Institutional Accountability: A Comparison of the Predictors of Student Loan Repayment and Default Rates[1]

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Abstract: Colleges have traditionally been held accountable for their cohort default rates, although this measure captures only a fraction of students who are struggling to repay their loans. The 2015 release of the College Scorecard dataset introduced a new loan repayment metric that may be used for high-stakes accountability in the future. Using a sample of 3,595 colleges, we test for whether student demographics, institutional characteristics, and state-level economic factors are associated with repayment rates and default rates in similar ways. We also examine whether factors associated with repayment rates change between one and seven years of entering repayment. We find that characteristics traditionally associated with economic disadvantage, including first generation and underrepresented minority status, as well as attending a for-profit college more strongly predict not repaying loans than defaulting on obligations, and that these factors are just as or more strongly associated with longer-term repayment rates compared to shorter-term repayment rates.

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Outstanding student loan debt reached $1.23 trillion by the end of 2015 (Federal Reserve Bank of New York 2016), up from $390 billion in nominal dollars ten years prior (Federal Reserve Bank of New York 2013). The percentage of undergraduate students who took out federal loans rose from 26 percent in 1995-96 to 42 percent in 2011-12, demonstrating that student loans are becoming a financial necessity for a growing percentage of students (authors' calculation using the National Postsecondary Student Aid Study). The growing use of loans has led to numerous articles in the mass media about the "student loan debt crisis" (e.g., Glum 2016; Swidey 2016).[1] Although research suggests that students who struggle the most with repaying their loans tend to have the smallest balances (Brown, Haughwout, Lee, Scally, and van der Klaauw 2015) and that the implications of student debt on outcomes such as purchasing a home are relatively modest (Houle and Berger 2015; Mezza, Ringo, Sherlund, and Sommer 2016), the clear public perception is that repaying student loans is a prominent concern.

The traditional federal accountability metric used to assess whether students are able to repay their loans is the Cohort Default Rate (CDR). For this metric, the U.S. Department of Education follows annual cohorts of borrowers for three years after entering repayment. If a borrower in the cohort fails to make a payment on a federal subsidized or unsubsidized loan within 360-days of repayment, then they are entered into default (Federal Student Aid 2015a). Colleges that have CDRs of at least 30 percent in three successive years are at risk of losing access to all federal financial aid, but only for two years and if the cohort has at least 30 borrowers. Colleges with CDRs over 40 percent in any given year can immediately lose access to federal student loans (Federal Student Aid 2015b).

The CDR metric represents a high-stakes accountability system in that it is highly publicized and used as a measure of colleges' performance. However, the default rate has long

been criticized by researchers and policymakers for being a weak measure of students' ability to repay loans (Field 2010; Shaheen and Hatch 2015). Because colleges face losing federal financial aid if their default rate is too high, they have a strong incentive to take steps to reduce defaults, regardless of whether students are actually repaying principal. Some colleges have encouraged students to place their loans in deferment or forbearance—statuses that result in interest continuing to accrue while avoiding default within the three-year window (Blumenstyk 2010; U.S. Senate HELP Committee 2012). The share of federal student loans flowing to colleges with default rates over 30 percent has fallen considerably since 2009 (Jaquette and Hillman 2015), but it is unclear whether this decline reflects true improvement in student outcomes or an attempt to game accountability metrics.

The growth of income-driven repayment plans, which now cover approximately 20 percent of students with federal Direct Loans and 40 percent of Direct Loan dollars (Furman and Black 2016), also weakens the relationship between default and repayment. Under income-driven plans borrowers can make low or no payments while not paying down principal, thereby shielding borrowers from default but also lowering their repayment rates. Additionally, the U.S. Department of Education has been criticized for assisting colleges in keeping their default rates just under the threshold for facing sanctions (Field 2014; Stratford 2014); only 17 small colleges have lost federal aid eligibility since 2001 (Fuller and Mitchell 2015). Yet, even the threat of losing federal aid has led to reduced enrollment of new students (Darolia 2013) or colleges opting out of the federal student loan program entirely in an effort to protect Pell Grant eligibility (Cochrane and Szabo-Kubitz 2014; Hillman and Jaquette 2014).

The federal government's 2015 release of the College Scorecard dataset provided a new set of institution-level metrics regarding whether students are repaying their loans. These metrics

reflect the percentage of a college's former students who had federal subsidized or unsubsidized loans and repaid at least $1 in principal one, three, five, and seven years after entering repayment. There is a sizable gap between the percentage of students in default and the percentage of students not paying down loans, with the gap becoming even larger after a coding error in the College Scorecard was corrected in 2017 that had resulted in repayment rates being overstated (Fuller 2017). The official CDR for students entering repayment in fiscal year 2012 was 11.3 percent, while the typical college with default rate data in the College Scorecard had 56 percent of students not repaying any principal within a three-year window (authors' calculation using College Scorecard data). This suggests that CDRs understate the amount of difficulty students are having and the amount of money the federal government is recouping on its investment in students.

A sizable body of research has examined the relationship between loan default and both student and institutional characteristics (e.g., Gross, Cekic, Hossler, and Hillman 2009; Hillman 2015a). Yet little research has examined the relationship between loan repayment rates and the characteristics that have been shown to be related to CDRs. In this study, we examine whether the institutional characteristics that are associated with default rates (a high-stakes accountability measure) are also associated with loan repayment rates. With federal policymakers taking more interest in alternatives to the CDR, a comparison of the two metrics can both improve accountability efforts and provide insights into how colleges might respond to the policy incentives present in high-stakes accountability systems.

This study examines the following two research questions:

(1) What are the associations between institutional characteristics and one-year loan repayment rates? How do these associations compare with the associations between institutional characteristics and two-year CDRs?

