CENTER FOR ANALYSIS OF
POSTSECONDARY EDUCATION
AND EMPLOYMENT

Early Labor Market and Debt Outcomes for Bachelor's Degree Recipients: Heterogeneity by Institution Type and Major, and Trends Over Time

A CAPSEE Working Paper

Judith Scott-Clayton

Community College Research Center
Teachers College, Columbia University

July 2016

Abstract

While research has consistently found strong positive earnings returns to the bachelor's degree, recent evidence also highlights heterogeneity in post-college outcomes. Combined with increases in the proportions of students borrowing to enroll, heterogeneity in college outcomes introduces the risk that some students with college degrees may experience financial hardship after graduation. Using nationally representative data on baccalaureate recipients in 1993 and 2008, this paper jointly examines labor market and debt outcomes four years after students graduate, with a focus on exploring heterogeneity by institution type and major field of study, as well as trends over time. Results confirm that the typical graduate fares well after college, both in terms of earnings and debt management. Borrowing rates and debt loads have increased substantially over time, but these substantially higher levels of debt are nonetheless manageable for the vast majority of graduates. Within this context of positive outcomes, stratification by institution type, for both earnings and debt outcomes, appears to be increasing. Similarly, while the top-earning majors have remained quite stable over time, the magnitude of the advantage of engineering, math/computer science, and business graduates has grown notably. Examining debt alongside earnings only reinforces the patterns by major: higher earning fields also have lower debt-to-earnings ratios. Overall, these patterns offer reassurance regarding the typical returns to bachelors' degrees, even for those graduating into the Great Recession, and even in light of growing debt loads. But the results also provide evidence that students' choices about where to attend and what to study have only become more consequential over time.

Table of Contents

1. Introduction

Under the simplest model of human capital investment, versions of which were formulated by Becker (1962) and Rosen (1976) and later utilized and adapted by many authors, individuals invest in additional years of schooling until the marginal benefit of the last year, in terms of future earnings, just equals the marginal cost, in terms of both direct costs and foregone wages. Empirically, this model was first evaluated using Mincerian earnings equations, in which log wages are regressed on years of schooling while controlling for measures of labor market experience, individual ability, and other covariates (Griliches, 1977). A long history of subsequent research has confirmed that educational attainment affects earnings, with quasi-experimental studies often suggesting even higher estimated returns than obtained via basic Mincerian regressions (see reviews by Barrow & Rouse, 2005; Card, 1999; and for community colleges, by Belfield & Bailey, 2011; Grubb, 2002a, 2002b).

The individual human capital investment decision involves far more than a simple choice about how many years of schooling to obtain, particularly when individuals move beyond a high school education. Individuals make choices not only about the quantity of schooling to obtain but also about the content and quality of that schooling (Behrman & Birdsall, 1983). The content and quality margins may be becoming increasingly important over time: recent empirical work has found that while returns to education continue to increase, residual wage inequality—wage dispersion within demographic and educational categories—has increased as well (Autor, Katz, & Kearney, 2008; Lemieux, 2006). This increase in wage dispersion within educational groups has coincided with growing evidence that a bachelor's degree is not a homogenous investment across subject areas and different types of schools (Arcidiacono, 2004; Zhang & Thomas, 2005).

Increasing heterogeneity in returns may interact in important ways with another significant trend over time: the increasing cost of college and associated increase in student loan debt. If returns to college have become more risky, some college investments that appeared worthwhile ex ante may nonetheless cause financial strain ex post if earnings are insufficient to cover loan repayments (Benson, Esteva, & Levy, 2015). Concerns are compounded by evidence that many students do not understand the contractual relationship involved in taking a student loan and that many student borrowers do not even realize that they have taken loans, let alone understand what their monthly repayments are likely to be post-graduation (Akers & Chingos, 2014a).

Heterogeneity in the returns to college, combined with rising debt levels, may be one reason why the media and general public continue to question whether college is "worth it" despite the strong economic evidence regarding average returns.[1] Indeed, the U.S. Department of Education has been motivated by such concerns to strengthen their power to eliminate federal

---

[1] See, for example, "Spending Too Much Time and Money on Education?" (2011).

financial aid eligibility for some postsecondary programs if an insufficient proportion of their graduates are "gainfully employed" or earning too little to pay back their student loans.[2]

In light of this context, this study examines descriptive evidence and utilizes regression analysis to explore three primary research questions. First, what are the labor market returns to bachelor's degrees with alternative fields of concentration (such as science, technology, engineering, and math [STEM], humanities, social sciences, education, or business), and from different types of institutions (particularly in terms of selectivity and control)? Second, how do patterns vary depending on the cohort (1993 versus 2008 graduates)? Third, how do student loans interact with patterns of returns (e.g., are students from some fields/institution types at particular risk of unmanageable payments)?

The Baccalaureate and Beyond (B&B) survey, conducted by the National Center for Education Statistics, is an ideal but underutilized survey for examining heterogeneity in returns at the baccalaureate level as well as interactions with financial aid (particularly student loan debt). The most recent fielding of this survey begins with a nationally representative sample of approximately 9,000 individuals who earned a bachelor's degree in 2008—just on the cusp of the Great Recession—and follows students for four subsequent years. The survey collects both administrative (transcript) and survey data in the base year, and collects self-reported information on post-baccalaureate experiences in 2012. An earlier wave of the survey began with 12,000 graduates in 1993 and also included a four-year follow-up (1997), allowing for comparisons between the experiences of these two distinct cohorts.

2. Review of Prior Literature

Returns to Bachelor's Degrees by Field

It has long been recognized that academic major has a substantial impact on the earnings of college graduates (Berger, 1988; Eide, 1994; Grogger & Eide, 1995; James, Alsalam, Conaty, & Do, 1989; Rumberger, 1984; Rumberger & Thomas, 1993; Thomas, 2000; see Zhang & Thomas, 2005, for a recent review of this literature). These prior studies, which control for student and family characteristics, generally find the highest returns for business, engineering, and health fields, followed by math and social sciences, followed by education and humanities majors.

There is some evidence that earnings vary more widely by college major for females than for males. For example, Thomas (2000) and Rumberger and Thomas (1993) find that male engineering graduates earn between 19 percent and 24 percent more per year than the average male graduate, while female engineering graduates earn between 36 percent and 39 percent more than the average female graduate. Health majors receive the next highest salaries for both men

---

[2] See "Program Integrity: Gainful Employment-Debt Measures," (2011).

and women: between 12 percent and 24 percent more for men and about 19 percent and 37 percent more for women.

Existing research has relied upon the self-reported labor market outcome data available from longitudinal surveys (including B&B 93/94 and 93/97, the 1972 National Longitudinal Study, High School and Beyond, and the 1997 Survey of Recent College Graduates), and has also relied upon declared major/degree field. I will improve upon this literature by utilizing administrative earnings data, extending the length of follow-up, and examining credits earned in various fields, not just declared majors.

Returns to Bachelor's Degrees by Institution Type and Quality

While college quality is generally understood to be a multidimensional construct, no consensus has been reached in the literature regarding how best to operationalize it. Measures include basic institutional characteristics such as public versus private control (Kane & Rouse, 1995; James et al., 1989; Zhang, 2004; Zhang & Thomas, 2005), two-year versus four-year institutions at initial entry (Gill & Leigh, 2001; Hilmer, 1999; and Light & Strayer, 2003), and flagship status (Hoekstra, 2009), as well as college selectivity measures such as average SAT/ACT scores (e.g., Dale & Krueger, 1999, 2011; Rumberger & Thomas, 1993) or Barron's Academic Competitiveness Index (Brewer & Ehrenberg, 1996; Brewer, Eide, & Ehrenberg, 1999). A study by Zhang (2003) finds that the effect of college quality is sensitive to alternative measures of "quality"; however, the estimated effect is generally positive and significant regardless of the measure used.

Most prior studies in this area address concerns about selection bias by using structural models and controlling for observed student characteristics, such as high school grades, test scores, and parental education (Brewer & Ehrenberg, 1996; Brewer et al., 1999). These studies find significant economic returns to attending an elite private institution and little evidence that correction for selection bias significantly changes the results (see review by Zhang & Thomas, 2005). Several studies have utilized early follow-up surveys from the B&B (Thomas, 2003; Zhang, 2009; Zhang & Thomas, 2005). For example, Zhang & Thomas (2005) find that graduating from a high-quality college provides a roughly 20 percent earnings advantage relative to graduating from a low-quality college, after controlling for academic and family background. The present analysis is the first to my knowledge to undertake a detailed comparison of the 1993 cohort with the more recent 2008 cohort.

The results from two particularly rigorous recent studies, however, have been more mixed. Using a regression discontinuity design, Hoekstra (2009) finds that attending the flagship state university results in a 20 percent higher return for white men, but he does not find an effect on earnings for white women. Dale and Krueger (2002) use the College and Beyond (C&B) survey to examine students who were accepted to 27 specific highly selective colleges and compare the wage returns of students who chose to attend one of the colleges with those who did not. The authors find little to no returns for attending one of these elite colleges, except among

low-income students. Dale and Krueger extend this previous work in 2011 by using administrative earnings data and again find little return to college selectivity, except for Black and Hispanic students.

This study will contribute to the literature by analyzing a nationally representative sample (unlike the more limited samples of Hoekstra, 2009, and Dale and Krueger, 2002, 2011). Of course, unlike these quasi-experimental studies, the present analysis makes no claim at causal estimation. Rather, this study helps provide a broader, more representative perspective on the range of outcomes experienced by students in different fields at different types of institutions.

