in the two-year sector instead of the four-year sector, which does not follow the default Integrated Postsecondary Education Data System (IPEDS) classification that relies on the highest degree awarded. Our analytic sample includes 571 four-year universities and 1,111 two-year colleges.

Data

Data on state PBF policies come from the first-ever detailed longitudinal dataset of policy details compiled by the InformEd States team through examining state policy documents and communicating with state higher education agencies and system offices to obtain more information as needed (Ortagus et al., 2021a).[1] This dataset contains information on PBF policies from Fiscal Years 1997 through 2020 and data are typically at the state by educational level (such as four-year public universities in Wisconsin). If only some institutions within a level were subject to PBF in a given year (such as two-year public colleges in Wisconsin for certain years), we used these subgroups for breaking down the data.

The InformEd States dataset includes several important details about state policies. It can distinguish between PBF policies that actually received funding in a given year and PBF policies that were approved to be in effect but were not funded. We found that nearly 20% of approved PBF observations were not funded, which could water down the effects of PBF if not appropriately considered in analyses. The dataset also includes the percentage of state general funds for higher education tied to performance metrics, which allows us to consider the intensity of PBF policies. Finally, there are indicators for whether there were equity provisions that incentivized outcomes for students from historically underrepresented groups (low-income, racially minoritized, adult, and/or academically underprepared students) or workforce provisions that incentivized STEM or health care majors as well as student earnings outcomes. We combined the workforce provisions into one metric because states frequently included several of these provisions at the same time or allowed colleges to choose from a menu of workforce-related options.

Table 1 contains details about when states had funded PBF systems, workforce metrics, and equity metrics across two-year and four-year institutions between Fiscal Years 1997 and 2020. The number of states with PBF policies has ebbed and flowed over time, with declines in funded systems occurring in the aftermath of the 2001 recession and the Great Recession that match prior research (Dougherty et al., 2012). In the early 2010s, there was a sharp increase in the number of states with a funded PBF system. In the four-year sector,

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[1] For more details on the data collection process, see Kelchen et al. (2019).

the number of PBF states rose from six in 2011 to 22 in 2020 while rising from six in 2011 to 30 in 2020 for community colleges. While some states, such as Kentucky and Missouri, had workforce and equity provisions in the late 1990s, the share of states with these additional metrics increased sharply during the 2010s. By 2020, nearly all four-year PBF systems had a workforce and an equity metric compared to about two-thirds of two-year PBF systems.

See Table 1: Funded PBF status by state and year, 1997-2020.

There are two primary sets of outcomes in this analysis, which come from the U.S. Department of Education's College Scorecard. The first set of outcomes is median federal undergraduate student debt burdens (excluding Parent PLUS loans) among those who borrowed. The College Scorecard provides two-year pooled cohorts for students entering repayment from Fiscal Years 1997 and 1998 to Fiscal Years 2018 and 2019. Each cohort except for 1997 and 2019 show up in two different data files. For example, the FY2015 cohort is pooled with 2014 in one file and 2016 in another file. To estimate the 2015 cohort, we averaged the two files that contained that cohort. We then adjusted all of these debt burdens into 2020 dollars using the Consumer Price Index.

Our primary measure of student debt is the median federal student debt of all students at a given college who entered repayment (defined as six months after leaving college) in a fiscal year. There are separate measures for non-completers and completers, which we considered due to potential effects on retention or completion rates at particular colleges that could affect the composition of the non-completer and completer pools. We also examined several other measures that reflect historically underrepresented student groups. These include family income tercile (less than $30,000 per year, $30,001 to $75,000 per year, and $75,001 per year), Pell receipt at any point in college, dependency status on the Free Application for Federal Student Aid (as a proxy for older versus younger students), and first-generation status. Unfortunately, there are no data available on debt by race/ethnicity because the FAFSA currently does not ask students about how they self-identify.

The second set of outcomes is the student loan repayment rate, which is defined as the percentage of students at an institution repaying at least $1 in principal on their federal student loans. This reflects whether students are doing well enough in the labor market to make progress repaying their loans. While borrowers can use income-driven repayment plans to make their monthly payments more manageable, students enrolled in these plans tend to have higher debt burdens relative to their income and thus are less likely to repay principal from the outset (Conzelmann et al., 2019).

Data on repayment rates were available for cohorts entering repayment between Fiscal Years 2006 and 2014, with two cohorts being combined in the data and separately estimated as described above. We used repayment rate metrics one year and three years after entering repayment because those were available for the most cohorts relative to five-year and seven-year rates and because repayment rates change little over a longer time horizon (Kelchen & Li, 2017). We used the same subgroup measures for loan repayment rates as for median

student debt, with the exception of data not being available by student completion status (non-completer versus completer).

We also included a number of college characteristics that have been shown to affect student debt and repayment rates independent of PBF policies (e.g., Hillman, 2015; Kelchen & Li, 2021) and could also affect how institutions respond to PBF incentives. These variables were in-state tuition and fees, average grants per student, percent of students receiving aid, state appropriations per student, local appropriations per student, instructional expenditures per student, and full-time equivalent student enrollment. We also included demographic characteristics and economic conditions of states that could shape both college enrollment patterns and labor market outcomes. These covariates included per-capita income, unemployment rate, and population size by race and ethnicity.

Table 2 contains the summary statistics of our dataset, broken down by sector and whether a college ever operated under PBF between 1997 and 2019. Notably, the share of funds tied to student outcomes during this panel was relatively low, with a mean of only four to five percent of state appropriations being subject to PBF among funded observations. In both the two-year and four-year sectors, debt burdens were higher at colleges that never had PBF than those that ever had PBF. Student loan repayment rates were also slightly higher at never-PBF than ever-PBF colleges, and in-state tuition prices and state appropriations were substantially higher at never-PBF institutions.

See Table 2: Summary statistics of the dataset.

Methods

We used two different econometric methods to estimate the effect of the presence of funded PBF systems and policy characteristics on student debt (logged) and repayment outcomes. The first method, which we preregistered through the Open Science Framework, is generalized difference-in-differences (DiD) with two-way (state and year) fixed effects. This method is frequently used in state policy research because it can be used with continuous treatment variables, when the treatment is adopted in different years across states, and when states adopt, abandon, and then re-adopt the treatment. We followed guidance of other studies that examined PBF policies nationally (e.g., Gándara & Rutherford, 2020; Hagood, 2019) by using all untreated observations as the comparison group. We did this because only nine states never adopted PBF during the period of study and prior research suggests state characteristics are only weakly related to PBF adoption (Li, 2017; McLendon et al., 2006).

The PBF policy details in the InformEd States dataset allowed us to estimate the effects of several policy characteristics. We first considered the effects of having any funded PBF policy, in which we considered approved but not funded PBF policies as a part of the comparison group. If colleges responded to policies that were not funded, then any treatment effects that we estimate are likely on the conservative side. To consider

whether dosage affected student outcomes, we next used a continuous measure of the percentage of state funding tied to performance metrics. As an alternative measure of dosage (available in the Appendix), we divided funded PBF systems into terciles based on observed dosages between Fiscal Years 1997 and 2019 and compared them to observations without funded PBF. The tercile cutoffs were 1.11% and 5.00% for two-year colleges and 1.75% and 5.50% for four-year universities. The final two sets of analyses consider the strength of incentives present in some PBF systems. One analysis includes indicator variables for whether colleges were subject to a PBF policy with workforce metrics or a PBF policy without workforce metrics, with colleges not operating under a funded PBF policy as the reference group. We then conducted a similar analysis for equity metrics.

All of our regressions controlled for the institution-level and state-level covariates detailed in Table 2.[2] We included institution fixed effects to account for time-invariant heterogeneity (e.g., institutional culture or history) and time fixed effects to account for common shocks, such as changes to federal student aid policy or the effects of recessions, that are likely to influence enrollment and student outcomes in similar ways regardless of PBF policy changes. We adjusted all financial variables into 2020 dollars using the Consumer Price Index and logged financial and enrollment variables. Standard errors were clustered at the OPEID level that the U.S. Department of Education's Office of Federal Student Aid used to report debt and repayment data through the College Scorecard. We used $p<.01$ as the threshold for statistical significance instead of conducting a Bonferroni correction for multiple hypothesis testing to reflect the number of separate regressions in this paper.

A particular analytic challenge with debt and repayment outcomes is that data are reported on when students left college and entered repayment instead of when they started college. We attempted to use covariates and PBF characteristics from the year of likely college entry in our preferred specification, and we had to make some assumptions to do so. For debt at graduation, we assumed that students took three years to graduate from a two-year college and five years to graduate from a four-year university since a large share of students take longer than the traditionally expected period of time to graduate. For example, while roughly 34% of first-time, full-time students who began at public universities graduated within four years, an additional 19% graduated within five years and five percent more graduated within six years (National Center for Education Statistics, 2021). Since many students, especially at community colleges, attend part time, we used a slightly longer time to graduation (150% of the on-time graduation period).

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[2] We also ran regressions without covariates, and the results were generally similar. For the sake of brevity, we do not present them in the paper but they are available upon request.

For the student debt of non-completers, we used the ratio of non-completer debt to completer debt (from Table 2) along with increases in annual federal student loan borrowing limits to inform our estimate of the length of time students remained in college. This led us to assume in our preferred specification that students dropped out of two-year institutions after approximately one year and dropped out of four-year institutions after approximately two years. Finally, all of the other student debt measures and all repayment measures combine non-completers and completers into one measure. Based on completion rates and the estimated time periods for non-completers and completers, we assumed that the typical student at a two-year college attended for two years and the typical student at a four-year university attended for four years. We ran specifications using one year before and after our preferred time periods, and the results were generally similar.[3] The repayment rate outcomes add one year (for one-year rates) or three years (for three-year rates) onto the time period used for debt outcomes. This means that one-year repayment rates at community colleges are measured three years after college entry.

While generalized DiD analyses allow for treatments to be introduced and removed across multiple time periods, a potential limitation of this method is that treatment effects may not be consistent over time like canonical DiD analyses in which treatment takes place in one time period and the treatment is never removed (Goodman-Bacon, 2021). To account for issues with time-varying treatment adoption outlined in recent econometrics literature (e.g., Borusyak et al., 2021; Sun & Abraham, 2020) and following best practices outlined by Furquim et al. (2020), our second method includes a series of event study techniques. These event study analyses allow for the use of binary treatment variables; to this point, event studies do not support continuous or categorical treatment variables or observations moving in and out of treated statuses. We used four different event study specifications in Stata that handle parallel trends assumptions in slightly different ways (Marcus & Sant'Anna, 2021), as the field has yet to identify a single preferred method.

The four event study techniques that we ran were *did_imputation* (Borusyak et al., 2021), *eventdd* (Clarke & Schyte, 2020), *did_multiplegt* (de Chaisemartin et al., 2021), and *eventstudyinteract* (Sun & Abraham, 2020), using the same covariates as in the DiD models. The only methodological difference between the two models was that we had to cluster standard errors at the IPEDS UnitID level to satisfy the requirements of the commands; this results in slightly less conservative standard errors than using OPEIDs. We then used the *eventplot* command in Stata (Borusyak, 2021) to plot results from all four techniques on the same graph.

We used two different analytic samples for the event study models. Beginning with all states that had PBF at some point between 1997 and 2019 (35 states in the two-year sector and 33 in the four-year sector), we first dropped states that had already adopted PBF in 1997. This exclusion of five states in the two-year sector and

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[3] For the sake of brevity, these results are available upon request from the authors.

six states in the four-year sector allows us to have pre-treatment observations for all institutions that adopted PBF during our panel. The second analytic sample fits the canonical event study requirement by excluding treatment states that dropped PBF before the end of the panel. Some states kept PBF policies on the books but did not fund the policies in certain years due to budget shortfalls; we counted these situations as a continuous treatment period. This resulted in 20 states being in the treatment group for two-year colleges and 17 for four-year universities. In both cases, the control group is institutions that had yet to adopt a funded PBF model. We also estimated DiD models with funded PBF as the policy variable with these two restricted samples to better compare the results with the event study results.

Limitations

Although our outcome measures of student debt and repayment rates are crucial for policymakers and researchers to consider, they do have several important limitations. The first limitation is that only federal undergraduate student loans were included in the College Scorecard dataset until the late 2010s. This excludes private loans, Parent PLUS loans, and federal graduate student loans. Together, these three sources of loans made up approximately 17% of all borrowing for college in Fiscal Year 1997 and 35% of borrowing in Fiscal Year 2019 (authors' calculations using data from Ma et al. (2020)). While Parent PLUS loans and graduate student loans are available in the newest iteration of the College Scorecard, they are only presented for students who completed a credential and the majority of PBF systems do not incentivize graduate student outcomes or do so for only a subset of research universities.