(2) What is the association between institutional characteristics and loan repayment rates one, three, five, and seven years after a student leaves college? Do the associations change based on the number of years after a student has left college?

Literature Review

Existing research has considered the ways student demographics (e.g., race/ethnicity, gender, and socioeconomic status) and institutional characteristics (e.g., highest degree offered, sector, and graduation rates) are related to student loan borrowing and default.

Black students are found to be more likely to borrow for college even after accounting for family financial resources and the type of college attended (Addo, Houle, and Simon 2016; Grinstein-Weiss, Perantie, Taylor, Guo, and Raghavan 2016; Gross et al. 2009). Black students are also more likely than students of other racial/ethnic groups to default on their loans (Hillman 2014; Jackson and Reynolds 2013; Lochner and Monge-Naranjo 2014). These results generally hold using institution-level data, as campuses with higher percentages of Black students are associated with higher default rates (Hillman 2015b; Ishitani and McKitrick 2016). In studies that conditioned on bachelor's degree completion, the relationship between Black students and debt levels was found to be positive or null (Chen and Wiederspan 2014; Lochner and Monge-Naranjo 2014; Price 2014). Asian and Hispanic students, however, tend to be less likely to borrow than White students even if they have similar financial need (e.g., Cunningham and

Santiago 2008; Goldrick-Rab and Kelchen 2015). With regard to repayment, there is some

evidence that Hispanic students default on their loans at higher rates than White students

(Hillman 2015b), although Ishitani and McKitrick (2016) did not find a relationship between the

proportion of Hispanic students enrolled and a college's CDR.

Borrowing and repayment have also been found in some studies to be associated with

gender and socioeconomic status (SES). Most studies show that borrowing and default rates do

not vary by gender (e.g., Gross et al. 2009) although, Chen and Wiederspan (2014) concluded

that female bachelor's degree recipients graduated with more debt than males. Students from

higher-SES families tend to have less debt and lower default rates than first-generation or low-

income students (Chen and Wiederspan 2014; Gross et al. 2009; Hillman 2014; Houle 2013;

Jackson and Reynolds 2013; Lochner and Monge-Naranjo 2014; Looney and Yannelis 2015),

and the percentage of students at an institution receiving Pell Grants is associated with higher

institutional CDRs (Hillman 2015b).

A number of other institutional characteristics have been consistently associated with

default rates. Even after accounting for student academic performance and other institutional

characteristics, studies have found that for-profit colleges and two-year colleges have higher

default rates than nonprofit or public four-year colleges (Hillman 2014; Jackson and Reynolds

2013; Lochner and Monge-Naranjo 2014; Looney and Yannelis 2015; Deming, Goldin, and Katz

2012; Hillman 2015b). Default rates at four-year colleges tend to be lower at more selective

colleges and those with higher graduation rates (Ishitani and McKitrick 2016; Webber and

Rogers 2014). Institutional default rates may also be affected by the macro-economic factors in

their geographic area, as institutions located in rural areas and areas with higher unemployment

rates and lower household income levels tend to have higher default rates (Ishitani and

McKitrick, 2016; Webber and Rogers 2014). Recovery from economic recessions varies across states, which can lead to differences in funding for public institutions and resources for student services programs (Webber and Rogers 2014).

Because default rates are made public and can be used to compare colleges, even colleges with lower default rates have an incentive to keep rates low. A large body of literature from the social sciences and public administration has found that organizations respond strategically to high-stakes accountability systems (like CDR sanctions) by focusing on the metrics that are measured while neglecting important outcomes that are unmeasured (e.g., Courty and Marschke 2008; Prendergast 1999). Van Thiel and Leeuw (2002) noted that this "performance paradox" reflects the gradual weakening of the relationship between the outcome being measured and true performance in publicly-accountable organizations. Applied here, the measurement and publication of default rates may cause colleges to artificially deflate rates (e.g., by encouraging borrowers to participate in forbearance or forgiveness to avoid default) without attempting to address the underlying goal of helping students repay their loans.

Because of the performance paradox, the CDR metric is unlikely to fully capture how well students are managing debts upon repayment. Loan repayment rates are a viable complement to this existing CDR metric. The closest study to our work was conducted by Belfield (2013), who used a 2010 release of repayment rate data from the U.S. Department of Education that was created in response to requests for information during negotiations of a set of gainful employment rules. Belfield (2013) found similar results as what has been documented in the default literature: the percentage of full-time students and the percentage of students under age 25 were positively associated with repayment rates, while for-profit colleges, the percentage of Black students, the percentage of Pell recipients, and student loans per FTE were negatively

associated with repayment rates. The percent of Black students, percent Pell recipients, and loans per FTE were statistically significant for default rates as well (Belfield, 2013).

In summary, the relationships between student and institutional characteristics and cohort default rates have been well-established in the empirical literature. But few studies have examined whether these characteristics correlate with repayment rates—a potential future accountability measure. If the two measures are perfectly correlated, then there would be little value for adding the new repayment metric to the existing CDR metric. But if the repayment metric adds new explanatory power, then it serves as a promising metric to improve accountability. The release of multiple years in the College Scorecard data also provides an opportunity to consider whether the institutional characteristics that are related to student loan repayment vary over time.

Data

To address the research questions, we created a dataset using institution-level data from the College Scorecard and the Integrated Postsecondary Data System (IPEDS), merged with a series of state-level variables gathered from the Bureau of Labor Statistics and the Current Population Survey.