Interactions Between Returns to College and Student Loan Burdens

Recent work has also begun to explore whether high average returns to college remain after taking loan repayments into account. A recent simulation analysis by Benson, Esteva, and Levy (2015) using data from California indicates that given heterogeneity in returns across students and institutions, some students may find themselves worse off after graduation. On the other hand, an analysis of data from the Survey of Consumer Finances by Akers and Chingos (2014b) finds that student loan debt tends to be positively correlated with earnings outcomes, such that the incidence of loan default is not strongly correlated with the size of a student's debt. While the B&B:2008 survey currently offers only a relatively short-term window for looking at post-college outcomes, it still offers a unique opportunity to establish some basic facts about students' post-college debt management. Are many students struggling to repay, and if so, how does debt burden vary across field of study and institution type?

3. Empirical Approach

Data: The *Baccalaureate and Beyond* Survey and its Comparative Advantage

This analysis uses data primarily from the most recent cohort of the Baccalaureate and Beyond (B&B) survey, following individuals who earned a bachelor's degree in the 2007–08 school year through 2012 (henceforth, the B&B:08/12). Where feasible, I also analyze data from the previous cohort (B&B:93/97) for comparison.[3] The B&B sample is drawn from the nationally representative National Postsecondary Student Aid Survey (NPSAS) and thus provides a nationally representative sample of graduating seniors, and can be linked to all of the rich survey and administrative variables provided in the baseline NPSAS data. At the four-year follow up, survey outcomes include questions about employment, enrollment, family formation, and more; these data are also linked to administrative records on loan repayments from the National Student Loan Data System (NSLDS).

---

[3] The B&B:2000 cohort cannot be used for comparison as it was only followed through 2001.

The analysis of a comparatively small survey dataset like the B&B may strike some as rather unfashionable given the increasing availability of large-scale administrative datasets in recent years. Postsecondary research increasingly utilizes state-level databases linking postsecondary transcripts to both pre-college education records as well as post-college quarterly earnings data (see, e.g., Zimmerman, 2014). Recent examinations of heterogeneity in college outcomes have utilized individual earnings histories from income tax records linked to institutional enrollment (Hoxby, 2015) and student loan debt and repayment records (Looney & Yannelis, 2015).

In this context, what is the value added in using the B&B survey, given its small sample size, relatively short length of follow-up, and infrequent fielding of new cohorts? The main advantage relative to administrative data sources is the ability to incorporate measures of individual and family background, as well as detailed postsecondary experiences (institutional quality, field of study, performance, etc.), into an analysis of post-college financial outcomes including both earnings and debt. State-level administrative databases often lack much information on family background or pre-college achievement, earnings data are often limited, and such data have not yet been linked with student loan repayment outcomes. The vast and illuminating datasets constructed by Hoxby (2015) and Looney and Yannelis (2015) are also not currently equipped to fully explore heterogeneity by family background and undergraduate experiences.

Census datasets such as the Current Population Survey (CPS) and American Community Survey (ACS) provide larger samples, and because they are fielded more frequently (monthly/annually), they are much better suited to tracking trends in labor market outcomes over time and examining differences in outcomes across basic demographic categories, as well as across degree levels and fields. Relative to the B&B, however, the CPS and ACS provide very little information on graduates' family and educational backgrounds. For example, the CPS and ACS do not include information on parental income or wealth (unless the graduate is still living with his/her parents), test scores or GPAs, or the type of institutions from which degrees were earned (public/private, selective, for-profit, etc.). Particularly important for this analysis, neither the CPS nor the ACS provides information on the year of degree receipt, nor do they provide any information on student loan borrowing or repayments.

Finally, the National Longitudinal Survey of Youth 1997 cohort (NLSY-97) starts with a nationally representative cohort of 12–17 year olds in 1997 and tracks them through 2013, allowing for both a (potentially) longer post-college follow-up as well as more pre-college information. Like the ACS and CPS, it also includes non-enrollees and non-graduates as potential comparison groups. The NLSY-97 sample is even smaller than the B&B, however: the baseline sample includes 8,974 individuals (only 7,166 of whom responded in the 2013 follow-up round). Fewer than 1,500 of these had earned a bachelor's degree by 2013, making further breakdowns by demographics, field of study, and institution type challenging. Moreover, the lack of data on student debt and repayment and the fact that degrees were earned across a range of years make the NLSY unsuitable for the research questions posed here.

While the B&B is a valuable and underutilized resource for examining outcomes among bachelor's degree recipients, it is also important to acknowledge its limitations. Currently, graduates have only been followed for four years (though a longer follow-up is planned). Graduates are thus very early in their careers, and approximately one in five were still enrolled in further education at the time of the follow-up survey. In addition, the B&B:08/12 examines graduates just on the cusp of the Great Recession. The results here cannot be interpreted as the last word on graduates' outcomes.

Methods: Descriptive and Multivariate Regression Analysis

Given the dearth of available evidence on how combined debt and labor market outcomes of recent graduates vary across institution type, field of study, and student characteristics, I first present descriptive tables summarizing these patterns. I focus on five main types of outcomes: (1) current activities (employment and/or enrollment), (2) graduate school enrollment/attainment, (3) earnings, (4) student loan borrowing (undergraduate, graduate, and overall), and (5) student loan repayment outcomes. For earnings and borrowing outcomes, I present both unconditional and conditional (on employment and on ever borrowing, respectively) averages and medians.

Descriptive tables can highlight notable dimensions of variation, but can also be difficult to interpret in isolation. For example, if we observe heterogeneity in earnings outcomes by gender, to what extent might this purely reflect differences in choice of major? Or vice versa: if we observe heterogeneity in earnings outcomes by institutional selectivity or major, to what extent might these simply reflect the different demographics of the students that choose these institutions/fields?

Multivariate regression analysis allows us to isolate differences in outcomes across institution types and fields of study, while holding other factors constant. The resulting regression coefficients cannot be interpreted as causal impact estimates (in the absence of additional strong assumptions), but can provide a more nuanced and informative summary of outcome variation. For example, differences in outcomes across institutional control and selectivity may largely reflect differences in student composition. Controlling for student characteristics does not magically allow us to interpret coefficient estimates as causal effects, but simply enables us to partial out known differences in outcomes along other dimensions (student age, race, gender, family income, and so on). Compared to raw differences in outcomes, controlling for observed covariates allows us to isolate the component of institution type- or field-level variation which is not explained by other observable factors. Resulting coefficients still may reflect differential selection of students into institutions and fields based on unobserved factors such as student motivation and career aspirations.

For the regression analyses, I focus on a subsample and subset of four-year follow-up outcomes that are most comparable across the two waves of the B&B, the B&B:93/97 and the B&B:08/12. I estimate ordinary least squares (OLS) equations (in the case of binary variables, these can be interpreted as linear probability models) of the basic form:

$$y_{ij} = \alpha + (BachFieldFE_{ij})\phi + \beta_1(CreditsInField_{1ij}) + ... + \beta_N(CreditsInField_{Nij}) + (OthDegreeFE_{ij})\psi \quad (1)$$

$$(InstTypeFE_j)\lambda + (InstSelectivityFE_j)\varphi + \pi(A_{ij}) + X_{ij}\delta + \varepsilon_{ij}$$

Where:

Y_{ij} = measure of employment, (log) earnings, or debt outcomes for individual i graduating from institution j

$BachFieldFE_{ij}$ = vector of fixed effects (dummy variables) for limited set of aggregated degree fields (e.g., STEM, humanities, social sciences, health sciences, education, or business)

$CreditsInField_{(1-N)ij}$ = credits accumulated in limited set of aggregated fields of study

$OthDegreeFE_{ij}$ = vector of fixed effects indicating receipt of other certificates, licenses, or post-baccalaureate degrees, in a limited set of aggregated fields

$InstTypeFE_j$ = vector of fixed effects for type(s) of institutions attended, including public two-year, public four-year, private two-year, private four-year

$InstSelectivityFE_j$ = vector of fixed effects indicating selectivity level of institution(s) attended, based on average ACT/SAT scores and/or Barron's Academic Competitiveness Index

A_{ij} = pre-college achievement, as measured by ACT/SAT score

X_{ij} = vector of individual demographic characteristics including gender, race/ethnicity, age, family income, and state of residence

For binary outcomes such as employment or graduate school degree attainment, the above can be interpreted as a linear probability model, with coefficients representing percentage point changes. I run two main specifications. Model 1 includes only a set of institutional selectivity-control dummies (with moderately selective public institutions left out as the default category), field-of-degree dummies (with "other" majors left out as the default category), and a dummy for whether the student initially began at a two-year institution. Model 2 adds credits completed overall and in STEM field, and controls for demographics including student gender, race/ethnicity, age, parental education, a summary measure of family resources while enrolled (the expected family contribution [EFC] as defined by federal financial aid programs), and pre-college achievement.