While the measures of student debt in this analysis have been updated annually in the same format in the College Scorecard since the initial release in 2015, the repayment measure has undergone changes that limit the period of analysis. The measure that we use (a borrower-based repayment rate) was last updated in 2018 with data from the cohort entering repayment in Fiscal Year 2014. In 2020, the Department of Education switched to a repayment rate that measures the share of dollars that a cohort still owes after entering repayment. This dollar-based measure is first available for cohorts entering repayment in Fiscal Years 2017 and 2018 (for one-year rates) and is not directly comparable to the previous borrower-based measure. Nonetheless, if the dollar-based measure continues to be included, it can be used for future analyses of the effects of PBF on repayment outcomes.

Another limitation of both the debt and repayment measures is that they are measured at the Federal Student Aid OPEID level instead of the IPEDS UnitID level. Many institutions (at the UnitID level) have their own program participation agreement with Federal Student Aid for federal financial aid, but some systems share agreements (Kelchen, 2019). This means that debt and repayment data reflect multiple UnitIDs in some cases but not others. About 20% of the sample exhibited this parent-child reporting relationship, with more two-year colleges than four-year colleges being affected. Some of these clusters were within the same degree level

(two-year or four-year), such as Rutgers University and Louisiana's technical college system. In other cases, clusters crossed degree levels. Regional branch campuses of Ohio public universities and Pennsylvania State University followed this pattern. But since these relationships were generally stable over time and systems typically had the same PBF metrics, these should not materially affect the direction of our estimates.

A final limitation of our research is that we were unable to control for all of the other policies and practices that could have also affected student debt and repayment rates at the institution level during the full period of study. Some of these include the intensity of merit aid programs at particular institutions (Sjoquist & Winters, 2015), excess credit hours policies designed to encourage students to graduate more quickly (Kramer et al., 2018a), caps or freezes on tuition increases (Deming & Walters, 2017), and tuition-setting authority (Kramer et al., 2018b). While state-level data exist for some of these policies in certain years, there is currently insufficient institution-level data on these policies over time. This is an area in which additional data collection would be valuable to the field of higher education.

Results

We begin by presenting the results of DiD regressions using a binary measure of a funded PBF policy as the treatment of interest, with the coefficients shown in Table 3. In the four-year sector, there is no effect of having a funded PBF policy on debt for all students. But PBF yielded a 3.3 percent increase in the student debt of those who did not finish degrees (p<.005). This could be a result of students progressing further into college as a result of PBF, even if they did not eventually graduate. Since there are some labor market returns to getting closer to completing a credential (e.g., Giani et al., 2020), this finding may not mean that non-completers are necessarily worse off as a result of not completing a degree under PBF. Unfortunately, since loan repayment metrics are not available by completion status, we cannot examine this finding in more detail. In the two-year sector, the same general story holds. There was an increase in student debt for all students (1.8 percent, p<.01), but it was driven by non-completers (2.4 percent, p<.001).

See Table 3: Effects of a funded PBF policy on student debt and repayment outcomes.

Turning to subgroups of interest, increases in student loan debt as a result of PBF policies appear to be concentrated among students from middle-income to higher-income families. Increases in debt were also larger among dependent students than independent students, while there were no consistent differences by Pell recipient status. There were no significant effects of the presence of a funded PBF policy on student loan repayment outcomes either one year or three years after entering repayment.

We conducted two additional DiD analyses with restricted samples and a binary measure of PBF to match the event study analyses. Appendix 1 contains the results for omitting colleges that operated under PBF in 1997 (Panel A) and also omitting colleges that operated under PBF systems that were abandoned before 2019 (Panel B). The results for excluding colleges operating under PBF in 1997 are generally similar to the main sample,

but restricting the treatment group to colleges that were first subject to PBF after 1997 and were continuously treated through 2019 resulted in larger increases in debt in the four-year sector and large increases in repayment rates for the two-year sector. However, since we do not find consistent changes in repayment rates in our main models, we interpret this result with caution.

Our next set of DiD analyses used more nuanced measures of PBF dosage. We repeated the analyses for the full sample using a continuous measure of the percentage of state funding tied to student outcomes as our treatment variable. As shown in Table 4, the dosage metric is generally statistically insignificant from zero. There are some negative effects of dosage on debt in the two-year sector, especially for graduates and students from higher-income families. But in general, the dosage effects do not move in the same direction as the binary treatment effects. The dosage terciles (Appendix 2) tell a slightly different story. Low-dosage PBF systems (generally less than 2% of state funding tied to performance metrics) are associated with more debt among non-completers of low-dosage PBF colleges relative to no-PBF colleges, and point estimates of repayment rates increase as dosage increases for two-year colleges.

See Table 4: Effects of PBF dosage (percent) on student debt

and repayment outcomes.

We then considered the effects of workforce provisions within PBF policies through DiD analyses that had indicator variables for PBF with workforce provisions and PBF without workforce provisions, with no funded PBF as the reference group (Table 5). While there were no effects of PBF with or without workforce metrics on student repayment outcomes, the effects of PBF policy design had some different effects on student debt. Again, the increases in debt were primarily driven by non-completers in both sectors. The increases in debt in the four-year sector were primarily concentrated at colleges that had PBF policies without workforce metrics (6.0 percent, p<.005). At community colleges, however, the increases in debt for non-completers from Table 3 were driven by institutions operating under PBF policies with workforce metrics (3.7 percent, p<.001).

See Table 5: Effects of PBF workforce metrics on student debt and repayment outcomes.

Our final DiD analysis examined the effects of equity metrics using the same framework as the workforce metrics analysis (comparing PBF with equity metrics and PBF without equity metrics to no funded PBF policy). As shown in Table 6, there are no effects of PBF equity metrics on student loan repayment rates. In the four-year sector, the increase in debt among non-completers appears to be driven by colleges subject to equity provisions (4.1%, p<.005). In the two-year sector, the increase in debt among non-completers is similar regardless of whether equity metrics are included.

See Table 6: Effects of PBF equity metrics on student debt and repayment outcomes.

We then conducted event study analyses using the presence of a funded PBF policy as the policy variable of interest, combining four different event study models onto one graph for each outcome. Figures 1-4 show the event study plots for student debt as the outcome across subgroups, and Figures 5-8 show the plots for one-year repayment rates. For the sake of brevity, we do not present three-year repayment rates here, but they are available upon request from the authors.

Figure 1 shows the event study analyses for four-year institutions omitting colleges that operated under PBF in Fiscal Year 1997. In our DiD model with a binary treatment variable (Figure 1), our only significant finding was an increase in debt for non-completers. This was largely confirmed by the overall event study results. However, the four separate event study models produced somewhat different results. The *eventstudyinteract* model had the largest estimated treatment effects, while *did_multiplegt* was frequently negative and significant in post-treatment years. Using the canonical event study sample that also excluded colleges that no longer operated under PBF by 2019, the DiD estimates for debt were much larger (Figure 2). The DID and event study models produced reasonably similar findings.

The two-year DiD models showed increases in debt for non-completers in the sample excluding colleges with PBF in 1997 and no effects for the canonical sample. Again, this generally matches the event study models (Figure 3 excluding PBF institutions in 1997 and Figure 4 for the canonical sample). The event study models in Figure 3 clustered just above zero for non-completers during the period of implementation, although the models differed considerably on pre-treatment estimates. The *eventdd* coefficients were strongly negative, while *eventstudyinteract* and *did_imputation* were generally larger and positive. For the canonical sample, *did_imputation* and *multiplegt* had negative coefficients, while *eventstudyinteract* and *did_multiplegt* were positive.

See Figures 1-4: Debt Event Studies.

For one-year repayment rates, most models were generally statistically insignificant in the DiD models. The event study models typically match that result during the year in which treatment was introduced, with the exception of *eventstudyinteract*. This event study model frequently produced large and statistically significant coefficients (even when imprecisely estimated) across all four models during pre-treatment and early post-treatment years. In the four-year model excluding colleges with PBF in 1997 (Appendix 1, Panel A), the other three models produce coefficients that are bunched together around zero. However, *did_imputation* is the one model with negative pre-treatment estimates. The same is generally true in the canonical model (Figure 6), although *did_multiplegt* produced the largest coefficients in most treatment years and *eventdd* had the smallest coefficients. For two-year colleges excluding colleges with PBF in 1997 (Figure 7), there are generally null findings with the four models producing similar results. Finally, using the canonical two-year sample

(Figure 8), *eventdd* and *eventstudyinteract* are positive and significant post-treatment, while *did_multiplegt* and *did_imputation* produce coefficients around zero.

See Figures 5-8: Repayment Event Studies.

Discussion and Future Work

During the same period in which 41 states adopted PBF policies to hold public colleges and universities more accountable for their students' outcomes (Rosinger et al., 2021), student loan debt has risen to unprecedented levels. A variety of stakeholders and influential advocacy groups have expressed concerns about student debt and repayment, especially given disparate impacts of debt on Black and low-income students and students who do not complete a degree. Despite growing concerns about rising student loan debt, prior research has shown that educational debt may actually benefit college students in the long run as long as students are able to complete college and repay their student loans (Hout, 2012). However, disparities in student loan debt and repayment highlight the importance of considering these outcomes for specific student groups.

In this paper, we offer the first analyses of the impact of various types of PBF policies on students' longer-term, post-college outcomes, such as student loan debt and repayment. Taken together, we find no relationship between PBF adoption and student repayment outcomes across numerous specifications. We also report no relationship between implementing a funded PBF policy and student loan debt for all students; however, we find consistent evidence of a negative impact of PBF adoption on student loan debt among college non-completers in particular in both the two- and four-year sector.

Our research raises important implications for methodological approaches for evaluating the impacts of educational policies as well as for higher education policy. Methodologically, while the field has coalesced around the importance of conducting event study analyses in addition to the traditional generalized difference-in-differences analyses when examining policies with time-varying adoption (e.g., Borusyak et al., 2021; Goodman-Bacon, 2021; Sun & Abraham, 2020), we show that four prominent event study techniques sometimes generate disparate results. This suggests that future research examining the impacts of educational policies implemented at different times should use multiple techniques to examine the consistency of results across methods.

The implications of our findings also reveal several considerations for higher education policy and practice. From a policy lens, the specific design elements of PBF systems have changed in non-trivial ways over the years, but researchers rarely consider the impact of PBF policy design on outcomes of interest (Ortagus et al., 2020). This study offers insight into how workforce and equity metrics, both of which have become common features of PBF policies in recent years (Rosinger et al., 2021), shape student loan debt and repayment.

We find that workforce metrics increase the debt of non-completers in the community college sector, while PBF without workforce metrics increase the debt of four-year non-completers. The presence of equity metrics resulted in more debt among non-completers in the four-year sector but no difference among community college students. This raises questions about the strength of workforce and equity provisions across sectors and the resulting incentives in PBF systems. For example, community colleges may push students into high-demand fields that are incentivized and keep students enrolled for somewhat longer. But if students leave college before graduation, debt would increase as a result of the incentive.

Given the focus of PBF policies on the accrual of additional credit hours and increases in retention rates, PBF-adopting students may be ramping up efforts to keep struggling students enrolled in coursework or persisting to the next semester, even in the absence of completing a certificate or degree. In such a scenario, students at PBF-adopting institutions would accumulate additional educational debt without earning a credential that allows them to obtain the same level of labor market returns as college graduates (Belfield & Bailey, 2011; Jepsen et al., 2014). Prior work has also shown that taking additional credit hours can have a positive (but relatively weak) impact on students' earnings, regardless of their graduation status (e.g., Belfield & Bailey, 2017), which may help to explain why we found that PBF adoption has no effect on student repayment.

Although policymakers have expressed concerns pertaining to rising student loan debt, few state policies are explicitly designed to reduce student loan debt. Some states have introduced sporadic efforts to reduce excess credits or incentivize colleges to be more efficient in terms of students' time to degree (Kramer et al., 2018a) as well as supporting colleges to send letters reminding students about their debt burdens (Darolia & Harper, 2018). Even PBF policies that focus explicitly on improving student outcomes do not account for student loan debt or repayment outcomes despite frequent revisions that occur to these policies. PBF policies now tie a larger share of state funds to student outcomes and directly incentivize equity-oriented measures, but no PBF policy to date has considered student loan debt or repayment, focusing instead on incentivizing additional credit hours earned, retention rates, graduation rates, and several labor market outcomes (Rosinger et al., 2021). However, even explicit metrics focused on debt and repayment may face limitations. Prior research has shown that policies designed to reduce debt may be subject to unintended consequences, such as actually increasing student loan debt in the two-year sector (Chakrabarti et al., 2020).