Outcome Variables

Our first outcome of interest was the institutional repayment rate, which represents the percentage of student borrowers who reduced their loan balance by paying at least $1 of principal (Council of Economic Advisers 2017). This measure was reported in the College

Scorecard one, three, five, and seven years after students enter repayment, and included

borrowers who left college whether or not a degree was attained. Notably, this differs from

Belfield (2013), who used the percentage of loan dollars entering repayment in fiscal years 2006-

2009 that had a declining principal balance by the end of fiscal year 2009 (U.S. Department of

Education 2010). For ease of interpretation, we turned this into a non-repayment rate by

subtracting the repayment rate from 100 percent. The College Scorecard calculated the

repayment rate as an average of two cohorts. The cohorts of students we examined left college

six months prior to entering repayment starting in fiscal years 2006 or 2007 (subsequently called

the 2007 cohort), with the one-year repayment rate measured in 2007 to 2008. The three-year,

five-year, and seven-year repayment rates of this same cohort were captured as averages

measured in 2009 to 2010, 2011 to 2012, and 2013 to 2014, respectively. We chose to investigate

this cohort because it had the most available data and allowed us to track their repayment

outcomes for seven years.

The second outcome variable we analyzed was the CDR of the same 2007 cohort of

students (Federal Student Aid, 2008), which was measured for two years into repayment.

Although federal policy now uses the three-year CDR, the two-year rate provides an advantage

because it captures the same students as the repayment rate, allowing us to make comparisons

between two different institutional accountability measures. Additionally, the potential sanctions

faced by colleges and the publicity given to default rates did not substantially change with the

move to three-year CDRs. The CDR is calculated annually on a single cohort, so we averaged

the CDRs of two cohorts (students entering repayment in 2006 and 2007) to match the period

covered by the one-year repayment rate. CDRs were not measured past two years, so they cannot

be compared to the three-year, five-year, and seven-year repayment rates.[2]

Figure 1 displays the percentages of students unable to repay any principal on their loans (the non-repayment rate) at one, three, five, and seven years after entering repayment and the two-year cohort default rate averaged across all institutions for the 2007 cohort of students. According to the two-year CDR, six percent of borrowers were in default within two-years of entering repayment. The two-year CDR is 33 percentage points lower than the one-year non-repayment rate (40 percent), suggesting a noteworthy share of students were unable to repay any principal but were not in default on their loans during this time period. An alternative explanation for the increase in non-repayment over time pertains to the increase in enrollment that tends to occur during recessions. The percentage of students in the 2007 cohort not repaying any principal fell from 40 percent in 2007 to 39 percent in 2009 and 34 percent in 2011 before rising to 36 percent in 2013 (seven years after entering repayment). Non-repayment rates could be capturing an influx of students who had previously entered repayment, but due to limited employment prospects during the Great Recession, re-enrolled in college and thus had loans placed in deferment.

FIGURE 1

Default and Non-Repayment Rates by Cohort

Figure 1 also shows the one-year, three-year, and five-year non-repayment rates and the CDRs for those entering repayment in 2007 and 2008 (referred to as 2008 cohort) and those entering repayment in 2008 and 2009 (the 2009 cohort).[3] These students were expected to begin repaying their loans around the time of the economic recession, which may explain their comparatively lower repayment rates five years after entering repayment. Default rates rose slightly to about eight percent for the latter two cohorts, but the non-repayment rate rose from 40

percent in the 2007 cohort to 52 percent in the 2009 cohort. Notably, the gap in non-repayment rates across cohorts was nearly identical five years after entering repayment (34 percent for 2007 versus 49 percent for 2009).

Sample

Among the 6,890 institutions in the entire Scorecard database in 2007, we restricted our sample to those that had all predictor variables of interest, had a cohort default rate in 2006 and 2007, and had at least one repayment rate available in the January 2017 College Scorecard data update. This led to a maximum sample size of 3,595 colleges, with fewer observations available for the five-year repayment rate. Much of the decline in sample size can be attributed to the sizable number of community colleges that do not participate in the federal student loan program (e.g., Cochrane and Szabo-Kubitz 2014), and therefore are not relevant to this study. Other colleges excluded from the sample either closed or consolidated by the end of the seven-year period or had too few students taking out loans for the Department of Education to release their repayment rates. Although this sample restriction limits our ability to generalize to small colleges, most of these institutions will likely not be subject to accountability for CDR or repayment rates in the future. We explored the distribution of the outcome variables. While there was some skewness to the right among all repayment rates and the CDR, these outcomes generally met the normality assumption in linear regression.

Predictor Variables

As described in the literature review, repayment rates may be related to a number of student and institutional characteristics, some of which have been found to relate to CDRs. Our study focuses on institutional-level variables that represent the enrollment profile of students

attending each institution. We included from IPEDS the percent of first-time, full-time[4] undergraduate students who: received any type of federal grant aid; received institutional grants, and received student loan aid. To represent age composition, we included the percent of undergraduate students filing as independents (versus dependents) for financial aid purposes from the College Scorecard. Consistent with prior research, we incorporated racial demographic data from IPEDS, specifically the percent of undergraduates in each of the following categories: Asian American, African American/Black, Hispanic/Latino, with white students as the reference category. We also controlled for percent of female undergraduates at the institution, using data from IPEDS, and percent of first generation undergraduates from the College Scorecard (defined as not having a parent with any college experience), in addition to undergraduate enrollment from IPEDS (logged) to capture institutional size.[5] Because a student's ability to repay loans is likely affected by family income, we added average family income (in $1,000s, CPI-adjusted to 2013 dollars) for two groups: independent and dependent students. We controlled for tuition and fee charges at an institution, which may relate to student debt incurred and ability to repay loans.[6]

To capture differences by institutional type and mission, we used indicators from IPEDS for private and for-profit colleges with public colleges as the reference group. Additionally, we controlled for the highest degree awarded from the Scorecard, using an indicator for associate's degrees and lower (which includes institutions that award certificates and those that award no degrees) as the reference group and indicators for institutions that grant bachelor's degrees and graduate degrees as the highest degree awarded. Since we were examining the repayment rates of the cohort of students who entered repayment in 2006 and 2007, we used 2004-2005 institutional characteristics to capture conditions during which this cohort of students were still enrolled

regardless of whether the outcome variable was one, three, five, or seven years into repayment. We followed Deming et al. (2012), Ishitani and McKitrick (2016), and Webber and Rogers (2014) in using lagged measures of institutional characteristics, with a short lag period to capture characteristics of institutions that award shorter credentials. The non-repayment rate includes students regardless of whether they graduated, so we control for each institution's graduation rate (within 150 percent of the normal program length), measured in 2006. Graduates experience greater wage gains, so institutions with higher graduation rates may also have higher repayment rates. To account for these potential labor market returns, we interact this graduation rate by the type of credential awarded (certificate, associate's degree, bachelor's degree).