4. Descriptive Findings

Tables 1 through 3 provide context for this analysis by summarizing the characteristics and key outcomes for bachelor's degree graduates in the 1993 and 2008 cohorts. Table 1 indicates that graduates are increasingly diverse, though still overwhelmingly White: about three in four graduates in the recent cohort identify as non-Hispanic White, compared to 85 percent in the 1993 cohort. On the other hand, recent graduates are less likely to be the first in their families to go to college: 20 percent of the 2008 cohort are first-generation college students, compared to 31 percent in the 1993 cohort (in part, this reflects secular increases in educational attainment among Americans overall, including graduates' parents). Table 1 also includes information on graduates' expected family contribution (EFC), which is an estimate of ability to pay generated by the federal financial aid formula (for those who do not apply for financial aid, this measure is estimated using self-reported data on income and assets). The EFC can also be interpreted as a proxy for financial status, with higher EFCs generally correlating with higher family income and wealth. The data indicate little increase in average EFCs over time, but modest increases in the median EFC.[4]

Table 2 shows the distribution of graduates across different institution types (selectivity and control). The data indicate notable growth in the proportion of graduates from for-profit institutions: these represent 5 percent of bachelor's degree recipients in the 2008 cohort, compared to just 1 percent in the 1993 cohort. The patterns also reveal a compositional shift of students from open-access and minimally selective institutions to moderately selective public and private institutions. Some of this reflects increased enrollment at institutions that have always been moderately selective, but some may also reflect increased selectivity by the same institutions over time.

Perhaps surprisingly—given frequent fretting about the decline of the humanities—the distribution of graduates across majors is relatively stable between 1993 and 2008. Business was and remains the most popular degree field (22–23 percent of graduates) by a substantial margin. Humanities majors have actually increased from 9 percent to 15 percent, while education majors saw the largest decline, from 13 percent in 1993 to 8 percent in 2008. While there is no apparent increase in the proportion of graduates majoring in STEM fields, there is a modest increase in the number of STEM credits earned by graduates across all fields.

Table 3 presents our first look at employment, enrollment, and debt outcomes four years after graduation for these two cohorts. While both cohorts graduated into weak labor markets, the 2008 cohort clearly did not escape the effects of the Great Recession: employment rates are lower (80 percent for the 2008 cohort versus 89 percent for the 1993 cohort), and the proportion of students neither enrolled nor employed is twice as high in the more recent cohort (14 percent versus 7 percent). After adjusting for inflation, median earnings are slightly lower for the more

---

[4] Note that the EFC formula has undergone changes over time, and it is unclear to what extent that might contribute to the increasing median EFC over time.

recent cohort ($37,300 versus $40,040); however, among those employed full-time, salaries are higher among the 2008 cohort ($45,600 versus $43,615), consistent with other evidence indicating increasing returns to bachelor's degrees. The more recent cohort is substantially more likely to have earned or be working toward a graduate degree. This may reflect both temporary reductions in the opportunity cost of schooling (due to the weak labor market) as well as broader trends toward increasing educational attainment.

Table 1. Selected Demographic Characteristics of Bachelor's Degree Recipients in 1992–93 and 2007–08

Characteristic	1992–93 Graduates	2007–08 Graduates
Female	55%	58%
Race/ethnicity		
White, non-Hispanic	85%	74%
Black, non-Hispanic	6%	8%
Asian	4%	5%
Hispanic	5%	9%
All others	1%	3%
Age (at year of graduation)	25.2	25.0
Parental education (highest of either)		
No more than high school graduation	31%	20%
Some college, less than BA/BS	19%	24%
BA/BS only	24%	26%
More than a BA/BS	26%	29%
Average EFC ($2012)	$15,002	$14,843
Median EFC ($2012)	$8,333	$9,607
Sample size (rounded to nearest 10)	7,910	13,130

Note. Author's calculations using B&B:1993/97 and B&B:2008/12 restricted-use data. Sample limited to U.S. citizens who responded to baseline, one-year follow-up and four-year follow-up surveys (weighted using wtc00 and wte000, respectively; alternative weights have little effect on percentages shown). Sample sizes rounded to nearest 10 per IES guidelines.

Table 2. Selectivity of BA/BS Institution and Field of Study

Institution/Field of Study	1992–93 Graduates	2007–08 Graduates
BA/BS institution selectivity and control		
Very selective, public	19%	17%
Very selective, private	12%	12%
Moderately selective, public	31%	36%
Moderately selective, private	12%	16%
Minimally selective, public	8%	7%
Minimally selective, private	5%	3%
Open access, public	9%	3%
Open access, private	3%	2%
For-profit	1%	5%
Degree field		
Business	22%	23%
Education	13%	8%
Engineering	6%	6%
Health	7%	8%
Public affairs	3%	2%
Biology	4%	5%
Mathematics or computer science	6%	4%
Social sciences	10%	8%
History	2%	2%
Humanities	9%	15%
Psychology	3%	7%
Other	14%	12%
Average total credits earned	135	124
Median total credits earned	129	126
Average credits earned, STEM fields	24	26
Median credits earned, STEM fields	14	16
Sample size (rounded to nearest 10)	7,910	13,130

Note. Author's calculations using B&B:1993/97 and B&B:2008/12 restricted-use data. Sample limited to U.S. citizens who responded to baseline, one-year follow-up and four-year follow-up surveys (weighted using wtc00 and wte000, respectively; alternative weights have little effect on percentages shown). Sample sizes rounded to nearest 10 per IES guidelines. Note that credits earned variables may not be fully consistent from survey to survey.

Table 3. Employment, Enrollment, and Debt Outcomes Four Years Post Graduation

Outcome	1992–93 Graduates	2007–08 Graduates
Currently employed	89%	80%
Currently employed full-time	81%	71%
Currently enrolled in school	15%	16%
Neither enrolled nor employed	7%	14%
Has earned any post-baccalaureate credential	14%	22%
Has earned post-baccalaureate credential, or still enrolled	27%	36%
Ever enrolled in post-baccalaureate education	36%	39%
Average annual earnings ($2012)	$41,182	$38,734
Average earnings, if employed full-time ($2012)	$49,013	$51,852
Median annual earnings ($2012)	$40,040	$37,300
Median earnings, if employed full-time ($2012)	$43,615	$45,600
Ever borrowed for undergraduate education	46%	67%
Average total amount borrowed for undergrad ($2012)	$6,717	$17,832
Average amount borrowed, if borrowed ($2012)	$14,753	$26,783
Median amount borrowed, if borrowed ($2012)	$12,712	$22,173
Ever borrowed for graduate education	12%	24%
Average amount borrowed for grad school ($2012)	$4,822	$11,820
Average amount borrowed, if borrowed ($2012)	$39,033	$49,370
Median amount borrowed, if borrowed ($2012)	$25,740	$35,151
Ever borrowed for undergrad/graduate education	51%	72%
Total amount of student loans due ($2012)	$7,296	$30,294
Average monthly loan payment, including 0s ($2012)	$85	$179
Average student loan payments as % of income[a]	2	13
Average payment as % of income, if borrowed	5	18
Median payment as % of income, if borrowed	0	5
Student loan payment >15% of income	2%	17%
Owes more on undergraduate loans than borrowed[b]	12%	20%
Ever defaulted on any student loan	3%	2%
Ever defaulted, if borrowed	6%	3%
Sample size (rounded to nearest 10)	7,910	13,130

Note. Author's calculations using B&B:1993/97 and B&B:2008/12 restricted-use data. Sample limited to U.S. citizens who responded to baseline, one-year follow-up and four-year follow-up surveys (weighted using wtc00 and wte000, respectively; alternative weights have little effect on percentages shown). Sample sizes rounded to nearest 10 per IES guidelines.

[a]Student loan payments include payments on all student loans, not just undergraduate loans. Percentage is capped at 100; those making payments with no income are set to 100.

[b]This measure refers to federal loans for undergraduate education only, and compares the amount originally borrowed to the amount owed four years after graduation.

An interesting pattern to emerge from Table 3 is that despite starkly higher levels of student debt in the recent cohort (over $30,000 for the 2008 cohort compared to $7,296 on average for the 1993 cohort), the vast majority of students still have debt levels that would be considered manageable given their incomes. The median monthly payment-to-income ratio among borrowers is just 5 percent; that is, only half of borrowers have payments exceeding 5 percent of their monthly income, and half pay a lower percentage. Default rates (within the four-year window examined here) among bachelor's degree graduates were only 3 percent among borrowers in the 2008 cohort—despite the deep recession—and have actually decreased slightly since the 1993 cohort. (This may be due in part to regulatory changes over time that reduced the benefits of defaulting; student loans currently are not generally dischargeable via bankruptcy.)

Nonetheless, Table 3 also shows that a non-trivial fraction of graduates in recent cohorts face payments that exceed comfortable levels. Among the 2008 cohort, nearly one in five graduates had student loan payments in excess of 15 percent of their incomes, compared to just 2 percent in the earlier cohort. A similar fraction in 2008 saw their undergraduate debt obligation grow rather than shrink over time (negative amortization).

Table 4a presents the same outcomes shown in Table 3, but separately by institution type (selectivity and control). For simplicity, I discuss this detailed breakdown only for the 2008 cohort, but equivalent information for the 1993 cohort is shown in Table 4b. Of course, the variation in outcomes here may be driven by compositional differences either in the types of students attending or the types of fields offered; this is precisely what the regression analyses below seek to disentangle. But the descriptive statistics nonetheless yield some interesting patterns. For example, for a number of outcomes, selectivity seems to matter more among private institutions than public ones. The percentage of students neither enrolled nor employed ranges only from 13 to 16 percent among public institutions of varying selectivity, but ranges from 13 percent at very selective privates to 24 percent at non-selective private not-for-profit institutions. Similarly, median earnings (if employed) vary only between $43,000 and $46,800 across public institution types, but go from $35,000 at non-selective privates to $51,500 at very selective privates. Finally, student loan payments for graduates of non-selective or minimally selective privates are almost as burdensome as they are for for-profit graduates, with monthly payments averaging 24 percent of income and 19 percent of income respectively.