From a practical lens, future research can examine whether students who accrue additional student loan debt in PBF-adopting states are in a better position financially in the long run than they would have been had they not accumulated additional educational debt. Prior work has shown that students, particularly community college students, may benefit from borrowing more money to pay for their educational pursuits (e.g., Black et al., 2020), suggesting that increases in student loan debt can be a complex issue that requires a nuanced discussion of potential benefits and challenges. In addition, repayment is a difficult outcome for colleges and universities to address in practice, as students can avoid defaulting by being placed into income-driven

repayment plans, which would ultimately decrease repayment rates even though the students did not actually default on their student loans.

In future work, researchers can continue to explore these complex but important issues at the intersection of state policy and post-college student outcomes. As one example, future research should examine the trajectories of non-completers attending PBF-adopting institutions and whether specific types of PBF metrics or policy details have differential impacts on those students who did not complete their certificate or degree. This is a critical policy consideration as researchers and policymakers continue to explore the conditions under which college students, even in the absence of degree completion, either face financial difficulties or end up in a better financial position than they would have been if they did not attend college at all. Although further research is needed to better understand the labor market effects of PBF adoption on students who failed to complete college, College Scorecard data on students' earnings are not available separately for non-completers and completers in the older data and focus solely on college graduates in the most recent data.

Another example of further research to be addressed in the future is the extent to which post-college outcomes, such as student debt and repayment, vary according to race/ethnicity. Unfortunately, current data limitations associated with College Scorecard data do not allow for analyses to consider differences by students' race/ethnicity. Such analyses are critically important given government policies that have led to racial disparities in wealth that necessitate greater reliance on student loans, which then reinforces the racial wealth gap (Houle & Addo, 2019). Finally, the role and influence of the COVID-19 pandemic has yet to be explored as researchers continue to explore the ways in which state policies intersect with students' post-college outcomes, but future work will be forced to consider the impact of a pandemic on student debt, repayment, and a host of other outcomes.

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Table 1: Funded PBF status by state and year, 1997-2020.

State	Two-year colleges			Four-year universities		
	Any PBF	Workforce PBF	Equity PBF	Any PBF	Workforce PBF	Equity PBF
Alabama	2019-20		2019-20			
Arizona				2013-17	2013-17	
Arkansas	1997, 2008, 2019-20	2019-20	2019-20	1997, 2008, 2019-20	2019-20	2019-20
California	2019-20	2019-20	2019-20			
Colorado	2001-03, 2016-20	2001-03, 2016-20	2001-03, 2016-20	2001-03, 2016-20	2016-20	2001-03, 2016-20
Connecticut	2017-20					
Florida	1997-2020	1997-2020	1997-99, 2016-19	1997-99, 2008, 2013-20	1998, 2008, 2013-20	2015-20
Hawaii	2012-20	2012-20	2012-20	2017-20	2017-20	2017-20
Illinois	1999-2001, 2013-20	1999-2001	1999-2001, 2013-20	2013-14	2013-14	2013-14
Indiana	2010-20	2010, 2013-20	2010-20	2007-20	2013-20	2009-20
Kansas	2006-20	2013-20	2013-20	2006-20	2006-20	2006-20
Kentucky	1997-98, 2018-20	1997-98, 2018-20	1997-98, 2018-20	1997-98, 2018-20	1997-98, 2018-20	1997-98, 2018-20
Louisiana	2017-20	2017-20	2017-20	2017-20	2017-20	2017-20
Massachusetts	2014-17	2016-17	2014-17	2016-17 (non-UMass)	2016-17 (non-UMass)	2016-17 (non-UMass)
Maine				2014-18 (most)	2014-18 (most)	2014-18 (most)
Michigan	2013-20			2006-07, 2013-20	2006-07, 2013-20	2015-20
Minnesota	2008-09, 2012-19	2014-19	2012-13, 2016	2008-09, 2012-17 [all], 2018-19 [MnSCU]	2008-09, 2014-17 [all], 2018-19 [MnSCU]	2008-09, 2014-17
Missouri	1997-2001, 2014-16	1997-2001, 2014-16	1997-2001, 2014-16	1997-2001, 2014-16	2014-16	1997-2001
Mississippi				2014	2014	2014
Montana	2015-20	2015	2015-20	2015-20	2015	2015-20

North Carolina	1999-2020		1999-2020			
North Dakota	2014-20			2014-20		
New Jersey	2000-02		2000-02	2000-02, 2020		2000-02, 2020
New Mexico	2013-20	2013-20	2013-20	2013-20	2013-20	2013-20
Nevada	2015-20	2015-20	2015-20	2015-20	2015-20	2015-20
New York	2014-18 (most)	2014-18 (most)	2014-18 (most)			
Ohio	1997-99, 2011-20	2011-20	2011-20	1998-2020	2008-20	1998-2020
Oklahoma	2002-20		2012-20	2002-20		2012-20
Oregon				2008-20	2015-20	2012-20
Pennsylvania				2001-19 (PASSHE)	2001-19 (PASSHE)	2001-19 (PASSHE)
Rhode Island	2019-20	2019-20		2019-20	2019-20	2019-20
South Carolina	1998-2002 (all), 2014-20 (SCTCS)	1998-2002 (all), 2014-20 (SCTCS)	1998-2002	1998-2002		
South Dakota				2000-03, 2005-13	2000-03, 2005-13	
Tennessee	1997-2020	1997-2020	2011-20	1997-2020	2011-20	2011-20
Texas	2014-20	2014-20	2014-20	2009-11	2009-11	2009-11
Utah	2014-20	2015-20	2014-20	2014-20	2015-20	2014-20
Virginia	2017-20	2017-20	2017-20			
Vermont	2020			2020 (non-UVM)	2020 (non-UVM)	
Washington	1998-99, 2010-20		2010-20	1998-99	1998-99	
Wisconsin	2015-20 (WTCS)	2015-20 (WTCS)	2015-20 (WTCS)	2019-20	2019-20	2019-20
Wyoming	2013-20	2013-20				

Source: Authors' review of state policy documents.

Notes:

[1] A state was included if the PBF system remained approved between periods in which funding occurred. For example, Florida kept a PBF system on the books for community colleges between 2009 and 2013 before resuming funding in 2014. If a state stopped funding a system before 2020 but it remained on the books through 2020, the last year of funding was included.

[2] Arkansas is counted as funded in FY 1997 even though funds passed into law were later withheld.

Table 2: Summary statistics of the dataset.

	Four-year universities				Two-year colleges			
	Ever PBF		*Never PBF*		*Ever PBF*		*Never PBF*	
	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)
Any funded PBF	34.6	(47.6)	0	--	35.2	(47.8)	0	--
Percent PBF (if funded)	5.2	(17.0)	0	--	3.7	(14.2)	0	--
Workforce premium	23.0	(42.1)	0	--	19.7	(39.8)	0	--
Any equity premium	25.6	(43.7)	0	--	26.3	(44.0)	0	--
Debt: All	11,161	(3,943)	12,576	(4,475)	5,135	(2,088)	5,406	(2,524)
Debt: Completers	19,825	(4,719)	19,934	(5,236)	8,906	(4,057)	9,678	(4,350)
Debt: Non-completers	7,116	(2,096)	7,745	(2,508)	4,583	(1,344)	4,613	(1,351)
Debt: Low-income	11,824	(3,949)	13,083	(4,487)	5,394	(2,226)	5,641	(2,627)
Debt: Middle-income	10,816	(4,621)	12,128	(5,225)	5,246	(2,265)	5,444	(2,673)
Debt: High-income	9,942	(4,398)	11,423	(5,004)	5,082	(2,150)	5,188	(2,514)
Debt: Dependents	10,315	(4,219)	11,898	(4,927)	4,404	(1,865)	4,703	(2,434)
Debt: Independents	12,904	(4,169)	13,710	(4,245)	6,251	(2,655)	6,722	(3,037)
Debt: Pell	12,102	(4,528)	13,471	(4,998)	5,297	(2,346)	5,571	(2,818)
Debt: Not Pell	10,036	(3,341)	11,629	(4,133)	5,009	(1,831)	5,210	(2,286)
Debt: First-generation	11,302	(4,141)	12,610	(4,577)	5,223	(2,127)	5,499	(2,542)
Debt: Not first-gen	11,067	(3,851)	12,567	(4,456)	5,112	(2,079)	5,334	(2,514)
1-yr repayment rate: All	59.2	(14.1)	60.6	(16.9)	42.5	(13.1)	43.3	(14.1)
1-yr repayment rate: Low-income	49.8	(14.2)	51.5	(16.3)	34.6	(12.7)	34.4	(13.0)
1-yr repayment rate: Middle-income	62.8	(13.4)	63.0	(15.8)	51.3	(11.5)	52.3	(12.8)
1-yr repayment rate: High-income	70.1	(11.8)	69.8	(15.1)	58.4	(10.8)	60.2	(11.7)
1-yr repayment rate: Dependents	62.7	(14.1)	63.2	(16.9)	48.1	(13.3)	49.1	(14.4)
1-yr repayment rate: Independents	49.7	(13.4)	49.9	(14.3)	37.7	(12.7)	37.3	(12.5)
1-yr repayment rate: Pell	52.6	(14.1)	54.1	(16.4)	36.0	(12.4)	36.6	(13.1)
1-yr repayment rate: Not Pell	69.2	(11.9)	69.4	(14.9)	58.7	(10.6)	59.4	(11.8)

1-yr repayment rate: First-generation	56.5	(14.1)	57.7	(16.2)	41.4	(13.1)	42.2	(14.0)
1-yr repayment rate: Not first-gen	60.7	(14.1)	62.0	(17.1)	43.4	(13.0)	44.3	(14.2)
3-yr repayment rate: All	62.7	(13.5)	64.7	(16.3)	46.0	(12.4)	46.7	(13.7)
3-yr repayment rate: Low-income	53.9	(13.3)	56.5	(15.7)	38.1	(11.9)	38.1	(12.5)
3-yr repayment rate: Middle-income	66.2	(12.9)	67.0	(15.3)	54.7	(10.6)	55.3	(12.3)
3-yr repayment rate: High-income	72.6	(11.5)	72.9	(14.5)	61.4	(10.3)	62.9	(11.3)
3-yr repayment rate: Dependents	66.0	(13.7)	66.9	(16.3)	51.6	(12.7)	52.5	(14.2)
3-yr repayment rate: Independents	53.8	(12.0)	54.8	(13.4)	41.2	(11.8)	40.7	(11.8)
3-yr repayment rate: Pell	56.6	(13.4)	58.7	(15.9)	39.5	(11.6)	40.2	(12.7)
3-yr repayment rate: Not Pell	72.0	(11.4)	72.7	(14.2)	62.1	(9.9)	62.6	(11.1)
3-yr repayment rate: First-generation	60.2	(13.3)	62.2	(15.5)	44.9	(12.4)	45.6	(13.6)
3-yr repayment rate: Not first-gen	64.1	(13.5)	65.8	(16.4)	46.9	(12.5)	47.8	(13.9)
FTE enrollment	10,954	(10,313)	10,210	(9,398)	4,702	(8,553)	3,459	(6,214)
Undergrad share of FTE	87.6	(9.5)	88.5	(10.4)	100	--	100	--
Per-FTE instructional spending	8,402	(3,892)	9,511	(5,403)	5,567	(2,831)	6,204	(3,600)
Share of undergrads part-time	23.3	(15.0)	20.0	(16.3)	58.8	(13.8)	53.1	(18.2)
In-state tuition	7,246	(2,887)	7,653	(3,519)	3,433	(2,046)	3,881	(2,498)
Amount of state grant	3,072	(1,755)	3,413	(1,903)	1,677	(870)	1,514	(896)
Amount of institutional grant	3,989	(2,256)	4,341	(2,674)	1,599	(1,056)	1,620	(1,288)
Percent receiving state grant	36.4	(21.6)	39.0	(22.6)	32.9	(22.2)	31.4	(27.9)
Percent receiving institutional grant	40.8	(22.8)	35.8	(22.4)	15.1	(17.2)	16.3	(18.5)
Per-FTE state appropriations	7,503	(4,008)	9,712	(6,553)	4,766	(3,411)	5,353	(4,966)
Per-FTE local appropriations	32	(330)	50	(577)	1,978	(3,055)	2,020	(2,898)
Per-capita state income	44,963	(6,959)	49,709	(8,995)	47,346	(8,122)	43,789	(7,120)
State unemployment rate	5.5	(1.8)	5.6	(1.9)	5.7	(2.0)	5.6	(1.8)
State share of adults w/BA	19.0	(4.3)	20.9	(4.7)	19.8	(4.4)	18.8	(4.4)
State number of young students	580,968	(521,172)	946,390	(934,844)	955,176	(930,819)	422,418	(296,804)
Share of Black young adults	12.8	(10.5)	16.5	(11.5)	13.4	(9.0)	19.5	(16.5)
Share of Hispanic young adults	10.0	(11.2)	10.8	(10.8)	13.5	(13.1)	7.0	(8.4)

Share of Native young adults	1.4	(2.8)	0.7	(1.8)	1.1	(2.4)	0.8	(1.6)
Number of observations	**7,973**		**5,237**		**19,703**		**5,250**	
Number of colleges	**343**		**238**		**844**		**267**	

Sources: Authors' data collection (all PBF policy variables), College Scorecard (debt, repayment, and earnings outcomes), Bureau of Labor Statistics and Census (state-level demographic and economic characteristics), Integrated Postsecondary Education Data System (all others)

Notes:

[1] All financial values were adjusted into 2020 dollars using the Consumer Price Index.