To account for economic variation among states, we included state variables that may relate to the capacity of students to repay their loans. We controlled for state unemployment rates from the Bureau of Labor Statistics, median household income from the Current Population Survey (CPS, in 1,000s, CPI-adjusted to 2013 dollars), percent of the population holding bachelor's degrees from the CPS, and percent of state residents below the poverty line from the CPS.[7] We incorporated measures of state conditions in the same year that repayment was measured to account for economic factors while students were trying to repay their loans (e.g., 2009 state variables for 2009 repayment rate). As a robustness check, we ran models with county-level characteristics instead of state-level characteristics. As the results were similar, we only present the results with state-level characteristics in this paper. Summary statistics are listed in Table 1.

TABLE 1

Summary Statistics of Variables Used in Analysis

Method

To investigate the association between institutional characteristics and repayment, as well as the association between such characteristics and the CDR, we conducted a series of multiple linear regressions, starting with the one-year repayment rate. Our formal models consisted of the following:

$$y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \varepsilon_i \qquad (1)$$

where y_i is the one-year non-repayment rate or the two-year CDR of the 2006 to 2007 cohorts, X_{1i} is a vector of institutional and student level predictors measured in year 2005, X_{2i} is a vector of state-level predictors in year 2007, and ε_i is the error term (Angrist and Pischke 2009). We clustered standard errors at the 'parent' level represented by the Office of Postsecondary Education Identification (OPEID) number as multiple child institutions (IPEDS UnitIDs) may share the same OPEID and thus the same default and repayment rates.[8] We conducted separate models analyzing the three, five, and seven-year non-repayment rates, each with the same 2005 values of institutional-level predictors but with state-level controls corresponding to the year of the non-repayment rate (i.e., state-level control values in 2009, 2011, and 2013, respectively).[9]

Limitations

While the College Scorecard data makes it possible to compare non-repayment rates and default rates, there are still several limitations with the data. First, the repayment rate captures only students who have made payments on their principal, but does not separate students who are

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current on their payments in income-driven repayment programs from those who are delinquent. The Department of Education has not released data on income-driven repayment take-up rates for individual colleges. Second, enrollment in graduate school is not considered in the definition of repayment rates. Repayment rates may be lower at colleges that send more students on to graduate school since these students can place federal loans in deferment and delay principal payments. The analyses also do not control for other potentially important forces including average employment rates and earnings by institution, although the inclusion of state-level unemployment and income seeks to accommodate these characteristics.

Because default and repayment rates are reported at the OPEID level instead of the UnitID level, outcomes for students at branch campuses cannot be separated from students at the main campus. This could provide potentially inaccurate information regarding branch campus outcomes, although clustering at the OPEID level helps reduce this concern. We were also limited to institution-level data, but student-level data has the potential to examine outcomes for certain subgroups. Potentially important student-level characteristics include creditworthiness, non-education debt, graduate school attendance, employment rates, and earnings levels (Mezza and Sommer 2015). Future studies could compare results generated from student-level versus institution-level analyses.

Results

Institutional Characteristics Related to Non-Repayment Rates and Cohort Default Rates

Our first research question considers whether institutional characteristics that are associated with the one-year non-repayment rate are also related to the two-year cohort default

rate for the cohort of students that entered repayment in 2006 and 2007. Estimates for the one-year non-repayment outcome are displayed in the first column of Table 2 and those for the CDR outcome are displayed in the second column. The results show that, aside from the state unemployment rate, the direction of coefficients was the same among predictor variables that were significantly related to both outcomes. Characteristics positively associated with both one-year non-repayment and two-year CDRs include a greater percent of students who filed as independents, were African American/Black, and were first generation. Institutions with higher percentages of Asian students and female students, and with higher family incomes (among independents and dependents) tended to have lower non-repayment rates and CDRs. The percentage of students on federal grants was positively related to non-repayment rates, although this variable had no relationship with CDRs. Private non-profit and for-profit colleges had higher non-repayment rates and CDRs than public institutions, while colleges awarding graduate degrees as the highest credential had lower non-repayment rates and CDRs. Institutions with higher tuition and fees, higher graduation rates across all degree levels, and that awarded bachelor's degrees as their highest award averaged lower non-repayment rates, although these characteristics were not significantly related to CDRs.

TABLE 2

Non-Repayment and Cohort Default Rates in 2007

We analyzed whether the effect sizes of the predictors differed for CDRs and repayment rates by conducting a *t*-test of means on the coefficients of all predictor variables (results in Table 2, column 3). We found that, while the percent of students filing as independents versus

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dependents had a positive association with both one-year non-repayment rates and two-year CDRs, it had a larger association with one-year non-repayment rates (a 0.137 versus 0.019 percentage point increase for a one percentage point increase in students filing as independents). This stronger association with one-year non-repayment rates was present for nearly all of the significant predictors, whether these associations are positive or negative. A lower percent of Asian students, higher percent of African American/Black students, higher percent of first generation students, and lower family incomes among independent and dependent students were all more strongly associated with higher non-repayment rates than CDRs.