Outcome	For-Prof	Non-Selective		Minimally Sel.		Moderately Sel.		Very Sel.	
		Public	**Private**	**Public**	**Private**	**Public**	**Private**	**Public**	**Private**
Currently employed	75%	81%	74%	79%	75%	84%	81%	79%	75%
Currently employed full-time	68%	72%	67%	71%	64%	73%	70%	70%	67%
Currently enrolled in school	10%	16%	7%	16%	15%	15%	16%	18%	22%
Neither enrolled nor employed	24%	13%	24%	16%	20%	13%	13%	14%	13%
Has earned any post-baccalaureate credential	10%	20%	13%	16%	14%	20%	21%	29%	26%
Has earned post-bac credential, or still enrolled	18%	35%	19%	31%	27%	34%	34%	44%	45%
Ever enrolled in post-baccalaureate education	21%	36%	23%	33%	29%	36%	38%	45%	47%
Average annual earnings ($2012)	$ 43,740	$ 39,208	$ 32,103	$ 36,800	$ 33,585	$ 38,116	$ 39,065	$ 38,743	$ 40,664
Avg. earnings, if employed full-time ($2012)	$ 61,322	$ 51,681	$ 45,883	$ 49,609	$ 48,442	$ 49,175	$ 51,577	$ 52,663	$ 57,830
Median annual earnings ($2012)	$ 38,000	$ 37,000	$ 26,000	$ 36,000	$ 31,000	$ 36,500	$ 38,500	$ 39,000	$ 38,480
Median earnings, if employed full-time ($2012)	$ 52,000	$ 45,900	$ 35,000	$ 43,000	$ 45,000	$ 43,680	$ 45,000	$ 46,800	$ 51,500
Ever borrowed for undergraduate education	90%	66%	76%	71%	79%	64%	76%	58%	61%
Avg. total amount borrowed for undergrad ($2012)	$ 35,131	$ 15,569	$ 19,009	$ 17,716	$ 26,562	$ 14,485	$ 24,052	$ 12,461	$ 19,577
Avg. amount borrowed, if borrowed ($2012)	$ 39,245	$ 23,725	$ 24,858	$ 24,856	$ 33,732	$ 22,570	$ 31,533	$ 21,374	$ 32,182
Median amt. borrowed, if borrowed ($2012)	$ 37,443	$ 19,061	$ 21,058	$ 21,370	$ 29,448	$ 21,054	$ 26,218	$ 18,254	$ 23,197
Ever borrowed for graduate education	18%	27%	17%	22%	20%	22%	25%	26%	27%
Avg. amount borrowed for grad school ($2012)	$ 7,202	$ 11,150	$ 6,746	$ 8,638	$ 7,993	$ 9,994	$ 11,176	$ 15,897	$ 17,096
Avg. amount borrowed, if borrowed ($2012)	$ 39,315	$ 40,904	$ 38,611	$ 39,568	$ 40,360	$ 44,508	$ 45,604	$ 60,954	$ 62,235
Median amt. borrowed, if borrowed ($2012)	$ 37,307	$ 29,730	$ 31,883	$ 34,116	$ 30,500	$ 30,750	$ 34,540	$ 41,000	$ 43,400
Ever borrowed for undergrad/grad education	90%	71%	77%	74%	82%	70%	79%	67%	69%
Total amount of student loans due ($2012)	$ 47,692	$ 29,023	$ 26,124	$ 28,459	$ 33,006	$ 25,144	$ 35,234	$ 27,869	$ 37,246
Average monthly loan payment, incl. 0s ($2012)	$ 275	$ 149	$ 179	$ 176	$ 233	$ 153	$ 214	$ 158	$ 204
Average student loan payments as % of income*	20	13	24	15	19	11	14	12	12
Average payment as % of income, if borrowed	23	17	31	21	22	16	18	18	17
Median payment as % of income, if borrowed	6	5	9	6	8	5	6	4	5
Student loan payment > 15% of income	27%	15%	28%	19%	26%	15%	19%	15%	17%
Owes more on UG loans than borrowed**	41%	27%	23%	29%	23%	19%	22%	14%	13%
Ever defaulted on any student loan	8%	4%	2%	3%	3%	2%	3%	2%	1%
Ever defaulted, if borrowed	9%	6%	3%	4%	4%	3%	4%	2%	2%
Sample size (rounded to nearest 10)	610	330	210	920	430	4,630	2,030	2,230	1,590

Table 4b
Employment, Enrollment, and Debt Outcomes By Baccalaureate Institutional Selectivity and Control

Outcome	1992-93 Graduates								
		Non-Selective		**Minimally Sel.**		**Moderately Sel.**		**Very Sel.**	
	For-Prof	**Public**	**Private**	**Public**	**Private**	**Public**	**Private**	**Public**	**Private**
Currently employed	81%	89%	87%	91%	91%	90%	92%	88%	81%
Currently employed full-time	72%	81%	77%	83%	83%	82%	85%	81%	73%
Currently enrolled in school	8%	12%	17%	12%	12%	15%	14%	18%	21%
Neither enrolled nor employed	14%	8%	9%	6%	7%	6%	6%	7%	9%
Has earned any post-baccalaureate credential	4%	13%	10%	11%	9%	12%	13%	16%	20%
Has earned post-bac credential, or still enrolled	12%	24%	25%	22%	19%	25%	25%	32%	37%
Ever enrolled in post-baccalaureate education	14%	32%	34%	33%	29%	32%	36%	41%	48%
Average annual earnings ($2012)	$ 35,789	$ 39,241	$ 36,019	$ 39,693	$ 41,848	$ 41,090	$ 44,094	$ 42,237	$ 40,661
Avg. earnings, if employed full-time ($2012)	$ 46,128	$ 45,636	$ 44,455	$ 46,053	$ 49,495	$ 47,954	$ 50,461	$ 50,317	$ 54,245
Median annual earnings ($2012)	$ 34,266	$ 38,610	$ 34,320	$ 37,180	$ 39,468	$ 40,040	$ 41,470	$ 42,831	$ 38,610
Median earnings, if employed full-time ($2012)	$ 42,900	$ 42,900	$ 40,040	$ 41,470	$ 45,760	$ 42,900	$ 45,760	$ 45,760	$ 46,475
Ever borrowed for undergraduate education	60%	47%	56%	48%	54%	42%	52%	39%	49%
Avg. total amount borrowed for undergrad ($2012)	$ 11,911	$ 5,856	$ 9,244	$ 5,862	$ 8,740	$ 5,216	$ 9,286	$ 4,838	$ 10,058
Avg. amount borrowed, if borrowed ($2012)	$ 19,834	$ 12,379	$ 16,431	$ 12,337	$ 16,095	$ 12,524	$ 17,707	$ 12,483	$ 20,642
Median amt. borrowed, if borrowed ($2012)	$ 19,068	$ 9,534	$ 11,918	$ 9,534	$ 14,301	$ 11,123	$ 15,890	$ 10,487	$ 19,068
Ever borrowed for graduate education	1%	9%	14%	8%	12%	11%	10%	16%	20%
Avg. amount borrowed for grad school ($2012)	$ 115	$ 3,161	$ 6,261	$ 2,541	$ 3,042	$ 3,667	$ 3,537	$ 6,260	$ 10,518
Avg. amount borrowed, if borrowed ($2012)	$ 14,784	$ 33,416	$ 44,873	$ 30,598	$ 26,141	$ 33,581	$ 36,169	$ 40,189	$ 53,579
Median amt. borrowed, if borrowed ($2012)	$ 15,015	$ 21,450	$ 24,310	$ 14,300	$ 14,300	$ 21,450	$ 24,310	$ 28,600	$ 34,320
Ever borrowed for undergrad/grad education	60%	52%	60%	51%	58%	47%	56%	48%	56%
Total amount of student loans due ($2012)	$ 6,648	$ 5,403	$ 10,231	$ 5,059	$ 6,639	$ 5,465	$ 7,306	$ 7,795	$ 13,911
Average monthly loan payment, incl. 0s ($2012)	$ 151	$ 71	$ 87	$ 86	$ 92	$ 73	$ 102	$ 80	$ 106
Average student loan payments as % of income*	16	2	1	2	4	1	3	2	2
Average payment as % of income, if borrowed	31	6	2	6	5	4	6	5	5
Median payment as % of income, if borrowed	0	0	0	0	0	0	0	0	0
Student loan payment > 15% of income	16%	2%	1%	2%	4%	1%	2%	2%	2%
Owes more on UG loans than borrowed**	3%	11%	10%	10%	10%	11%	8%	15%	17%
Ever defaulted on any student loan	12%	4%	3%	3%	4%	3%	2%	2%	3%
Ever defaulted, if borrowed	22%	7%	7%	5%	9%	6%	5%	5%	6%
Sample size (rounded to nearest 10)	110	700	210	650	400	2,420	950	1,520	950

14

The outcomes of bachelor's degree graduates from for-profit institutions present a complex picture, perhaps reflecting heterogeneity within this sector. For example, one in four for-profit graduates was neither enrolled nor employed four years later, much higher than the 14 percent average across all graduates. Yet for those who were employed full-time, median earnings were the highest of any institution type ($52,000, compared with $45,600 across all employed graduates). Total amount of student loans due is more than 50 percent higher than average for for-profit graduates ($47,692 versus $30,294 across all graduates), even though for-profit students have very low rates of graduate school attendance (21 percent versus 39 percent overall). All debt-related outcomes are notably worse for these graduates, with 41% owing more after four years than they did at graduation, and 8 percent of their graduates experiencing default (compared to just 2 percent among all graduates).