[2] Repayment outcomes were only available for cohorts entering repayment between Fiscal Years 2006 and 2014.

Table 3: Effects of a funded PBF policy on student debt and repayment outcomes.

Group of interest	Four-year universities			Two-year colleges		
	Debt (log)	1-yr repay	3-yr repay	Debt (log)	1-yr repay	3-yr repay
All students	0.0205	0.3225	-0.0047	0.0184*	-0.3405	-0.1241
	(0.0152)	(0.4451)	(0.5377)	(0.0081)	(0.3794)	(0.5039)
Completers	0.0144	--	--	0.0185	--	--
	(0.0177)	--	--	(0.0124)	--	--
Non-completers	0.0332**	--	--	0.0237***	--	--
	(0.0117)	--	--	(0.0067)	--	--
Low-income	0.0046	0.4575	-0.0389	0.0122	0.0932	0.1510
	(0.0175)	(0.4754)	(0.5345)	(0.0099)	(0.3997)	(0.5257)
Middle-income	0.0161	0.5157	-0.1018	0.0254**	-0.3988	-0.5793
	(0.0127)	(0.3519)	(0.4177)	(0.0086)	(0.3422)	(0.4654)
High-income	0.0322**	0.2266	0.0986	0.0185*	0.0187	0.1464
	(0.0121)	(0.3771)	(0.4411)	(0.0080)	(0.4212)	(0.4922)
Dependent	0.0215	0.5932	0.1248	0.0204**	-0.0336	0.0631
	(0.0155)	(0.3941)	(0.5196)	(0.0073)	(0.3659)	(0.5105)
Independent	0.0059	0.5976	-0.0449	0.0049	-0.2606	-0.4264
	(0.0167)	(0.4602)	(0.4969)	(0.0095)	(0.4291)	(0.5123)
Pell recipient	0.0114	0.5139	0.0590	0.0177	0.2133	-0.1381
	(0.0165)	(0.4616)	(0.5298)	(0.0091)	(0.3853)	(0.4975)
Not Pell recipient	0.0194	0.5032	0.4019	0.0089	-0.0297	0.3386
	(0.0140)	(0.3898)	(0.4438)	(0.0073)	(0.3810)	(0.4439)
First-generation	0.0207	0.4390	-0.1063	0.0193*	-0.3179	0.0161
	(0.0153)	(0.4739)	(0.5407)	(0.0083)	(0.4129)	(0.5479)
Not first-generation	0.0122	0.2719	0.2970	0.0147	-0.1353	-0.2576
	(0.0151)	(0.4271)	(0.5046)	(0.0078)	(0.3634)	(0.5048)
Max observations	**11,456**	**4,576**	**4,593**	**17,393**	**6,842**	**6,766**

Notes:

[1] All models include the control variables shown in Table 2 and state and year fixed effects. Each coefficient is the result of a separate regression.

[2] Standard errors are clustered at the OPEID level to account for College Scorecard data being reported at the OPEID level instead of the UnitID level.

[3] * signifies $p<.01$. ** signifies $p<.005$, and *** signifies $p<.001$.

[4] Control variables and PBF information are aligned with a cohort's estimated first year of entry into college.

[5] Repayment rate data are only available for cohorts entering repayment between Fiscal Years 2006 and 2014.

Table 4: Effects of PBF dosage (percent) on student debt and repayment outcomes.

Group of interest	Four-year universities			Two-year colleges		
	Debt (log)	1-yr repay	3-yr repay	Debt (log)	1-yr repay	3-yr repay
All students	0.00011	-0.04561	-0.08023	-0.00060	0.05630	-0.00556
	(0.00047)	(0.07286)	(0.11911)	(0.00039)	(0.05363)	(0.03687)
Completers	0.00001	--	--	-0.00128*	--	--
	(0.00065)	--	--	(0.00048)	--	--
Non-completers	-0.00012	--	--	-0.00016	--	--
	(0.00033)	--	--	(0.00031)	--	--
Low-income	-0.00014	-0.05723	-0.06164	-0.00077	0.08088	-0.02939
	(0.00059)	(0.06729)	(0.11411)	(0.00046)	(0.04450)	(0.03098)
Middle-income	0.00016	-0.01797	-0.07221	-0.00135*	0.10526*	0.01502
	(0.00035)	(0.06583)	(0.09194)	(0.00050)	(0.04007)	(0.04667)
High-income	0.00009	-0.01175	-0.05335	-0.00122*	0.06476	0.00722
	(0.00045)	(0.04887)	(0.08884)	(0.00047)	(0.05982)	(0.05366)
Dependent	0.00000	-0.00731	-0.01067	-0.00066	0.05640	0.00024
	(0.00047)	(0.06000)	(0.10413)	(0.00039)	(0.05575)	(0.04015)
Independent	0.00021	-0.05143	-0.08506	-0.00067	0.08650	-0.03452
	(0.00056)	(0.07188)	(0.10766)	(0.00042)	(0.05588)	(0.03832)
Pell recipient	0.00016	-0.03647	-0.03876	-0.00070	0.04689	-0.04481
	(0.00053)	(0.07682)	(0.11264)	(0.00043)	(0.04714)	(0.03608)
Not Pell recipient	0.00018	-0.00644	0.00781	-0.00086**	0.07769	0.00328
	(0.00045)	(0.06213)	(0.07782)	(0.00031)	(0.04165)	(0.03345)
First-generation	0.00041	-0.03841	-0.05316	-0.00051	0.07404	0.00058
	(0.00049)	(0.07291)	(0.12059)	(0.00038)	(0.05080)	(0.03696)
Not first-generation	-0.00007	-0.01879	-0.04376	-0.00088	0.03902	-0.01364
	(0.00046)	(0.07688)	(0.11162)	(0.00038)	(0.05576)	(0.04168)
Max observations	**11,456**	**4,576**	**4,593**	**17,393**	**6,842**	**6,766**

Notes:

[1] All models include the control variables shown in Table 2 and state and year fixed effects. Each coefficient is the result of a separate regression.

[2] Standard errors are clustered at the OPEID level to account for College Scorecard data being reported at the OPEID level instead of the UnitID level.

[3] * signifies p<.01. ** signifies p<.005, and *** signifies p<.001.

[4] Control variables and PBF information are aligned with a cohort's estimated first year of entry into college.

[5] Repayment rate data are only available for cohorts entering repayment between Fiscal Years 2006 and 2014.

Table 5: Effects of PBF workforce metrics on student debt and repayment outcomes.

	Four-year universities			Two-year colleges		
Group of interest	Debt (log)	1-yr repay	3-yr repay	Debt (log)	1-yr repay	3-yr repay
All students						
PBF with workforce	0.01158	0.39149	0.31575	0.03057**	-0.76538	-0.87152
	(0.01962)	(0.59656)	(1.11135)	(0.01068)	(0.54452)	(0.59800)
PBF, no workforce	0.03639	0.24242	-0.31084	0.00177	0.28072	1.22889
	(0.01758)	(0.49691)	(0.56375)	(0.01101)	(0.62876)	(0.85152)
Completers						
PBF with workforce	0.01126	--	--	0.00154	--	--
	(0.02246)	--	--	(0.01585)	--	--
PBF, no workforce	0.01971	--	--	0.04108	--	--
	(0.02040)	--	--	(0.01890)	--	--
Non-completers						
PBF with workforce	0.01865	--	--	0.03726***	--	--
	(0.01294)	--	--	(0.00954)	--	--
PBF, no workforce	0.05994**	--	--	0.00537	--	--
	(0.01870)	--	--	(0.00887)	--	--
Low-income						
PBF with workforce	-0.00845	0.90319	0.26129	0.00828	-0.24357	-0.82253
	(0.02249)	(0.66159)	(1.01964)	(0.01280)	(0.54995)	(0.59094)
PBF, no workforce	0.02785	-0.05900	-0.32491	0.01764	0.59207	1.94294
	(0.02039)	(0.56043)	(0.57558)	(0.01395)	(0.69629)	(0.97546)
Middle-income						
PBF with workforce	0.01116	0.48376	0.01502	0.03860***	-0.81916	-1.13108
	(0.01561)	(0.49020)	(0.78608)	(0.01062)	(0.45630)	(0.59956)
PBF, no workforce	0.02448	0.55283	-0.21102	0.00638	0.22060	0.44846
	(0.01569)	(0.44270)	(0.52357)	(0.01318)	(0.58182)	(0.71782)
High-income						
PBF with workforce	0.02225	0.12071	0.29632	0.02703*	-0.84434	-0.52589
	(0.01539)	(0.51528)	(0.73771)	(0.01037)	(0.49641)	(0.62028)
PBF, no workforce	0.04909**	0.34967	-0.08581	0.00610	1.27672	1.41880
	(0.01562)	(0.42799)	(0.54081)	(0.01255)	(0.72903)	(0.74273)
Dependent						
PBF with workforce	0.01481	0.65870	0.60609	0.02706*	-0.59394	-0.72082
	(0.02009)	(0.53726)	(1.07561)	(0.01008)	(0.51893)	(0.64092)
PBF, no workforce	0.03340	0.51711	-0.33654	0.01114	0.79374	1.55708
	(0.01799)	(0.42954)	(0.55894)	(0.01049)	(0.51320)	(0.75099)

Independent						
PBF with workforce	-0.00339	1.17030	-0.03246	0.00509	-0.80114	-1.17808
	(0.02157)	(0.64818)	(0.95393)	(0.01231)	(0.57064)	(0.58273)
PBF, no workforce	0.02261	-0.06746	-0.05684	0.00470	0.53736	1.00595
	(0.01976)	(0.59888)	(0.56635)	(0.01331)	(0.79439)	(1.04677)
Pell recipient						
PBF with workforce	0.00488	0.84583	0.50241	0.02399	-0.14672	-1.09298
	(0.02090)	(0.65493)	(1.04381)	(0.01194)	(0.53948)	(0.58381)
PBF, no workforce	0.02309	0.12969	-0.36253	0.00906	0.74078	1.67986
	(0.01993)	(0.53440)	(0.57624)	(0.01185)	(0.64847)	(0.86219)
Not Pell recipient						
PBF with workforce	0.01047	0.40468	1.13947	0.01474	-0.99817	-0.67009
	(0.01851)	(0.52357)	(0.89732)	(0.00944)	(0.53212)	(0.56630)
PBF, no workforce	0.03531	0.61725	-0.29922	0.00085	1.38941**	2.25915***
	(0.01589)	(0.42162)	(0.46453)	(0.01047)	(0.47006)	(0.62009)
First-generation						
PBF with workforce	0.01218	0.51628	0.13858	0.02896*	-0.83421	-0.80257
	(0.01952)	(0.63897)	(1.05602)	(0.01114)	(0.59105)	(0.64206)
PBF, no workforce	0.03584	0.34946	-0.33920	0.00589	0.45016	1.54627
	(0.01856)	(0.52320)	(0.62622)	(0.01123)	(0.68464)	(0.98389)
Not first-generation						
PBF with workforce	0.00229	0.40053	0.93911	0.01887	-0.49925	-1.15321
	(0.01968)	(0.57148)	(1.02920)	(0.01015)	(0.50673)	(0.59593)
PBF, no workforce	0.02995	0.12287	-0.31381	0.00894	0.40613	1.41646
	(0.01701)	(0.47858)	(0.54082)	(0.01101)	(0.63597)	(0.88266)
Max observations	**11,456**	**4,576**	**4,593**	**17,393**	**6,842**	**6,766**

Notes:

[1] All models include the control variables shown in Table 2 and state and year fixed effects. Each coefficient is the result of a separate regression.

[2] Standard errors are clustered at the OPEID level to account for College Scorecard data being reported at the OPEID level instead of the UnitID level.

[3] * signifies p<.01. ** signifies p<.005, and *** signifies p<.001.