Compared to public colleges, private non-profit and for-profit colleges had loan non-repayment rates 2.1 and 8.5 percentage points higher, respectively, than public colleges. However, the default rate differences were 0.5 and 1.7 percentage points, respectively. As a whole, results suggest that institution-level characteristics are more strongly associated with repayment rates than default rates. *R*-squared values were also higher for the loan repayment model than the CDR model (0.81 versus 0.57).

With respect to the state-level controls, higher unemployment rates were associated with higher one-year non-repayment rates but with lower two-year CDRs. Higher unemployment may lead to students' increased possibility of being unable to repay any principal, but unemployed students may also be more likely to use deferment or forbearance to avoid default. As expected, a higher median household income was associated with lower non-repayment rates, and higher state poverty rates were associated with both higher CDRs and non-repayment rates.

Institutional Characteristics Related to Non-Repayment Rates by Number of Post-Repayment Years

Next, we present results addressing our second research question on the association between institutional characteristics and loan repayment rates one, three, five, and seven years after students left college (Table 3). The findings show that the majority of characteristics related to non-repayment rates were remarkably stable over time. With respect to institutional-level racial demographics, a one percentage point increase in the proportion of Asian students was associated with a lower non-repayment rate— between 0.147 and 0.165 percentage points lower depending on the number of post-repayment years. On the other hand, for every one percentage point increase in the proportion of African American/Black students, institutions saw a 0.192 to 0.220 percentage point increase in non-repayment rates. Interestingly, the proportion of Hispanic/Latino student enrollment was unrelated to non-repayment rates, regardless of year. The percent of first-time full-time students receiving federal grants (which is largely tied to financial need) and the percent of students filing as independents both retained significance across all years of post-repayment, with higher percentages of these student populations experiencing higher non-repayment rates.

TABLE 3

Non-Repayment Rates by Number of Post-Repayment Years

To examine whether the magnitude of the coefficients on non-repayment changed over time, we again conducted a *t*-test of means on the coefficients of variables associated with the one-year rate, compared to the three-year and seven-year rate. Table 4 shows whether effect sizes differ, and if they do, referring back to the coefficients in Table 3 will indicate which year's non-repayment rate had a stronger effect. Table 4 shows that the size of the effect of African

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American/Black students relative to white students was larger for three-year non-repayment rates yet smaller for seven-year non-repayment rates. These differences could reflect differences in economic circumstances of students by race/ethnicity in the years following college exit.

TABLE 4

Differences in Predictors of Non-Repayment Rates across Time

We also found that a greater percent of female students was associated with lower rates of non-repayment while a greater percent of first generation students was associated with higher rates of non-repayment, regardless of when non-repayment was measured. These two variables were more strongly associated with three-year non-repayment than with one-year non-repayment. First generation students may have less knowledge of the longer-term consequences of borrowing and continue to face challenges, even seven years after leaving college, in their ability to repay debt (Lee and Mueller 2014).

The analyses also suggest that independent students may have less ability to repay loans—a higher proportion of independent students was related to higher non-repayment across all years measured. This relationship was stronger for the seven-year non-repayment rate compared to the one-year rate. As expected, higher family incomes among independent and dependent students were associated with lower rates of non-repayment. The direction and size of these effects did not change throughout the seven-year period observed. Overall, our estimates reveal that student level characteristics aggregated at the institutional level have a strong association with repayment behavior, and generally do not change based on the number of post-repayment years.

When examining differences based on highest degree awarded, we found that compared to those that award certificates or associate's degrees, institutions that award bachelor's degrees and graduate degrees had lower non-repayment rates in all years, and the size of these effects did not differ across years. Bachelor's granting and graduate degree granting institutions had non-repayment rates ranging from 3.5 to 4.5, and 3.8 to 4.8 percentage points lower, respectively, than institutions granting shorter credentials. These findings suggest that students who earn higher-level degrees may be more likely to hold jobs that allow them to pay down principal.

Non-repayment rates were generally higher at private non-profit colleges than public colleges and even higher at for-profit colleges, with a 6.8 to 9.4 percentage point differential between for-profits and publics depending on the number of post-repayment years (Table 3). The repayment penalty for attending a for-profit college was significantly higher at three years after entering repayment compared to one year (Table 4), raising concerns about the labor market outcomes of students with credentials from proprietary institutions.

Turning to state-level variables, institutions located in states with lower median household incomes and higher poverty rates experienced higher non-repayment rates in all years, which was expected given that lower incomes would create more challenges in repaying loans. The unemployment rate was another economic indicator, with more unemployment associated with higher non-repayment. Higher educational attainment (measured as the proportion of the state population holding bachelor's degrees) was unrelated to non-repayment rates. As evidenced by the R-squared values, the predictors used in the models were comparable in explanatory power as post-repayment years increased. The independent variables explained 81 percent of the variation in repayment rates one year after entering repayment, and 84 percent after three years, five years, as well as seven years.

Discussion and Future Work

As outstanding student loan debt increases, concerns about students' ability to repay their obligations and calls to hold colleges accountable for their outcomes are becoming more prominent. The newly-released loan repayment metrics in the College Scorecard provide a new way to judge colleges' effectiveness alongside cohort default rates, which have been the standard measure for determining colleges' eligibility for federal financial aid dollars. Bipartisan legislation introduced in the U.S. Senate prior to the release of the College Scorecard dataset called for a college's access to federal financial aid to be based on three-year loan repayment rates instead of cohort default rates and for colleges to be held liable for a portion of former students' debt that is not repaid via a risk-sharing system (Shaheen and Hatch 2015). The calls to use loan repayment rates are likely to increase after an error in the College Scorecard was corrected that resulted in significantly lower repayment rates (Fuller 2017).