Finally, Table 5a breaks outcomes out by undergraduate major, again focusing on the 2008 cohort (outcomes by major for the 1993 cohort are shown in Table 5b but not discussed here for simplicity). While high earnings returns for engineering and math degrees may not be surprising, it is notable that not only are earnings higher conditional upon working full-time, but rates of full-time employment are also substantially higher than average (81 percent full-time employment with a $68,000 median salary for employed engineering majors, compared to 71 percent and $45,600 overall). For fields like engineering, math, and to a lesser extent business, the well-known earnings advantage is reinforced even further by a debt advantage: graduates in these fields have less debt and lower payment burdens after four years (in part due to significantly lower graduate borrowing). Default rates for engineering and math majors are almost non-existent (around 1 percent). On the other hand, psychology is a relatively large major in which graduates receive relatively low earnings but also take on higher than average debt (driven by a 56 percent graduate school attendance rate), leading to relatively high rates of negative amortization (29 percent). Education majors receive relatively low earnings but also borrow less than average, such that their debt outcomes in terms of payment burdens, negative amortization, and default are not much worse than those in significantly higher paying fields such as business or health.

It is important to acknowledge that the short length of follow-up can make interpretation complicated in some cases. For example, biology majors accumulate nearly twice as much debt as average after four years, yet the median incomes of those who are employed is not much better than average. However, since nearly two-thirds of biology majors enroll in graduate school and nearly one-third are still enrolled in 2012, median earnings may be particularly underestimated for these graduates. The same may be true to a lesser extent for history and psychology majors, who have similar rates of graduate school attendance.

Outcome	2007-08 Graduates											
	Business	**Educ.**	**Engin.**	**Health**	**Pub. Aff.**	**Bio**	**Math**	**Soc Sci**	**Hist**	**Human.**	**Psych**	**Other**
Currently employed	84%	83%	86%	87%	76%	64%	85%	77%	79%	76%	72%	81%
Currently employed full-time	78%	75%	81%	72%	64%	56%	77%	70%	67%	61%	60%	73%
Currently enrolled in school	12%	18%	15%	17%	11%	32%	13%	20%	21%	18%	22%	11%
Neither enrolled nor employed	13%	14%	9%	10%	19%	15%	13%	15%	11%	17%	18%	15%
Has earned any post-baccalaureate credential	15%	28%	22%	22%	32%	31%	16%	26%	34%	21%	35%	17%
Has earned post-bac credential, or still enrolled	26%	44%	35%	38%	42%	57%	28%	44%	51%	36%	52%	26%
Ever enrolled in post-baccalaureate education	27%	47%	36%	40%	42%	62%	32%	45%	56%	38%	56%	30%
Average annual earnings ($2012)	$ 45,311	$ 32,731	$ 58,416	$ 47,900	$ 29,768	$ 29,839	$ 53,545	$ 36,362	$ 33,496	$ 30,562	$ 28,044	$ 34,711
Avg. earnings, if employed full-time ($2012)	$ 56,066	$ 41,357	$ 70,586	$ 59,555	$ 43,925	$ 50,471	$ 66,996	$ 50,106	$ 45,988	$ 45,280	$ 43,340	$ 45,428
Median annual earnings ($2012)	$ 43,500	$ 35,000	$ 63,000	$ 49,084	$ 32,500	$ 27,600	$ 49,920	$ 34,986	$ 32,874	$ 30,000	$ 30,000	$ 35,568
Median earnings, if employed full-time ($2012)	$ 50,000	$ 38,750	$ 68,000	$ 56,160	$ 42,588	$ 46,800	$ 60,000	$ 41,600	$ 41,016	$ 39,579	$ 38,700	$ 41,600
Ever borrowed for undergraduate education	68%	68%	55%	72%	76%	62%	66%	62%	69%	65%	69%	70%
Avg. total amount borrowed for undergrad ($2012)	$ 18,092	$ 18,038	$ 14,138	$ 21,297	$ 19,269	$ 16,350	$ 17,441	$ 17,253	$ 18,400	$ 18,022	$ 15,623	$ 18,628
Avg. amount borrowed, if borrowed ($2012)	$ 26,677	$ 26,624	$ 25,906	$ 29,607	$ 25,481	$ 26,400	$ 26,359	$ 27,827	$ 26,777	$ 27,849	$ 22,629	$ 26,692
Median amt. borrowed, if borrowed ($2012)	$ 22,653	$ 23,076	$ 21,320	$ 25,584	$ 21,320	$ 21,320	$ 24,651	$ 21,784	$ 21,320	$ 22,386	$ 19,588	$ 21,320
Ever borrowed for graduate education	17%	24%	15%	23%	33%	38%	15%	27%	36%	25%	40%	22%
Avg. amount borrowed for grad school ($2012)	$ 6,725	$ 6,380	$ 8,859	$ 9,672	$ 10,501	$ 37,014	$ 5,447	$ 17,174	$ 18,012	$ 12,058	$ 19,137	$ 10,530
Avg. amount borrowed, if borrowed ($2012)	$ 39,470	$ 26,099	$ 57,197	$ 42,152	$ 31,602	$ 97,922	$ 35,714	$ 63,549	$ 50,130	$ 48,644	$ 47,847	$ 48,412
Median amt. borrowed, if borrowed ($2012)	$ 30,851	$ 20,500	$ 32,300	$ 34,654	$ 25,012	$ 78,736	$ 27,734	$ 46,500	$ 41,000	$ 39,700	$ 36,383	$ 37,718
Ever borrowed for undergrad/grad education	71%	71%	60%	77%	80%	74%	70%	71%	76%	71%	78%	74%
Total amount of student loans due ($2012)	$ 24,243	$ 24,758	$ 20,194	$ 30,000	$ 30,493	$ 59,448	$ 21,719	$ 36,263	$ 38,711	$ 30,964	$ 37,573	$ 30,660
Average monthly loan payment, incl. 0s ($2012)	$ 168	$ 168	$ 166	$ 223	$ 174	$ 162	$ 156	$ 199	$ 178	$ 172	$ 188	$ 191
Average student loan payments as % of income*	11	14	10	11	16	14	11	14	11	15	16	15
Average payment as % of income, if borrowed	16	19	16	14	20	18	15	20	14	21	20	21
Median payment as % of income, if borrowed	4	7	3	6	5	3	4	6	5	6	6	6
Student loan payment > 15% of income	15%	18%	11%	15%	21%	17%	12%	21%	16%	20%	20%	21%
Owes more on UG loans than borrowed**	17%	20%	7%	19%	35%	22%	19%	21%	26%	21%	29%	21%
Ever defaulted on any student loan	3%	3%	1%	3%	3%	2%	1%	2%	5%	2%	3%	3%
Ever defaulted, if borrowed	4%	4%	1%	3%	4%	3%	1%	3%	5%	3%	4%	4%
Sample size (rounded to nearest 10)	3,020	1,110	770	990	320	660	510	1,060	290	1,970	920	1,510