[4] Control variables and PBF information are aligned with a cohort's estimated first year of entry into college.

[5] Repayment rate data are only available for cohorts entering repayment between Fiscal Years 2006 and 2014.

Table 6: Effects of PBF equity metrics on student debt and repayment outcomes.

	Four-year universities			Two-year colleges		
Group of interest	Debt (log)	1-yr repay	3-yr repay	Debt (log)	1-yr repay	3-yr repay
All students						
PBF with equity	0.02361	0.31998	-0.62366	0.02036	-0.65908	-1.11069
	(0.01841)	(0.65760)	(0.82243)	(0.00956)	(0.58383)	(0.79315)
PBF, no equity	0.01405	0.32513	0.69613	0.01453	-0.08834	0.78369
	(0.01793)	(0.53983)	(0.68589)	(0.01177)	(0.49040)	(0.61056)
Completers						
PBF with equity	0.02088	--	--	0.00548	--	--
	(0.02258)	--	--	(0.01435)	--	--
PBF, no equity	0.00199	--	--	0.04332	--	--
	(0.02150)	--	--	(0.02010)	--	--
Non-completers						
PBF with equity	0.04147**	--	--	0.02211*	--	--
	(0.01323)	--	--	(0.00806)	--	--
PBF, no equity	0.01719	--	--	0.02667*	--	--
	(0.01547)	--	--	(0.00987)	--	--
Low-income						
PBF with equity	0.00429	0.52322	-0.73686	0.00484	-0.20917	-1.13724
	(0.02137)	(0.71701)	(0.80372)	(0.01165)	(0.55855)	(0.80328)
PBF, no equity	0.00534	0.38641	0.75093	0.02617	0.33534	1.30550
	(0.02081)	(0.52732)	(0.67785)	(0.01432)	(0.55287)	(0.64733)
Middle-income						
PBF with equity	0.02031	0.26873	-0.59090	0.03552***	0.02585	-0.69923
	(0.01589)	(0.43435)	(0.66913)	(0.00943)	(0.52675)	(0.82362)
PBF, no equity	0.00792	0.78270	0.45343	0.00666	-0.73584	-0.48853
	(0.01383)	(0.55419)	(0.61231)	(0.01391)	(0.44903)	(0.56333)
High-income						
PBF with equity	0.04161*	-0.17476	-0.40744	0.02204	-0.40290	0.40634
	(0.01481)	(0.49668)	(0.72463)	(0.00913)	(0.59356)	(0.81481)
PBF, no equity	0.01395	0.66054	0.67294	0.01186	0.35408	-0.04508
	(0.01376)	(0.55715)	(0.55961)	(0.01247)	(0.56489)	(0.62478)
Dependent						
PBF with equity	0.02897	0.44677	-0.31049	0.02126	-0.08486	-0.13243
	(0.01913)	(0.54404)	(0.76538)	(0.00890)	(0.54350)	(0.78732)
PBF, no equity	0.00624	0.75140	0.61119	0.01874	0.00674	0.23779
	(0.01735)	(0.54111)	(0.68970)	(0.01052)	(0.48377)	(0.66833)

Independent						
PBF with equity	0.00159	0.71716	-1.23414	0.00524	-0.30497	-1.87841
	(0.02024)	(0.68278)	(0.68943)	(0.01125)	(0.57596)	(0.80975)
PBF, no equity	0.01478	0.46847	1.28381	0.00432	-0.22578	0.87044
	(0.01994)	(0.52275)	(0.60351)	(0.01443)	(0.60853)	(0.62103)
Pell recipient						
PBF with equity	0.01569	0.57812	-0.56100	0.01761	0.10963	-1.29709
	(0.02010)	(0.68160)	(0.82414)	(0.01088)	(0.55386)	(0.78164)
PBF, no equity	0.00273	0.44446	0.75981	0.01802	0.29501	0.88700
	(0.01925)	(0.57618)	(0.70109)	(0.01277)	(0.52406)	(0.59097)
Not Pell recipient						
PBF with equity	0.02288	0.39777	-0.08023	0.00865	0.63656	0.13651
	(0.01687)	(0.57914)	(0.64498)	(0.00855)	(0.52717)	(0.70359)
PBF, no equity	0.01230	0.61712	0.94689	0.00947	-0.55489	0.51739
	(0.01660)	(0.46300)	(0.55661)	(0.01051)	(0.54163)	(0.59193)
First-generation						
PBF with equity	0.02232	0.43432	-0.55279	0.02134	-0.49772	-0.95783
	(0.01858)	(0.70316)	(0.83785)	(0.01004)	(0.57476)	(0.83946)
PBF, no equity	0.01729	0.44409	0.39854	0.01524	-0.17522	0.89983
	(0.01849)	(0.56742)	(0.72193)	(0.01198)	(0.58158)	(0.67052)
Not first-generation						
PBF with equity	0.01644	0.25281	-0.39899	0.01316	-0.18736	-1.33497
	(0.01831)	(0.62492)	(0.76121)	(0.00908)	(0.56421)	(0.80772)
PBF, no equity	0.00360	0.29261	1.08387	0.01765	-0.09402	0.72005
	(0.01740)	(0.52834)	(0.65404)	(0.01141)	(0.46966)	(0.59989)
Max observations	**11,456**	**4,576**	**4,593**	**17,393**	**6,842**	**6,766**

Notes:

[1] All models include the control variables shown in Table 2 and state and year fixed effects. Each coefficient is the result of a separate regression.

[2] Standard errors are clustered at the OPEID level to account for College Scorecard data being reported at the OPEID level instead of the UnitID level.

[3] * signifies $p<.01$. ** signifies $p<.005$, and *** signifies $p<.001$.

[4] Control variables and PBF information are aligned with a cohort's estimated first year of entry into college.

[5] Repayment rate data are only available for cohorts entering repayment between Fiscal Years 2006 and 2014.

Figure 1: Debt event studies, 4-years, post-1997 PBF
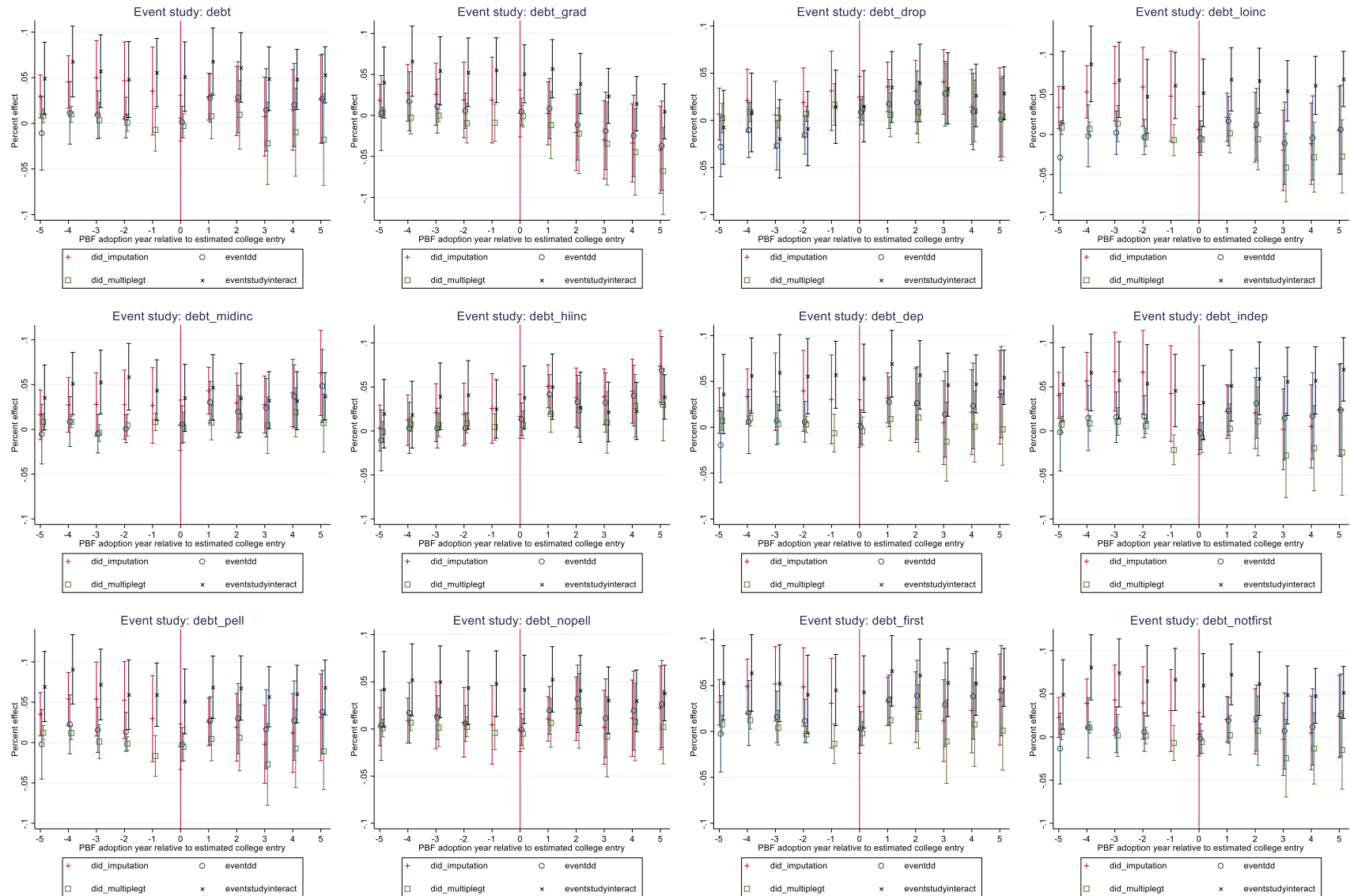
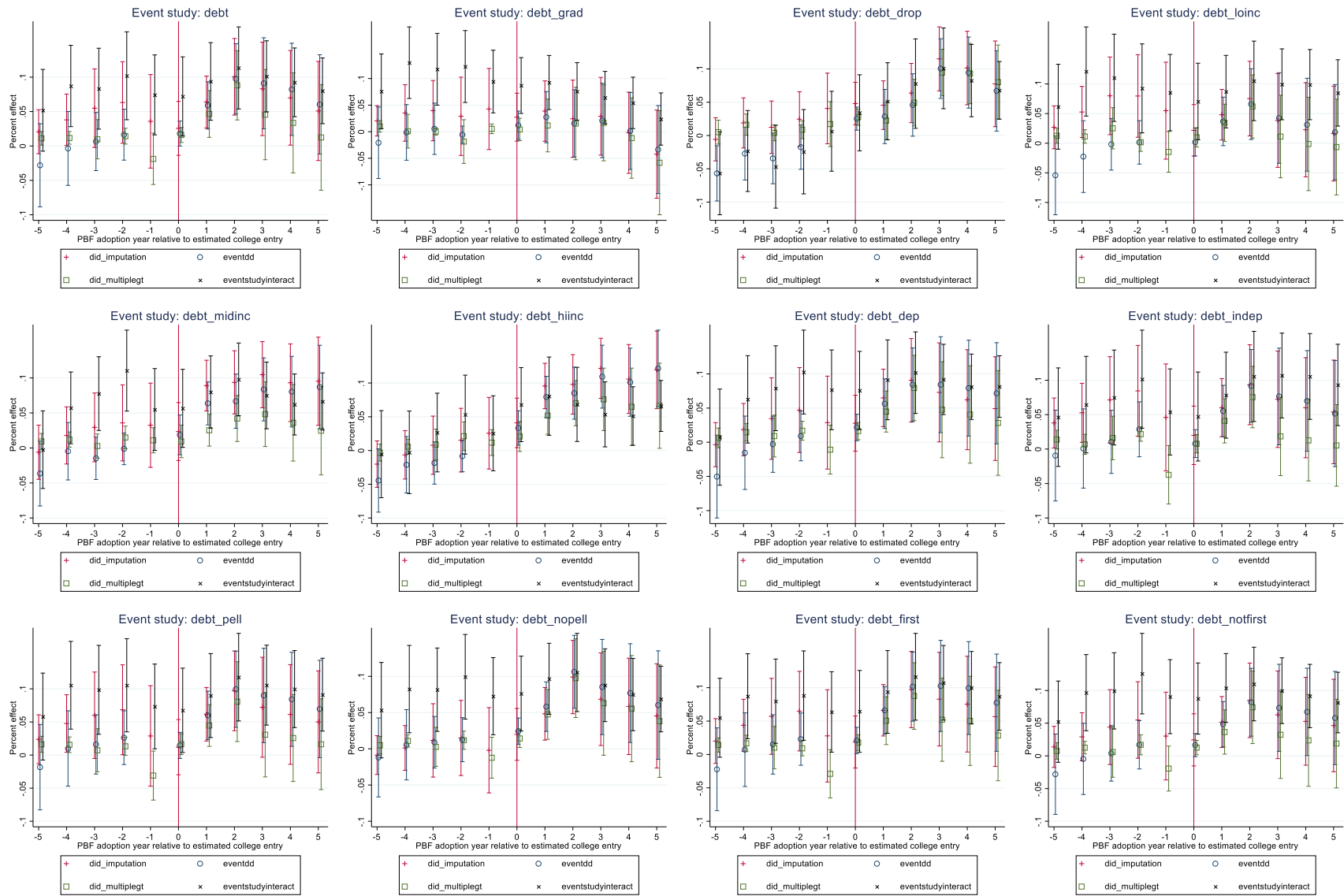## Figure 2: Debt event studies, 4-years, canonical