In this paper, we examined the institutional characteristics and state-level economic conditions that were associated with the percentage of students who were unable to pay down at least $1 of the principal on their loans and cohort default rates. We found that the institutional characteristics associated with cohort default rates were also generally associated with loan repayment rates, with institutions serving more traditionally underrepresented groups (African-Americans, first-generation students, and financially independent students), and for-profit and private institutions having higher rates of non-repayment and default. These institutional characteristics generally had a stronger relationship with non-repayment than default rates. The stronger relationships for non-repayment than for default may suggest that colleges and student

loan servicers are more focused on keeping students attending these institutions out of default (e.g., by encouraging students to place their loans in deferment or forbearance where interest continues to accrue). While colleges with high default rates tend to have high non-repayment rates, an accountability metric based on repayment rates may affect additional colleges that have successfully managed their default rates (Barrett 2016).

Several institutional-level characteristics were consistent predictors of non-repayment regardless of whether students had left college one year, three years, five years, or seven years ago. Higher percentages of students receiving federal grants, filing as independents, and higher percentages of African American/Black and first generation students were associated with higher non-repayment rates across all years. On the other hand, a higher percentage of Asian students, female students, and higher incomes among independent and dependent students were associated with lower non-repayment rates.

One potential reason why students face challenges in the initial years after leaving college is that it takes time to secure stable employment, particularly for those who did not earn a degree. Colleges that increase the availability of career services professionals to students, particularly those who did not earn a degree, may help increase repayment. Another implication for practice is more active contact with students who left college, to emphasize the consequences of not repaying loans and to provide advice on how and when to repay loans, as perhaps students simply need more information. Financial aid offices or other student affairs divisions are appropriate areas to implement such services. Since we find that institutions with higher shares of underserved students tend to have higher rates of for non-repayment, a strategic effort at these institutions may decrease the loan debt burdens and potentially limit disparities in employment outcomes and earnings that continue to persist across race and educational attainment levels.

As repayment rates are likely to become a key accountability metric in the next several years, researchers and policymakers need to examine how colleges may respond. If repayment rates are used alongside or instead of default rates, colleges may choose to focus on assisting students who are making payments that just barely fail to keep up with accumulating interest over those students who are far behind on their loans or at risk of defaulting. These actions represent the "performance paradox" of public organizations delivering on consequential measures of performance while ignoring other important areas (Van Thiel and Leeuw 2002). Empirical research from K-12 education has shown that organizations focus on cases at the margin of success when accountability systems have a cutoff score (Lauen and Gaddis 2016; Neal and Schanzenbach 2010). This type of response would focus from students on the threshold of defaulting to those who are on the threshold of paying down principal. Additional research in this area is encouraged.

Further research is also needed to determine whether the relationships we found between institutional characteristics and repayment rates hold among more recent cohorts of students. The 2006-07 cohort that we explored had both a two-year CDR that covered the same time period as a one-year repayment rate and a seven-year repayment rate, while just one other cohort now has a seven-year repayment rate. The most recent cohorts no longer have two-year CDRs, and three-year CDRs would align with a four-year repayment rate that is not reported in the College Scorecard. The cohort examined in this study predates the beginning of the Great Recession and the growth in income-driven repayment programs. An analysis of more recent cohorts to examine characteristics associated with shorter-term repayment rates would be a valuable addition to the literature.

Future research should also include measures of the broad fields in which students earn degrees (e.g., STEM, business, and education) to see whether the mix of majors is relevant to repayment or default rates. Results would have implications for practice, by informing colleges of specific fields that are especially at risk of default. Limited research considers disparities in these outcomes by academic discipline. Exploring these differences can encourage colleges to publicize such findings, provide additional support to students in majors with higher risk of future default and non-repayment, or steer students into majors that lead to a higher likelihood of repaying loans.

Additional research is also required to further understand differences in predictors of default and non-repayment by type of college (public, private nonprofit, and for-profit). This study found differences based on institutional control, and further research may help explain why different types of institutions seem to be more or less successful than others in helping certain subgroups of students repay their loans, particularly given the high rates and borrowing amounts for students attending for-profit colleges and the consequences for taxpayers when students fail to repay loans.

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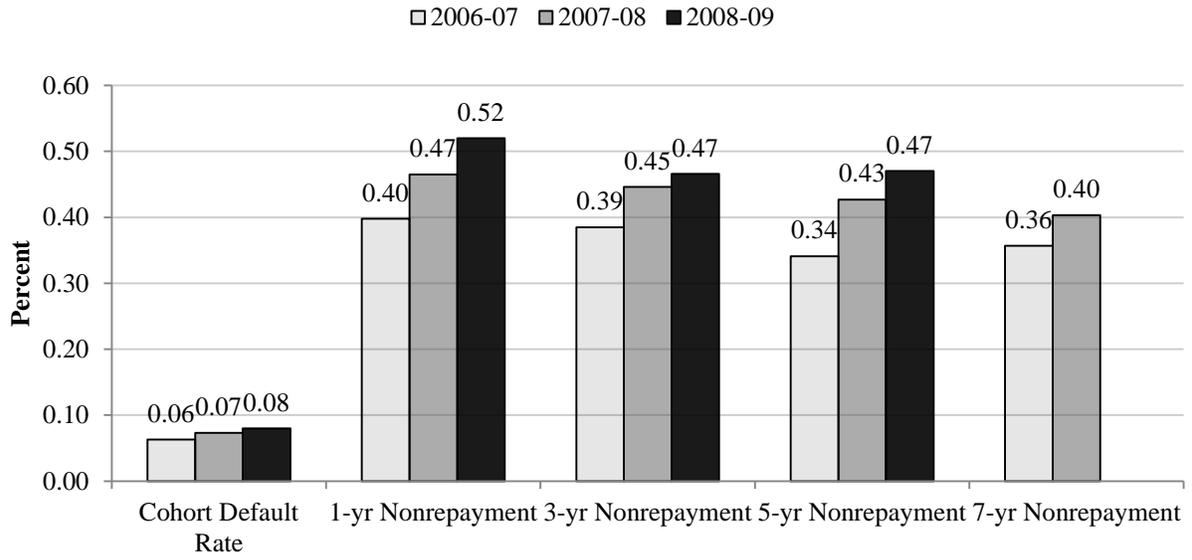**Figure 1: Default and Nonrepayment Rates by Cohort**