Outcome	1992-93 Graduates											
	Business	Educ.	Engin.	Health	Pub. Aff.	Bio	Math	Soc Sci	Hist	Human.	Psych	Other
Currently employed	93%	90%	95%	89%	94%	65%	86%	87%	80%	85%	80%	92%
Currently employed full-time	89%	80%	92%	77%	86%	56%	81%	79%	73%	71%	70%	83%
Currently enrolled in school	8%	20%	15%	11%	9%	35%	18%	19%	21%	16%	26%	13%
Neither enrolled nor employed	5%	8%	3%	8%	5%	12%	7%	7%	9%	11%	10%	6%
Has earned any post-baccalaureate credential	8%	16%	15%	14%	16%	18%	13%	17%	18%	14%	15%	15%
Has earned post-bac credential, or still enrolled	16%	33%	28%	23%	24%	49%	29%	32%	35%	27%	36%	25%
Ever enrolled in post-baccalaureate education	21%	47%	37%	33%	38%	62%	44%	41%	44%	38%	50%	31%
Average annual earnings ($2012)	$ 48,453	$ 33,027	$ 59,854	$ 45,935	$ 39,726	$ 24,695	$ 44,323	$ 40,652	$ 31,042	$ 34,266	$ 30,844	$ 40,443
Avg. earnings, if employed full-time ($2012)	$ 53,189	$ 38,824	$ 64,501	$ 55,430	$ 43,336	$ 42,330	$ 54,845	$ 50,616	$ 39,423	$ 43,420	$ 41,298	$ 46,419
Median annual earnings ($2012)	$ 45,760	$ 32,890	$ 60,060	$ 47,190	$ 37,752	$ 24,310	$ 42,900	$ 38,610	$ 34,320	$ 35,693	$ 32,890	$ 38,610
Median earnings, if employed full-time ($2012)	$ 48,620	$ 35,321	$ 61,776	$ 51,480	$ 40,040	$ 40,755	$ 51,480	$ 42,900	$ 40,040	$ 40,040	$ 38,610	$ 42,891
Ever borrowed for undergraduate education	42%	50%	50%	50%	49%	51%	46%	41%	43%	45%	41%	46%
Avg. total amount borrowed for undergrad ($2012)	$ 5,516	$ 7,507	$ 7,954	$ 9,329	$ 7,192	$ 7,463	$ 6,651	$ 5,803	$ 5,504	$ 7,032	$ 5,935	$ 6,402
Avg. amount borrowed, if borrowed ($2012)	$ 13,203	$ 14,918	$ 15,945	$ 18,831	$ 14,570	$ 14,700	$ 14,559	$ 14,311	$ 12,665	$ 15,626	$ 14,652	$ 14,067
Median amt. borrowed, if borrowed ($2012)	$ 11,123	$ 12,712	$ 12,712	$ 15,890	$ 12,712	$ 12,712	$ 11,441	$ 12,712	$ 10,371	$ 13,507	$ 11,918	$ 11,600
Ever borrowed for graduate education	5%	11%	10%	9%	14%	33%	14%	18%	21%	15%	20%	12%
Avg. amount borrowed for grad school ($2012)	$ 1,566	$ 3,164	$ 2,721	$ 3,682	$ 3,386	$ 26,677	$ 4,414	$ 7,542	$ 7,704	$ 4,684	$ 5,936	$ 4,261
Avg. amount borrowed, if borrowed ($2012)	$ 31,988	$ 27,722	$ 27,853	$ 39,718	$ 24,221	$ 81,561	$ 31,321	$ 42,944	$ 37,278	$ 31,545	$ 30,329	$ 34,713
Median amt. borrowed, if borrowed ($2012)	$ 18,590	$ 21,450	$ 20,020	$ 28,600	$ 21,450	$ 71,500	$ 21,450	$ 31,460	$ 22,880	$ 24,310	$ 24,310	$ 25,740
Ever borrowed for undergrad/grad education	44%	56%	55%	54%	52%	66%	51%	49%	54%	50%	52%	51%
Total amount of student loans due ($2012)	$ 3,754	$ 5,899	$ 5,580	$ 7,562	$ 5,560	$ 29,916	$ 6,647	$ 9,477	$ 9,360	$ 7,176	$ 8,791	$ 6,394
Average monthly loan payment, incl. 0s ($2012)	$ 68	$ 82	$ 139	$ 95	$ 82	$ 83	$ 73	$ 86	$ 79	$ 93	$ 71	$ 92
Average student loan payments as % of income*	2	3	0	2	1	3	2	2	2	4	4	1
Average payment as % of income, if borrowed	5	7	1	5	4	6	5	4	4	9	8	4
Median payment as % of income, if borrowed	0	0	0	0	0	0	0	0	0	0	0	0
Student loan payment > 15% of income	2%	3%	0%	2%	1%	3%	2%	2%	2%	4%	4%	1%
Owes more on UG loans than borrowed**	6%	10%	7%	9%	11%	35%	11%	19%	17%	15%	19%	11%
Ever defaulted on any student loan	3%	2%	1%	2%	6%	2%	3%	2%	2%	3%	6%	5%
Ever defaulted, if borrowed	7%	4%	3%	4%	12%	3%	7%	5%	2%	6%	11%	11%
Sample size (rounded to nearest 10)	1,730	1,040	490	580	270	350	440	760	140	700	270	1,140

5. Regression Results

The regression results decompose the variation discussed above to better isolate which portions are due to institution type and field of study, and which are due to differences in the composition of the student population. I begin with a detailed analysis of the 2008 cohort and then proceed to a comparison of regression results for the 1993 and 2008 cohorts. For simplicity, I focus on a subset of key outcomes that are most comparable from cohort to cohort (for example, I avoid some of the other debt and default outcomes shown in the descriptive tables because of difficulty in verifying the strict comparability of the relevant variables over time). Three outcomes are examined for the full sample of graduates: full-time employment, graduate school attainment, and "neither enrolled nor employed." For graduates who are employed full-time and are not currently enrolled, I further examine log earnings and total debt-to-income ratios.[5]

Tables 6a and 6b present full regression results for these five outcomes, first including only institution types and major field indicators, and then including a full set of individual demographic controls, including age, gender, race/ethnicity, SAT/ACT score quartile, high school GPA if available, parents' highest educational attainment if available, EFC, and EFC squared. Moderately selective public institutions are the omitted comparison category for institution type, and "other" is the omitted category for majors.

A first interesting finding is that as we move to the models with controls from the models without, many of the institution type dummies become smaller and lose significance, indicating that much of the institutional variation in these outcomes can be explained by background factors. This is particularly true with the graduate attainment outcome and with several of the outcomes for for-profit graduates (including earnings: despite the much higher observed earnings of employed for-profit graduates, the difference goes away when control variables are added). Still, there are notable differences that survive the inclusion of controls. For-profit, open-access and minimally selective private institutions all have significantly higher rates of graduates who are neither enrolled nor employed and who have significantly higher debt-to-income ratios. In fact, private institutions of all types have significantly higher debt-to-income ratios among graduates than do moderately selective public institutions. With respect to earnings, those attending very selective institutions earn significantly more, and open-access private graduates earn significantly less.

The variation in outcomes by major appears more robust to the inclusion of controls. With or without controls, business, engineering, health, and math/computer science majors appear to fare the best in terms of earnings and debt-to-income ratios (and patterns on the other outcomes are consistent with this as well). Humanities majors fare the worst in terms of earnings

---

[5] Using the natural log of earnings helps to de-emphasize outlying observations and enables the resulting coefficients to be interpreted roughly as percent increases (as long as the coefficients are not too large).

and employment rates, but social science and history majors fare the worst in terms of debt-to-income ratios.

Table 6a.
Regression Results: How Employment and Enrollment Vary by Institution Type and Major,
For 2008 Baccalaureate Graduates, Four Years Later

Predictor	2012 Outcomes, No Controls			2012 Outcomes, Full Controls		
	Emp FT	Grad Deg.	No Enr or Emp	Emp FT	Grad Deg.	No Enr or Emp
For-profit	-0.09 **	-0.08 ***	0.12 ***	-0.04	-0.03	0.08 **
	(0.04)	(0.02)	(0.03)	(0.04)	(0.02)	(0.03)
Open access, public	-0.02	-0.02	0.01	-0.01	0.01	-0.01
	(0.04)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)
Open access, private	-0.08	-0.07 **	0.11 **	-0.04	-0.05	0.08 *
	(0.05)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)
Minimally selective, public	-0.02	-0.06 ***	0.03	-0.01	-0.04 **	0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Minimally selective, private	-0.10 ***	-0.07 **	0.07 **	-0.08 **	-0.06 **	0.05 *
	(0.04)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)
Moderately selective, private	-0.03	-0.02	0.00	-0.02	-0.03	0.00
	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)
Very selective, public	-0.02	0.06 ***	0.01	-0.01	0.03	0.01
	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)
Very selective, private	-0.05 **	0.04 *	0.00	-0.04 *	-0.02	0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Began at Public 2-Year	-0.01	-0.03 **	0.02	0.00	0.02	0.00
	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
Business	0.06 ***	-0.01	-0.02	0.07 ***	-0.01	-0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Education	0.01	0.11 ***	0.00	0.03	0.12 ***	0.00
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Engineering	0.07 **	0.03	-0.05 **	0.07 **	-0.01	-0.05 *
	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)
Health	-0.01	0.05 **	-0.05 **	0.01	0.06 **	-0.06 ***
	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)
Public Affairs	-0.09 **	0.15 ***	0.04	-0.06	0.17 ***	0.02
	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)	(0.03)
Biology	-0.17 ***	0.12 ***	0.01	-0.16 ***	0.08 **	0.01
	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)
Mathematics or Computer Sci	0.06	-0.01	-0.03	0.06	-0.03	-0.04
	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)
Social Sciences	-0.03	0.07 ***	0.02	-0.02	0.06 **	0.01
	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)
History	-0.06	0.16 ***	-0.03	-0.06	0.17 ***	-0.02
	(0.05)	(0.04)	(0.03)	(0.04)	(0.04)	(0.03)
Humanities	-0.12 ***	0.03	0.03	-0.11 ***	0.02	0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Psychology	-0.13 ***	0.18 ***	0.04	-0.11 ***	0.16 ***	0.03
	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)
Total credits earned				0.00	0.00	0.00
				(0.00)	(0.00)	(0.00)
Credits earned in STEM				0.00	0.00 *	0.00
				(0.00)	(0.00)	(0.00)