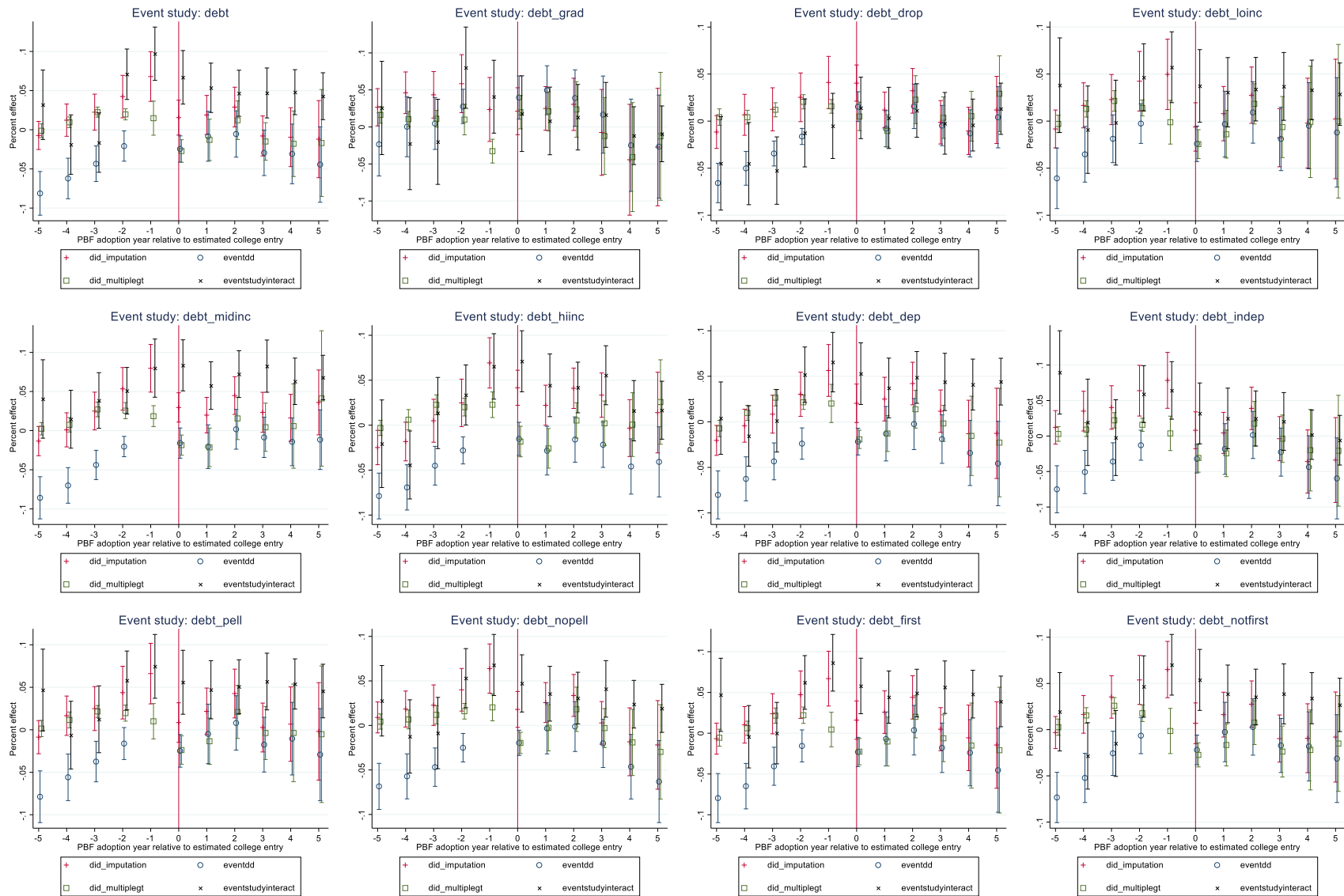## Figure 3: Debt event studies, 2-years, post-1997 PBF

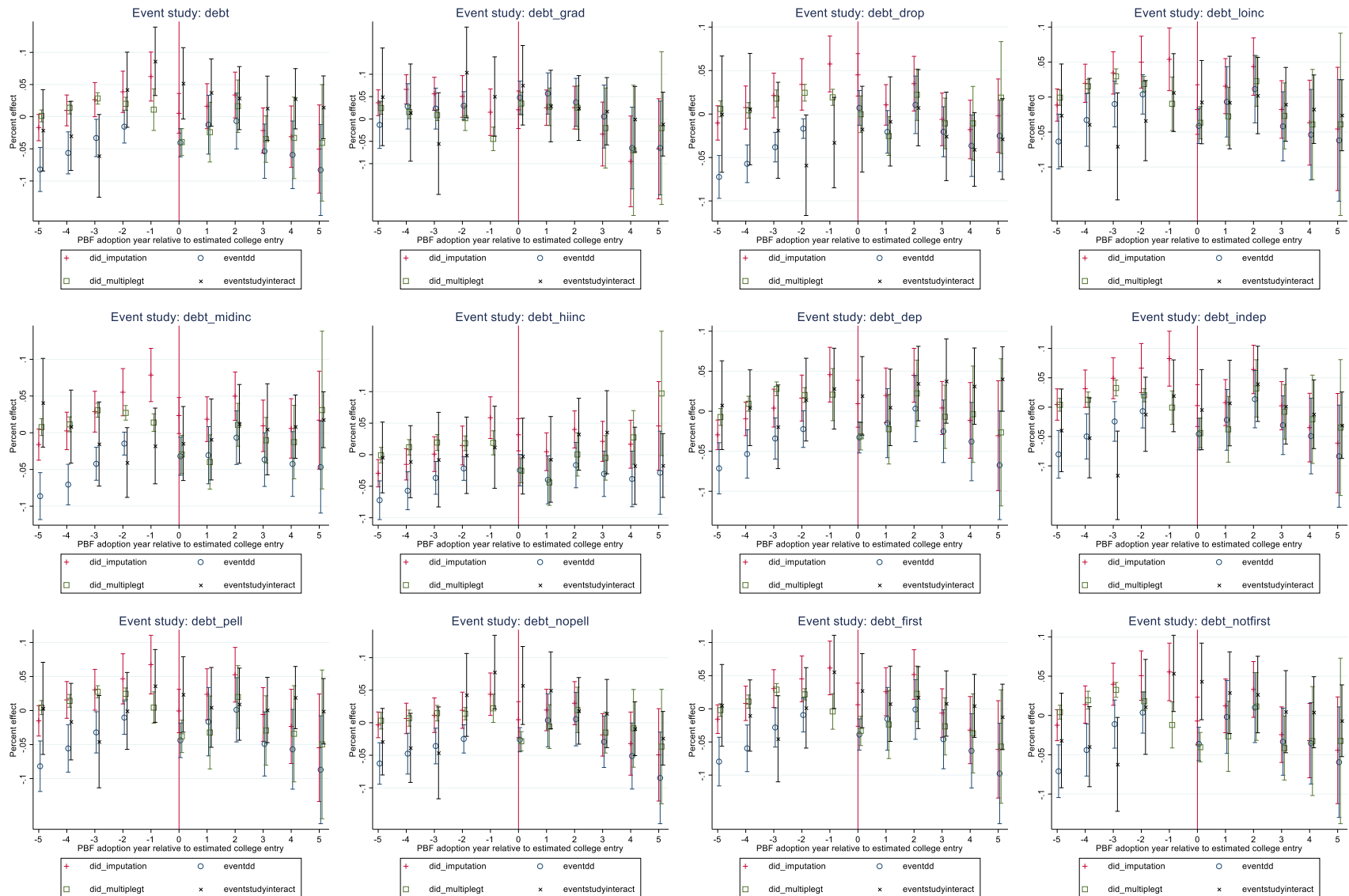## Figure 4: Debt event studies, 2-years, canonical

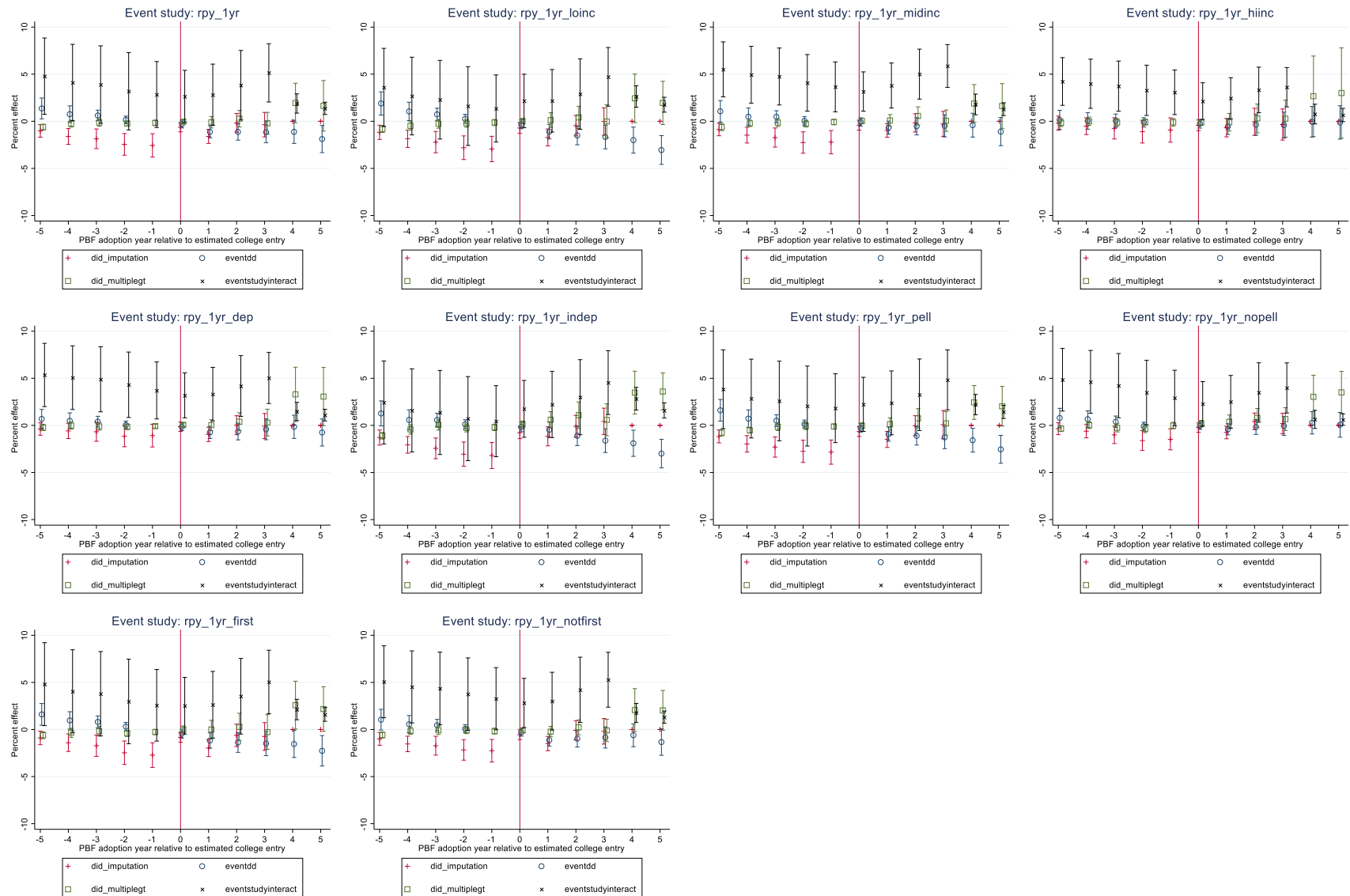# Figure 5: Repayment event studies, 4-years, post-1997 PBF