□ 2006-07 ▨ 2007-08 ■ 2008-09

Table 1

Variable	Mean	Std. Dev
Outcome Metrics (2006 and 2007 cohorts)		
1-year non-repayment	0.398	0.17
3-year non-repayment	0.385	0.178
5-year non-repayment	0.341	0.166
7-year non-repayment	0.357	0.171
CDR (2-year)	0.073	0.049
Institutional Characteristics (2004-05 unless noted)		
Percent receiving federal grants	0.459	0.229
Percent receiving institutional grants	0.303	0.346
Percent receiving loans	0.538	0.283
Percent filing as independents (vs dependents)	0.489	0.246
Percent Asian	0.039	0.072
Percent African American/Black	0.161	0.206
Percent Hispanic/ Latino	0.108	0.17
Percent female	0.643	0.204
Percent first generation	0.479	0.135
Number of undergraduates (log)	7.091	1.66
Family income of independents (in $1000s)	25.323	9.199
Family income of dependents (in $1000s)	59.339	22.656
Tuition and fees (in $1000s)	9.861	7.207
Graduation rate: All degree levels (2006)	0.581	0.348
Graduation rate: Certificates (2006)	0.830	0.351
Graduation rate: AA degrees (2006)	0.486	0.410
Graduation rate: BA degrees (2006)	0.479	0.209
Highest degree BA: (omitted is AA or less)	0.113	
Highest degree: Graduate degree	0.315	
Private college (omitted is public)	0.276	
For-profit college	0.344	
State Variables (2007 shown; other years available from authors)		
Unemployment rate	0.047	0.008
Median household income (in $1000s)	44.561	6.312
Percent with BA degree	0.273	0.044
Poverty rate	0.123	0.025
N (Colleges) = 3595		

Table 2

	1-yr Non-Repayment Rate	2-yr Cohort Default Rate	Effect size differs
Percent receiving federal grants	0.038**	0.009	X
	(0.012)	(0.005)	
Percent receiving institutional grants	-0.002	0.001	
	(0.008)	(0.003)	
Percent receiving loans	0.009	0.001	
	(0.008)	(0.004)	
Percent filing as independents (vs.	0.137***	0.019***	X
dependents)	(0.011)	(0.005)	
Percent Asian	-0.147***	-0.042***	X
	(0.026)	(0.010)	
Percent African American/Black	0.209***	0.021***	X
	(0.010)	(0.004)	
Percent Hispanic/ Latino	0.023	0.002	
	(0.018)	(0.006)	
Percent female	-0.025*	-0.033***	
	(0.013)	(0.004)	
Percent first generation	0.189***	0.071***	X
	(0.026)	(0.012)	
Number of undergraduates (log)	0.009***	0.002**	X
	(0.002)	(0.001)	
Family income of independents (in $1000s)	-0.003***	-0.001***	X
	(0.000)	(0.000)	
Family income of dependents (in $1000s)	-0.001***	-0.001***	X
	(0.000)	(0.000)	
Tuition and fees (in $1000s)	-0.001*	0.000	X
	(0.000)	(0.000)	
Graduation rate: All degree levels	-0.044***	-0.010	X
	(0.013)	(0.006)	
Graduation rate: Certificates	-0.011	0.000	
	(0.014)	(0.006)	

Graduation rate: AA degrees	0.005	0.008	
	(0.014)	(0.007)	
Graduation rate: BA degrees	0.013	-0.009	
	(0.021)	(0.009)	
Highest degree: BA (omitted is AA or less)	-0.042***	-0.005	X
	(0.011)	(0.005)	
Highest degree: Graduate degree	-0.048***	-0.016***	X
	(0.007)	(0.004)	
Private college (omitted is public)	0.021**	0.005*	X
	(0.007)	(0.003)	
For-profit college	0.085***	0.017***	X
	(0.008)	(0.003)	
State unemployment rate	0.551**	-0.334***	X
	(0.176)	(0.078)	
State median household income (in 1000s)	-0.002***	0.000	X
	(0.000)	(0.000)	
State percent with BA degree	0.107	0.027	
	(0.066)	(0.030)	
State poverty rate	0.266***	0.120***	X
	(0.073)	(0.029)	
R-squared	0.81	0.57	
N (Colleges)	3591	3595	