19

Predictor	No Controls			Full Controls		
	Emp FT	Grad Deg.	No Enr or Emp	Emp FT	Grad Deg.	No Enr or Emp
age				0.03 ***	-0.05 ***	-0.01
				(0.01)	(0.01)	(0.01)
age squared				0.00 ***	0.00 ***	0.00 *
				(0.00)	(0.00)	(0.00)
female				-0.03 **	0.00	0.00
				(0.01)	(0.01)	(0.01)
black				-0.08 ***	0.07 ***	0.04 *
				(0.02)	(0.02)	(0.02)
asian				-0.10 ***	-0.01	0.10 ***
				(0.03)	(0.03)	(0.03)
hisp				-0.06 **	0.01	0.03
				(0.02)	(0.02)	(0.02)
other				-0.07 **	0.05	0.06 **
				(0.03)	(0.03)	(0.03)
satactq_m				-0.11 **	0.10 ***	0.02
				(0.04)	(0.03)	(0.03)
satactq1				-0.03	0.01	0.02
				(0.02)	(0.02)	(0.02)
satactq3				0.00	0.03 *	-0.02
				(0.02)	(0.02)	(0.01)
satactq4				-0.03	0.05 ***	-0.04 **
				(0.02)	(0.02)	(0.02)
hsgpa				0.00	0.02 ***	0.00
				(0.01)	(0.01)	(0.01)
hsgpa_m				0.01	0.27 ***	0.00
				(0.06)	(0.05)	(0.05)
pareduc_lba				0.00	-0.01	0.01
				(0.02)	(0.02)	(0.02)
pareduc_ba				0.00	0.01	-0.01
				(0.02)	(0.02)	(0.02)
pareduc_hba				-0.04 **	0.04 **	-0.01
				(0.02)	(0.02)	(0.02)
pareduc_m				-0.19 ***	0.02	0.11 *
				(0.07)	(0.05)	(0.06)
efc				0.00 ***	0.00	0.00
				(0.00)	(0.00)	(0.00)
efcsq				0.00 *	0.00	0.00
				(0.00)	(0.00)	(0.00)
_cons	0.75 ***	0.18 ***	0.13 ***	0.41 **	0.89 ***	0.25 *
	(0.02)	(0.02)	(0.01)	(0.16)	(0.13)	(0.13)
N	13,130	13,130	13,130	13,130	13,130	13,130
r2	0.03	0.03	0.01	0.05	0.06	0.03

Source: OLS regressions using B&B:1993/97 and B&B:2008/12 restricted-use data.

Notes: Sample limited to U.S. citizens who responded to baseline, one-year follow-up and four-year follow-up surveys (weighted using wtc00 and wte000, respectively; alternative weights have little effect on percentages shown). Sample sizes rounded to nearest 10 per IES guidelines.

*** $p < .01$. ** $p < .05$. * $p < .1$.

Table 6b.
Regression Results: How Earnings and Debt/Income Ratios Vary by Institution Type and Major,
For 2008 Baccalaureate Graduates, Four Years Later

Predictor	All Outcomes Conditional on FT Employment, No Current Enrollment			
	2012 Outcomes, No Controls		2012 Outcomes, Full Controls	
	Ln(Earnings)	100*(Debt/Income)	Ln(Earnings)	100*(Debt/Income)
For-profit	0.10 *	30.05 ***	0.01	33.13 ***
	(0.06)	(3.97)	(0.06)	(3.63)
Open access, public	0.02	7.34 *	0.00	5.34
	(0.05)	(4.16)	(0.05)	(3.72)
Open access, private	-0.20 **	11.49 **	-0.24 ***	14.10 ***
	(0.09)	(5.60)	(0.08)	(5.26)
Minimally selective, public	0.00	7.99 ***	0.02	6.54 **
	(0.03)	(2.78)	(0.03)	(2.70)
Minimally selective, private	-0.04	21.84 ***	-0.05	21.23 ***
	(0.05)	(4.33)	(0.05)	(4.50)
Moderately selective, private	0.05 **	12.01 ***	0.03	14.81 ***
	(0.02)	(1.94)	(0.02)	(1.89)
Very selective, public	0.08 ***	-3.58 *	0.06 **	-0.67
	(0.02)	(1.83)	(0.03)	(1.81)
Very selective, private	0.16 ***	4.68 **	0.13 ***	10.35 ***
	(0.03)	(2.32)	(0.03)	(2.18)
Began at Public 2-Year	0.03	-0.20	0.01	-1.29
	(0.02)	(1.67)	(0.02)	(1.74)
Business	0.18 ***	-9.20 ***	0.15 ***	-7.58 ***
	(0.03)	(2.28)	(0.03)	(2.15)
Education	-0.11 ***	4.04	-0.11 ***	-0.45
	(0.03)	(2.71)	(0.03)	(2.69)
Engineering	0.44 ***	-15.33 ***	0.32 ***	-13.76 ***
	(0.05)	(2.74)	(0.04)	(3.15)
Health	0.28 ***	-1.00	0.26 ***	-5.52 **
	(0.03)	(2.80)	(0.04)	(2.79)
Public Affairs	0.00	4.80	0.00	-0.51
	(0.04)	(4.56)	(0.04)	(4.42)
Biology	0.10 ***	3.48	0.04	-0.98
	(0.04)	(3.44)	(0.05)	(3.67)
Mathematics or Computer Sci	0.37 ***	-14.12 ***	0.27 ***	-12.45 ***
	(0.05)	(3.33)	(0.05)	(3.50)
Social Sciences	0.06	6.36 **	0.03	6.24 **
	(0.04)	(3.08)	(0.04)	(2.85)
History	-0.04	13.08 **	-0.05	9.38 *
	(0.06)	(5.11)	(0.06)	(4.84)
Humanities	-0.06 *	0.79	-0.06 *	1.99
	(0.03)	(2.63)	(0.03)	(2.49)
Psychology	-0.04	6.88 **	-0.04	1.50
	(0.04)	(3.29)	(0.04)	(3.16)
Total credits earned			0.00 *	0.07 ***
			(0.00)	(0.02)
Credits earned in STEM			0.00	0.03
			(0.00)	(0.04)

Predictor	2012 Outcomes, No Controls		2012 Outcomes, Full Controls	
	Ln(Earnings)	100*(Debt/Income)	Ln(Earnings)	100*(Debt/Income)
Age			0.04 ***	2.71 **
			(0.01)	(1.12)
Age squared			0.00 ***	-0.04 ***
			(0.00)	(0.02)
female			-0.11 ***	6.25 ***
			(0.02)	(1.38)
black			-0.07 **	15.41 ***
			(0.03)	(2.70)
asian			0.09 *	-11.18 ***
			(0.05)	(2.93)
hisp			-0.04	-2.94
			(0.03)	(2.35)
other			0.03	1.58
			(0.04)	(3.57)
satactq_m			0.00	-1.83
			(0.07)	(3.96)
satactq1			0.02	0.36
			(0.02)	(1.96)
satactq3			0.04	-0.64
			(0.02)	(1.92)
satactq4			0.04	-0.86
			(0.03)	(2.11)
hsgpa			0.01	-1.48 *
			(0.01)	(0.83)
hsgpa_m			0.11	-8.25
			(0.10)	(6.51)
pareduc_lba			-0.02	1.16
			(0.02)	(1.97)
pareduc_ba			-0.02	-6.44 ***
			(0.02)	(1.95)
pareduc_hba			-0.02	-10.21 ***
			(0.03)	(1.98)
pareduc_m			0.02	-0.27
			(0.11)	(6.48)
efc			0.00001 ***	-0.0004 ***
			(0.00000)	(0.0001)
efcsq			0.0000 *	0.0000
			(0.0000)	(0.0000)
graddeg			0.07 ***	20.91 ***
			(0.02)	(1.62)
bagpa			0.07 ***	-6.43 ***
			(0.02)	(1.58)
_cons	10.59 ***	32.28 ***	9.68 ***	15.10
	(0.02)	(1.95)	(0.23)	(19.99)
N	7,810	7,810	7,810	7,810
r2	0.11	0.07	0.17	0.18

*** $p < .01$. ** $p < .05$. * $p < .1$.

Finally, in Table 7 I compare the role of institution type and major between the 1993 and 2008 cohorts (both followed up four years later, in 1997 and 2012 respectively). Note that all of these regressions include the full set of controls shown in Tables 6a and 6b, though I do not show all of the coefficients in Table 7. In order to make the regressions as comparable as possible, a few modifications to the specification were required; the largest of these is that I omit for-profit institutions from this comparison. Because such a small number of graduates came from for-profit institutions in the earlier sample (roughly 110), it may be unwise to attempt to draw comparisons over time. Note, however, that omitting for-profit institutions from the sample has little effect on the other coefficients (which remain relative to the omitted category of moderately selective public institutions).

The results are suggestive that the importance of institution type may have grown over time. In 1997, only one institution type indicator was significant: graduates of very selective private institutions earned about 10 percent more. In 2012, this same coefficient has grown to 13 percent, while the coefficient for very selective public institutions went from an insignificant 1 percent to a significant 6 percent premium above graduates from moderately selective public institutions. Moreover, the disadvantage of attending less selective private institutions appears to have grown as well. With respect to debt-to-income ratios, the coefficients for all private institutions have grown over time, but actually have grown much less for the most selective private institutions than for less selective private institutions. For example, debt-to-income ratios for graduates of very selective institutions were 8 points higher and 10 points higher in 1997 and 2012 respectively, while those of minimally selective private institutions were 6 points higher and 19 points higher in 1997 and 2012 respectively (compared to graduates of moderately selective public institutions).