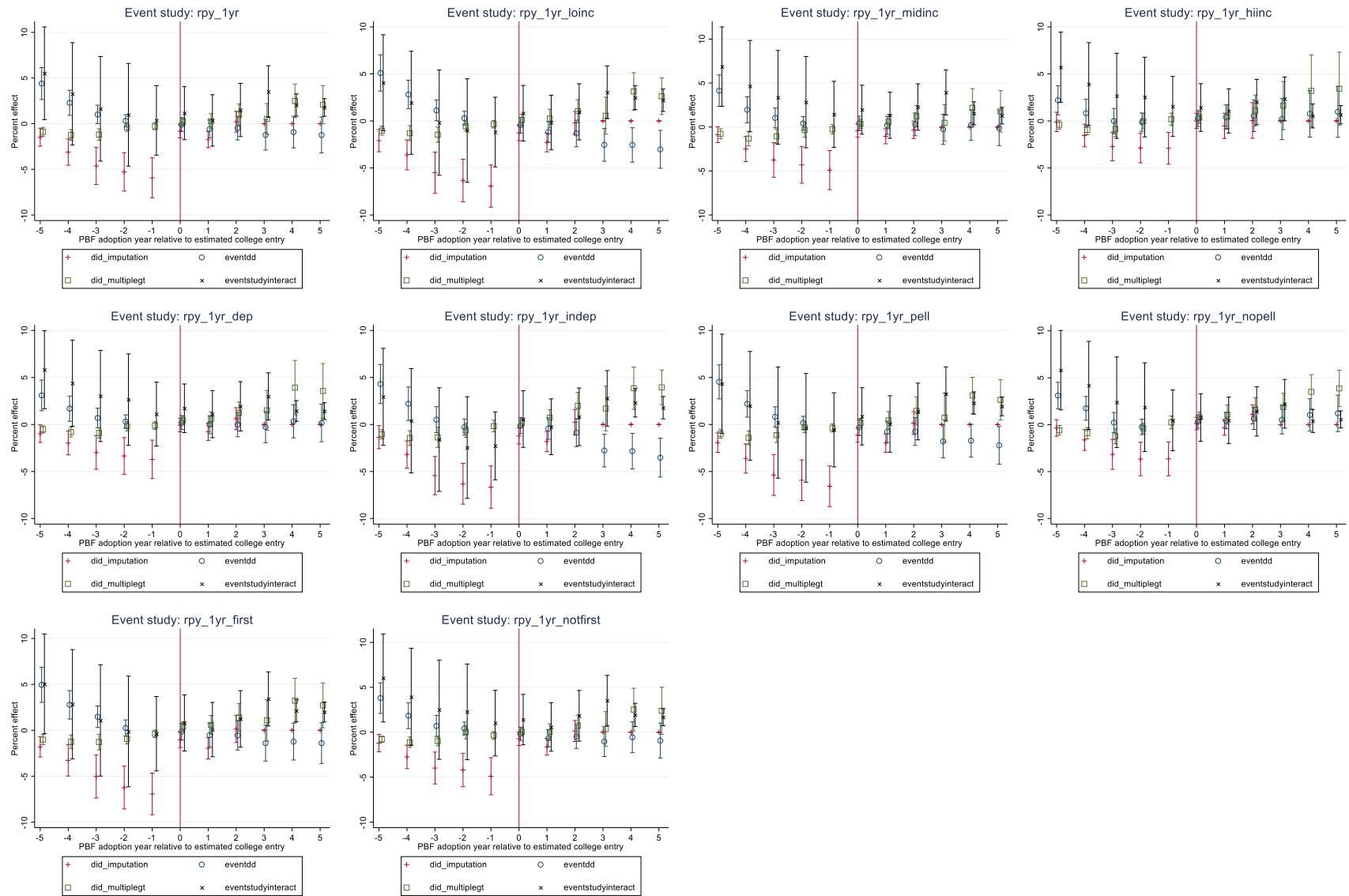## Figure 6: Repayment event studies, 4-years, canonical

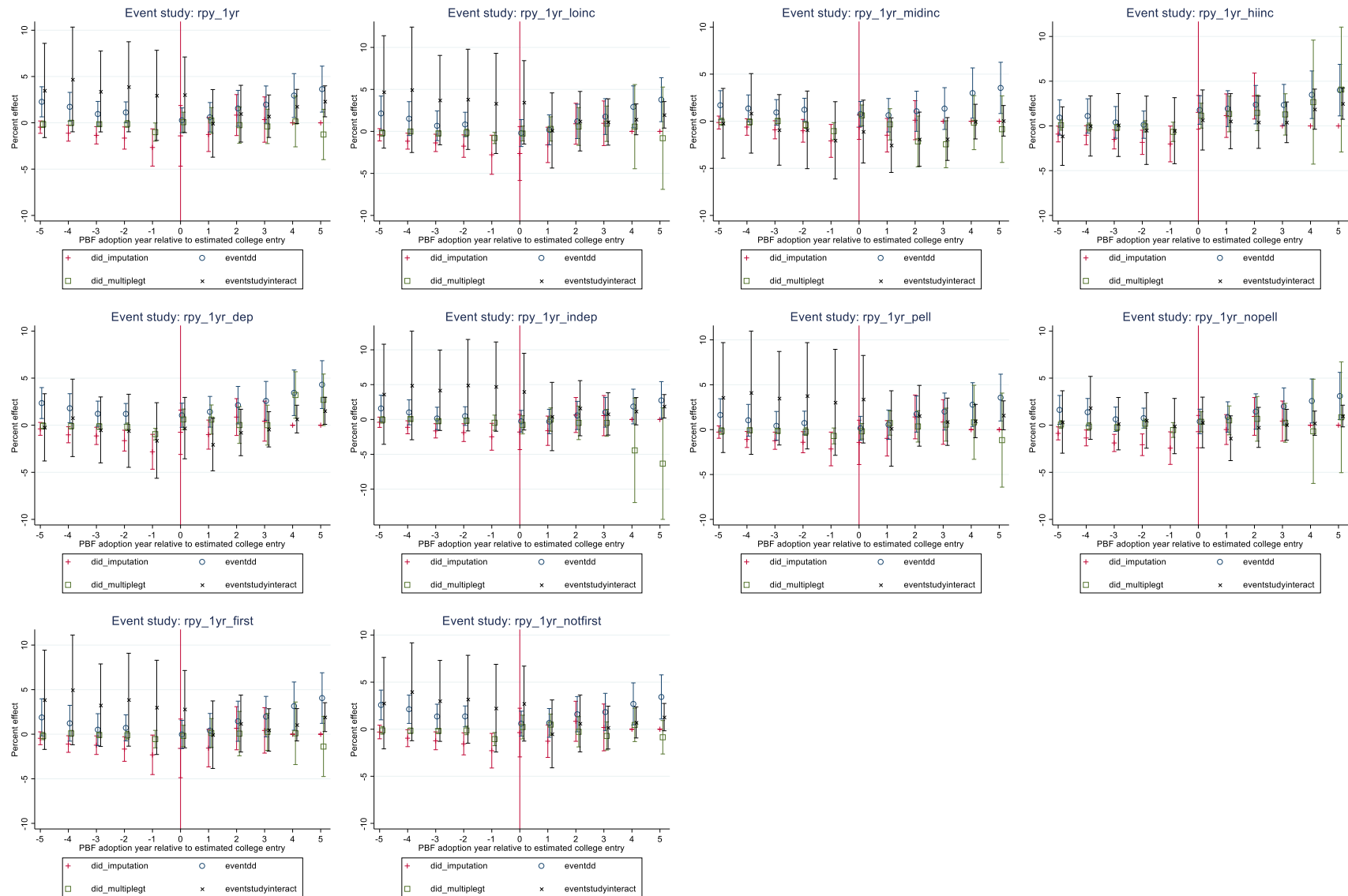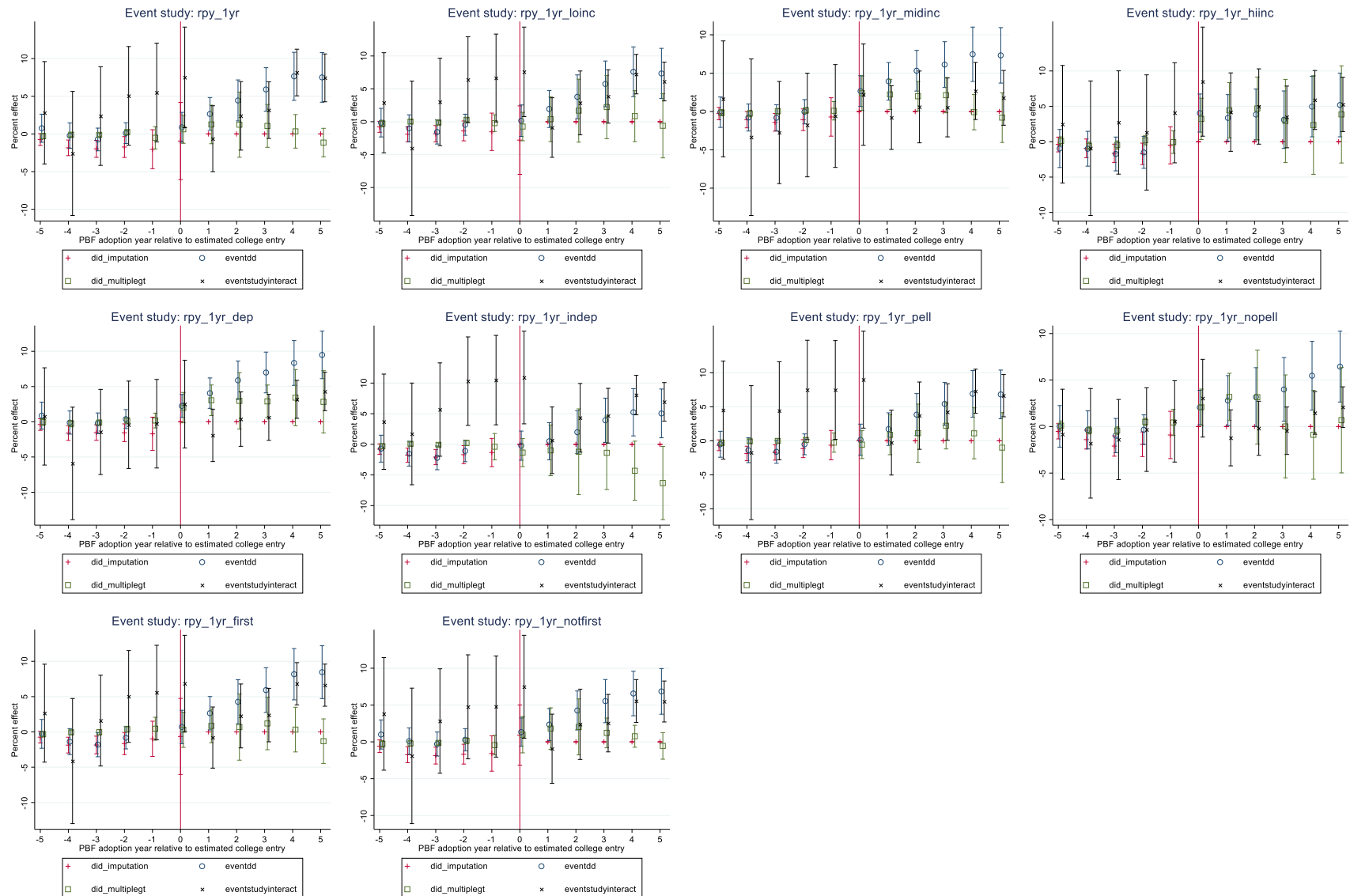# Figure 7: Repayment event studies, 2-years, post-1997 PBF

Figure 8: Repayment event studies, 2-years, canonical

Appendix 1: Effects of a funded PBF policy on student debt and repayment outcomes (alternative samples).

Panel A: Excluding colleges subject to PBF in 1997.