Table 3

	1-yr	3-yr	5-yr	7-yr
Percent receiving federal grants	0.038**	0.037**	0.041***	0.030**
	(0.012)	(0.011)	(0.012)	(0.010)
Percent receiving institutional grants	-0.002	-0.008	-0.005	-0.012
	(0.008)	(0.007)	(0.007)	(0.007)
Percent receiving loans	0.009	0.018*	0.009	0.016*
	(0.008)	(0.008)	(0.008)	(0.007)
Percent filing as independents (vs. dependents)	0.137***	0.142***	0.135***	0.153***
	(0.011)	(0.011)	(0.011)	(0.011)
Percent Asian	-0.147***	-0.155***	-0.165***	-0.154***
	(0.026)	(0.024)	(0.021)	(0.022)
Percent African American/Black	0.209***	0.220***	0.220***	0.192***
	(0.010)	(0.009)	(0.010)	(0.009)
Percent Hispanic/Latino	0.023	0.009	0.018	0.021
	(0.018)	(0.017)	(0.017)	(0.016)
Percent female	-0.025*	-0.033**	-0.034**	-0.031**
	(0.013)	(0.012)	(0.010)	(0.012)
Percent first generation	0.189***	0.234***	0.186***	0.203***
	(0.026)	(0.026)	(0.025)	(0.024)
Number of undergraduates (log)	0.009***	0.008***	0.006**	0.005**
	(0.002)	(0.002)	(0.002)	(0.002)
Family income of independents (in $1000s)	-0.003***	-0.003***	-0.002***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)
Family income of dependents (in $1000s)	-0.001***	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)
Tuition and fees (in $1000s)	-0.001*	0.000	0.001	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Graduation rate: All degree levels	-0.044***	-0.040**	-0.074***	-0.038**
	(0.013)	(0.013)	(0.015)	(0.012)
Graduation rate: Certificates	-0.011	-0.014	0.037*	-0.004
	(0.014)	(0.014)	(0.017)	(0.013)

Graduation rate: AA degrees	0.005	0.004	0.046**	0.005
	(0.014)	(0.014)	(0.017)	(0.013)
Graduation rate: BA degrees	0.013	0.017	0.016	-0.004
	(0.021)	(0.020)	(0.023)	(0.020)
Highest degree: BA (omitted is AA or less)	-0.042***	-0.045***	-0.036**	-0.035***
	(0.011)	(0.011)	(0.012)	(0.011)
Highest degree: Graduate degree	-0.048***	-0.048***	-0.038***	-0.046***
	(0.007)	(0.007)	(0.008)	(0.006)
Private college (omitted is public)	0.021**	0.025***	0.011	0.019**
	(0.007)	(0.007)	(0.007)	(0.007)
For-profit college	0.085***	0.094***	0.068***	0.080***
	(0.008)	(0.008)	(0.009)	(0.008)
State unemployment rate	0.551**	0.073	0.335**	0.258*
	(0.176)	(0.088)	(0.114)	(0.113)
State median household income (in 1000s)	-0.002***	-0.001*	-0.001**	-0.001**
	(0.000)	(0.001)	(0.000)	(0.000)
State percent with BA degree	0.107	0.059	0.104	0.058
	(0.066)	(0.066)	(0.067)	(0.057)
State poverty rate	0.266***	0.367***	0.075	0.137*
	(0.073)	(0.065)	(0.084)	(0.057)
R squared	0.81	0.84	0.84	0.84
N (Colleges)	3591	3594	2669	3595

Table 4

Testing for Differences in Non-Repayment Rates by Post-Repayment Years

	1-yr vs 3-yr	1-yr vs 7-yr
Percent receiving federal grants		
Percent receiving institutional grants	X	X
Percent receiving loans	X	
Percent filing as independents (vs dependents)		X
Percent Asian (omitted is white)		
Percent African American/Black	X	X
Percent Hispanic/ Latino	X	
Percent female	X	
Percent first generation	X	
Number of undergraduates (log)		X
Family income of independents (in $1000s)		
Family income of dependents (in $1000s)		
Tuition and fees (in $1000s)	X	X
Graduation rate: all degree levels		
Graduation rate: Certificates		
Graduation rate: AA degrees		
Graduation rate: BA degrees		
Highest degree: (BA omitted is AA or less)		
Highest degree: Graduate degree		
Private college (omitted is public)		
For-profit college	X	
State unemployment rate	X	X
State median household income (in $1000s)	X	
State's percent with BA degree		
State poverty rate	X	X

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[1] A Google News search in September 2016 using the phrase "student debt crisis" returned 7,100 results.

[2] The U.S. Department of Education released draft three-year cohort default rates for our cohorts of interest (which were for informational purposes only and not used for high-stakes accountability), but these would be the same length of time as a two-year repayment rate.

[3] The 2006-07 cohort was the first cohort of students in the College Scorecard dataset, so we cannot examine the repayment rates of earlier groups of students.

[4] Data on the percent of undergraduates receiving the different types of aid was not available in the years analyzed, so we used the percent of first-time, full-time students. Data on the percent of undergraduates receiving loan aid was not available for 2007, but was available for 2008. For years 2008 to 2013, the percent of undergraduates receiving loan aid was positively correlated (ranging from 0.78 to 0.85) with the percent of first-time, full-time students receiving loan aid. We decided that the first-time, full-time measures are representative of the same measures on all undergraduates.

[5] We excluded a measure for percent of part-time students due to a high percentage of missing data.

[6] Some institutions in the dataset reported tuition and fees on a program year basis, while the majority reported on an academic year basis. An analysis of data accounting for this reporting difference yielded the same results, so we use a single merged tuition measure.

[7] Because state conditions do not apply for online colleges that serve students from a broader and unknown geographic area, we deleted the four exclusively online colleges in the dataset (e.g., University of Phoenix Online). Other colleges likely serve a high percentage of adult students from out of state (such as Excelsior College or Thomas Edison State University), but IPEDS measures of residency status are for first-year students only and not for returning adults. This reflects a limitation of the state-level variables, as we cannot directly control for these types of colleges.

[8] See Jaquette and Parra (2014) for more details about the importance of accounting for parent-child relationships in IPEDS and Federal Student Aid data.

[9] As a robustness check, we conducted the regression using a Tobit model, which yielded the same estimates as the OLS regression. This is likely due to few zeros in the distribution of the outcome variables and that the variables are close to normally distributed. We conclude that the OLS model produces unbiased estimates of the parameters.