Group of interest	Four-year universities			Two-year colleges		
	Debt (log)	1-yr repay	3-yr repay	Debt (log)	1-yr repay	3-yr repay
All students	0.0302	0.4488	0.9586	0.0127	-0.2650	-0.2035
	(0.0179)	(0.4972)	(0.5063)	(0.0090)	(0.5033)	(0.6032)
Completers	0.0221	--	--	0.0052	--	--
	(0.0208)	--	--	(0.0145)	--	--
Non-completers	0.0371**	--	--	0.0167*	--	--
	(0.0127)	--	--	(0.0070)	--	--
Low-income	0.0154	0.5938	0.8512	0.0006	-0.4027	-0.0419
	(0.0205)	(0.5418)	(0.5242)	(0.0109)	(0.5419)	(0.6277)
Middle-income	0.0182	0.5251	0.7835*	0.0268***	-0.2623	-0.3341
	(0.0148)	(0.3934)	(0.3785)	(0.0080)	(0.4802)	(0.5735)
High-income	0.0350*	0.2619	0.8038*	0.0222**	0.6219	0.3865
	(0.0141)	(0.4072)	(0.3995)	(0.0076)	(0.5859)	(0.5902)
Dependent	0.0306	0.6772	1.0706*	0.0170*	0.2390	0.4139
	(0.0182)	(0.4374)	(0.4925)	(0.0082)	(0.4555)	(0.6163)
Independent	0.0171	0.7104	0.7742	-0.0064	-0.3626	-0.3783
	(0.0195)	(0.5268)	(0.5116)	(0.0107)	(0.5657)	(0.6176)
Pell recipient	0.0192	0.6772	0.9532	0.0124	0.0366	-0.0530
	(0.0192)	(0.5162)	(0.5132)	(0.0100)	(0.5188)	(0.5924)
Not Pell recipient	0.0296	0.4719	1.0805*	0.0018	0.6139	0.8000
	(0.0165)	(0.4222)	(0.4306)	(0.0083)	(0.5032)	(0.5368)
First-generation	0.0295	0.5470	0.7437	0.0141	-0.2101	0.0058
	(0.0179)	(0.5392)	(0.5287)	(0.0093)	(0.5831)	(0.6476)
Not first-generation	0.0209	0.3326	1.2733**	0.0060	-0.2098	-0.3432
	(0.0178)	(0.4688)	(0.4776)	(0.0087)	(0.4717)	(0.5950)
Max observations	**10,323**	**4,101**	**4,116**	**14,746**	**5,785**	**5,724**

Panel B: Also excluding colleges that dropped PBF before 2019.

Group of interest	Four-year universities			Two-year colleges		
	Debt (log)	1-yr repay	3-yr repay	Debt (log)	1-yr repay	3-yr repay
All students	0.0744**	0.0270	1.2983	0.0058	1.8716	3.6265**
	(0.0249)	(1.0149)	(0.7797)	(0.0140)	(1.0707)	(1.2327)
Completers	0.0684*	--	--	0.0091	--	--
	(0.0300)	--	--	(0.0239)	--	--
Non-completers	0.0563**	--	--	0.0155	--	--
	(0.0178)	--	--	(0.0105)	--	--
Low-income	0.0584*	-0.5154	1.0151	-0.0045	0.8218	3.9348**
	(0.0290)	(1.1316)	(0.8399)	(0.0162)	(1.2311)	(1.1976)
Middle-income	0.0585**	-0.0671	1.1467	0.0153	2.6844**	3.9286**
	(0.0220)	(0.6120)	(0.6564)	(0.0128)	(1.0276)	(1.2924)
High-income	0.0859***	0.3104	1.2718	0.0126	4.4599***	3.4565*
	(0.0210)	(0.6904)	(0.7804)	(0.0123)	(1.2501)	(1.3891)
Dependent	0.0741**	0.5923	1.5099*	0.0121	2.4500**	3.9856**
	(0.0265)	(0.8622)	(0.7655)	(0.0129)	(0.8879)	(1.4057)
Independent	0.0719**	-0.0430	0.8479	-0.0001	1.3592	3.1293*
	(0.0270)	(1.0517)	(0.7571)	(0.0165)	(1.2894)	(1.2580)
Pell recipient	0.0610*	-0.0858	1.3209	0.0092	1.8299	4.0561***
	(0.0275)	(1.0174)	(0.8203)	(0.0153)	(1.2066)	(1.1926)
Not Pell recipient	0.0809***	0.8875	1.4106*	-0.0049	2.9854**	3.2801*
	(0.0221)	(0.8495)	(0.6643)	(0.0128)	(0.9358)	(1.2898)
First-generation	0.0717**	0.0032	1.2264	0.0100	1.7629	4.0361**
	(0.0253)	(1.1199)	(0.8314)	(0.0146)	(1.2069)	(1.3048)
Not first-generation	0.0662**	-0.0315	1.5781*	-0.0028	1.9407*	3.8009**
	(0.0249)	(0.9457)	(0.7409)	(0.0138)	(0.9850)	(1.1763)
Max observations	**7,484**	**2,980**	**2,981**	**10,448**	**4,106**	**4,045**

Notes:

[1] All models include the control variables shown in Table 2 and state and year fixed effects. Each coefficient is the result of a separate regression.

[2] Standard errors are clustered at the OPEID level to account for College Scorecard data being reported at the OPEID level instead of the UnitID level.

[3] * signifies p<.01. ** signifies p<.005, and *** signifies p<.001.

[4] Control variables and PBF information are aligned with a cohort's estimated first year of entry into college.

[5] Repayment rate data are only available for cohorts entering repayment between Fiscal Years 2006 and 2014.

Appendix 2: Effects of PBF dosage (terciles) on student debt and repayment outcomes.

Group of interest	Four-year universities			Two-year colleges		
	Debt (log)	1-yr repay	3-yr repay	Debt (log)	1-yr repay	3-yr repay
All students						
Low PBF	0.03017	0.12513	-0.02989	0.01567	-0.64787	-0.93142
	(0.01800)	(0.45971)	(0.47117)	(0.00919)	(0.43263)	(0.54167)
Medium PBF	0.00617	0.49760	0.37742	0.00622	-1.76997**	-0.10728
	(0.01596)	(0.49300)	(0.64276)	(0.01112)	(0.56490)	(0.57602)
High PBF	0.02451	1.45162	-1.70423	0.03341	2.70516	2.33353
	(0.03288)	(1.78974)	(2.20052)	(0.01512)	(1.31597)	(1.05819)
Completers						
Low PBF	0.02417	--	--	0.02222	--	--
	(0.01945)	--	--	(0.01542)	--	--
Medium PBF	-0.00243	--	--	0.00534	--	--
	(0.01938)	--	--	(0.01630)	--	--
High PBF	0.02274	--	--	0.02544	--	--
	(0.04056)	--	--	(0.02273)	--	--
Non-completers						
Low PBF	0.06155***	--	--	0.02986***	--	--
	(0.01418)	--	--	(0.00702)	--	--
Medium PBF	0.00927	--	--	0.02674**	--	--
	(0.01361)	--	--	(0.00923)	--	--
High PBF	0.01392	--	--	0.01230	--	--
	(0.01994)	--	--	(0.01222)	--	--
Low-income						
Low PBF	0.01915	0.23603	-0.10511	0.01309	-0.08942	-0.50285
	(0.02106)	(0.50019)	(0.50118)	(0.01102)	(0.47679)	(0.59039)
Medium PBF	-0.00769	0.76532	0.55154	0.01463	-1.08827	-0.08605
	(0.01825)	(0.56128)	(0.67347)	(0.01444)	(0.60025)	(0.60445)
High PBF	-0.00522	-0.38011	-2.46072	0.00874	2.42567	2.32203
	(0.03918)	(1.88489)	(2.03403)	(0.01791)	(1.37200)	(1.06456)
Middle-income						
Low PBF	0.02554	0.41260	0.04754	0.03403***	-0.91903	-1.81265***
	(0.01560)	(0.39896)	(0.41179)	(0.00762)	(0.42675)	(0.46591)
Medium PBF	0.00134	0.60287	-0.03871	0.01111	-1.88690***	0.72283
	(0.01528)	(0.41739)	(0.50303)	(0.01456)	(0.45935)	(0.58008)
High PBF	0.02387	1.38503	-1.80825	0.02482	3.98262***	1.88685
	(0.02459)	(1.14542)	(1.83011)	(0.01520)	(1.08785)	(1.09059)

High-income						
Low PBF	0.03918*	0.35444	0.24534	0.02766***	-0.00797	-0.32447
	(0.01405)	(0.44967)	(0.43252)	(0.00784)	(0.49539)	(0.51001)
Medium PBF	0.01999	0.01333	0.04907	0.00243	-2.68954***	0.34625
	(0.01530)	(0.46836)	(0.51921)	(0.01378)	(0.49512)	(0.63687)
High PBF	0.04095	1.81176	-0.97293	0.01852	4.96053***	1.33820
	(0.02598)	(1.29786)	(1.89811)	(0.01409)	(1.28184)	(1.27810)
Dependent						
Low PBF	0.02915	0.51207	-0.04014	0.02232*	-0.33331	-0.72742
	(0.01789)	(0.41465)	(0.44756)	(0.00861)	(0.45493)	(0.51997)
Medium PBF	0.00891	0.62591	0.44015	0.00654	-1.48635	0.08144
	(0.01686)	(0.44579)	(0.60768)	(0.00963)	(0.59060)	(0.59849)
High PBF	0.02696	1.82816	-0.09534	0.03016	3.18030**	2.47227
	(0.03320)	(1.43422)	(2.22340)	(0.01440)	(1.03392)	(1.21286)
Independent						
Low PBF	0.02122	0.52969	0.14162	0.00403	-0.55411	-0.95047
	(0.02005)	(0.52138)	(0.47444)	(0.01146)	(0.47181)	(0.58054)
Medium PBF	-0.00949	0.78303	0.20823	-0.00909	-1.65624*	0.05904
	(0.01771)	(0.55337)	(0.63165)	(0.01348)	(0.60988)	(0.58385)
High PBF	-0.00016	-1.41853	-2.82218	0.01887	2.84376	0.75667
	(0.03758)	(1.81310)	(2.09161)	(0.01754)	(1.63149)	(1.17186)
Pell recipient						
Low PBF	0.02116	0.27236	-0.05857	0.02104	-0.07325	-0.88024
	(0.02008)	(0.48254)	(0.48097)	(0.00983)	(0.45922)	(0.52987)
Medium PBF	-0.00224	0.80006	0.55919	0.00319	-0.94153	-0.06950
	(0.01740)	(0.53108)	(0.67072)	(0.01290)	(0.58210)	(0.56773)
High PBF	0.01433	0.54597	-1.49175	0.02614	2.89415	2.00767
	(0.03509)	(1.82990)	(1.99948)	(0.01680)	(1.36548)	(1.07595)
Not Pell recipient						
Low PBF	0.02929	0.39707	0.21280	0.00784	-0.09950	-0.22810
	(0.01599)	(0.41147)	(0.39171)	(0.00907)	(0.42388)	(0.45275)
Medium PBF	0.00066	0.51917	0.73416	-0.00211	-2.15289***	1.19425
	(0.01497)	(0.44394)	(0.53614)	(0.00948)	(0.55875)	(0.56250)
High PBF	0.03093	2.65332	0.29832	0.02041	3.50446***	1.28463
	(0.03091)	(1.44921)	(1.66906)	(0.01320)	(0.96875)	(1.14473)
First-generation						
Low PBF	0.03228	0.24446	-0.14961	0.01670	-0.62499	-0.92546
	(0.01845)	(0.48371)	(0.50779)	(0.00944)	(0.50038)	(0.59944)
Medium PBF	0.00058	0.61629	0.28689	0.00753	-1.99903**	0.52874
	(0.01626)	(0.53296)	(0.65173)	(0.01152)	(0.66491)	(0.61454)
High PBF	0.03078	1.47469	-1.73298	0.03363	3.16504	2.41448
	(0.03334)	(1.89934)	(2.10178)	(0.01558)	(1.31932)	(1.16459)

Not first-generation						
Low PBF	0.02269	0.01947	0.19511	0.01636	-0.48608	-1.06848
	(0.01752)	(0.44703)	(0.44937)	(0.00913)	(0.42827)	(0.55273)
Medium PBF	0.00212	0.49461	0.64803	0.00943	-1.48371**	-0.31808
	(0.01576)	(0.47884)	(0.62443)	(0.01046)	(0.51850)	(0.56414)
High PBF	0.00715	1.75568	-0.62869	0.01716	2.97130	2.23565
	(0.03282)	(1.67428)	(2.02771)	(0.01456)	(1.28165)	(1.08053)
Max observations	**11,456**	**4,576**	**4,593**	**17,393**	**6,842**	**6,766**

Notes:

[1] All models include the control variables shown in Table 2 and state and year fixed effects. Each coefficient is the result of a separate regression.

[2] Standard errors are clustered at the OPEID level to account for College Scorecard data being reported at the OPEID level instead of the UnitID level.

[3] * signifies $p<.01$. ** signifies $p<.005$, and *** signifies $p<.001$.

[4] Control variables and PBF information are aligned with a cohort's estimated first year of entry into college.

[5] Repayment rate data are only available for cohorts entering repayment between Fiscal Years 2006 and 2014.

[6] The tercile cutoffs were 1.11% and 5.00% for two-year colleges and 1.75% and 5.50% for four-year universities.