Variation in outcomes by major appears surprisingly stable over time. The highest paid majors are still the highest paid majors; however, the earnings advantage for the highest paid majors has grown larger over time, particularly for math/computer science. Similarly, while the sign and significance of major coefficients have remained relatively stable for debt-to-income ratios, the coefficients themselves have gotten much larger. A couple of exceptions to this are history and psychology majors, which did not stand out in 1997 but have higher than average debt-to-income ratios in 2012, perhaps reflecting graduate school enrollment trends.

| | Employed FT Employed Full-Time | | Conditional on FT Employment, No Curr. Enrollment | | | |
| | | | Ln(Earnings) | | (Debt/Income)*100 | |
	1997	2012	1997	2012	1997	2012
Institution type (omitted: mod sel, public)						
Open access, public	-0.01	-0.01	-0.04	0.01	-0.30	5.49
	(0.02)	(0.04)	(0.03)	(0.05)	(1.25)	(4.04)
Open access, private	-0.04	-0.04	-0.01	-0.22 ***	4.65 **	11.20 **
	(0.04)	(0.05)	(0.04)	(0.08)	(2.29)	(5.51)
Minimally selective, public	0.00	-0.01	-0.03	0.02	0.28	5.66 **
	(0.02)	(0.02)	(0.03)	(0.03)	(1.25)	(2.71)
Minimally selective, private	0.00	-0.08 **	0.00	-0.04	5.84 ***	19.26 ***
	(0.03)	(0.04)	(0.05)	(0.05)	(1.58)	(4.46)
Moderately selective, private	0.03 *	-0.02	0.05	0.04 *	5.31 ***	13.88 ***
	(0.02)	(0.02)	(0.03)	(0.02)	(1.13)	(1.88)
Very selective, public	0.01	-0.01	0.01	0.06 **	1.02	-0.41
	(0.02)	(0.02)	(0.03)	(0.03)	(0.91)	(1.85)
Very selective, private	-0.04 **	-0.04 *	0.10 ***	0.13 ***	7.98 ***	10.35 ***
	(0.02)	(0.02)	(0.03)	(0.03)	(1.34)	(2.28)
Major (omitted: other)						
Business	0.06 ***	0.07 ***	0.11 ***	0.15 ***	-4.32 ***	-8.04 ***
	(0.02)	(0.02)	(0.03)	(0.03)	(1.08)	(2.22)
Education	-0.02	0.02	-0.13 ***	-0.09 ***	1.44	2.49
	(0.02)	(0.02)	(0.03)	(0.03)	(1.36)	(2.66)
Engineering	0.06 **	0.08 **	0.29 ***	0.34 ***	-5.77 ***	-14.90 ***
	(0.03)	(0.04)	(0.05)	(0.04)	(1.62)	(3.20)
Health	-0.04	0.00	0.25 ***	0.28 ***	-0.90	-4.05
	(0.03)	(0.03)	(0.03)	(0.04)	(1.55)	(2.82)
Public Affairs	0.02	-0.09 **	-0.03	0.00	-1.10	2.57
	(0.03)	(0.04)	(0.05)	(0.04)	(1.96)	(4.62)
Biology	-0.26 ***	-0.15 ***	-0.09	0.06	0.40	1.97
	(0.04)	(0.03)	(0.06)	(0.05)	(2.19)	(3.83)
Mathematics or Computer Science	-0.02	0.08 **	0.17 ***	0.27 ***	-3.23 **	-12.73 ***
	(0.03)	(0.04)	(0.04)	(0.05)	(1.49)	(3.76)
Social Sciences	-0.02	-0.02	0.04	0.03	3.50 **	8.97 ***
	(0.02)	(0.03)	(0.04)	(0.04)	(1.67)	(2.95)
History	-0.06	-0.06	-0.31	-0.05	1.70	13.92 ***
	(0.04)	(0.04)	(0.23)	(0.06)	(3.93)	(5.03)
Humanities	-0.07 ***	-0.12 ***	-0.05	-0.06 *	1.45	3.06
	(0.03)	(0.02)	(0.04)	(0.03)	(1.46)	(2.60)
Psychology	-0.13 ***	-0.12 ***	-0.02	-0.04	0.89	7.13 **
	(0.04)	(0.03)	(0.04)	(0.04)	(2.11)	(3.21)
Total credits earned	0.00	0.00	0.00	0.00	0.01	0.05 **
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.02)
Credits earned in STEM	0.00	0.00	0.00	0.00	0.02	0.06
	(0.00)	(0.00)	(0.00)	(0.00)	(0.02)	(0.04)
N	7,630	12,510	4,960	7,440	4,960	7,440
r2	0.07	0.06	0.11	0.16	0.09	0.12

Source: OLS regressions using B&B:1993/97 and B&B:2008/12 restricted-use data.

Notes: Sample limited to U.S. citizens who responded to baseline, one-year follow-up and four-year follow-up surveys (weighted using wtc00 and wte000, respectively; alternative weights have little effect on percentages shown). For-profit graduates excluded from this analysis due to small number of graduates from this sector in 1993. Sample sizes rounded to nearest 10 per IES guidelines. All regressions all include controls for the same set of variables listed in Tables 6a and 6b.

*** $p < .01$. ** $p < .05$. * $p < .1$.

6. Discussion

The Baccalaureate & Beyond survey data provide a wealth of interesting data regarding the early post-college labor market and debt outcomes of bachelor's degree graduates in 1993 and 2008. These can be distilled to three key findings related to the original research questions:

The typical bachelor's degree graduate fares extremely well in the labor market, even in the first few years post-graduation, even during periods of substantial economic crises, and even considering dramatic increases in student loan debt. In 2012, 80 percent of 2008 graduates were employed, lower than the 89 percent rate among the 1993 cohort, but still well above the typical employment rate of individuals without a bachelor's degree (for example, employment-to-population ratios in 2012 for those with some college but no bachelor's degree was only 64 percent). Among graduates employed full-time, median earnings in 2012 were $45,600, more than 10 percent higher than the nationwide median.[6] While there is certainly heterogeneity around this median, even the 25th percentile of graduates' earnings ($35,000) is above the national median for those with only a high school diploma ($34,000). Moreover, there was no institution type or major examined that had median earnings below this high school median. Finally, the median debt-to-income ratio was around 47 percent in 2012 (up from zero in 1997), representing a very large increase in debt load over time, but still remaining at a manageable level (a common rule of thumb is that students' total education debt should not exceed their anticipated salary). Among those who borrowed, the median monthly payment represented just 5 percent of graduates' income, and only 3 percent of borrowers had defaulted within the four-year follow-up window.

The employment and earnings premia accruing to graduates of selective institutions, as well as to STEM majors, appears to have increased over time. In the 1993 cohort, graduates of very selective private institutions had an earnings advantage over similar graduates of other institution types, but there was not much difference across these other institution types. For the 2008 cohort, the advantage accruing to graduates of very selective private institutions (relative to moderately selective public institutions) has grown from 10 percent to 13 percent, but the advantage to very selective public institutions and moderately selective private institutions has become significant as well. Moreover, graduates of open-access private institutions earn significantly less than other graduates in the 2008 cohort, a pattern than did not exist for 1993 graduates. With respect to major, the top-earning majors are relatively stable over time, but the premium for math/computer science and engineering majors is substantially larger for the 2008 cohort (the same is true, to a lesser extent, for business majors).

Considering student loan debt alongside earnings, the advantages of particular majors is reinforced further, but in some cases debt patterns erode the growing earnings advantage for more selective institutions. For example, despite their higher earnings, debt-to-earnings ratios are

---

[6] National medians computed for full-time wage and salary workers age 25 and over, both overall and by educational attainment, using U.S. Bureau of Labor Statistics (n.d.) data.

still 10 percentage points higher on average for 2008 graduates from very selective public institutions (compared with moderately selective public institutions). Unsurprisingly, taking loan debt into account makes public institutions look better. Open-access and minimally selective private institutions look particularly less appealing when earnings and debt are considered together: not only are earnings lower than average at these institutions, but debt levels are significantly higher as well.

7. Summary and Conclusions

While research has consistently found strong positive earnings returns to the bachelor's degree, recent evidence also highlights heterogeneity in post-college outcomes. Combined with increases in the proportions of students borrowing to enroll, heterogeneity in college outcomes introduces the risk that some students with college degrees may experience financial hardship after graduation. Using nationally representative data on baccalaureate recipients in 1993 and 2008, this paper jointly examines labor market and debt outcomes four years after students graduate, with a focus on exploring heterogeneity by institution type and major field of study, as well as trends over time.

Results suggest that stratification by institution type, for both earnings and debt outcomes, is increasing over time. Examining debt alongside earnings tends to erode the earnings advantage of very selective private institutions but reinforces the disadvantage of less selective private institutions. With respect to income variation by major, the top-earning majors have remained quite stable over time, but the magnitude of the advantage of engineering, math/computer science, and business graduates has grown notably. Examining debt alongside earnings only reinforces the patterns by major: higher earning fields also have lower debt-to-earnings ratios. Borrowing rates and debt loads have increased substantially over time, and among the 2008 cohort, nearly one in five recent graduates has monthly loan payments that would be considered unmanageable given their income. However, the substantially higher levels of debt among the 2008 cohort are nonetheless manageable for the vast majority of graduates, and default rates are actually lower than among the 1993 cohort.

The analysis presented above also raises a number of questions for further analysis. Dramatically increasing rates of graduate school attainment (which grew from 14 percent in the 1993 cohort to 22 percent in the 2008 cohort) were not part of the original focus of this study but suggest that measuring earnings just four years after graduation may be increasingly "too early" to get a reliable sense of graduates' longer term prospects. In particular, some low-earning majors such as history and psychology have particularly high rates of graduate school enrollment. Will this lead to a greater earnings payoff in the longer term? Or will it simply leave these students deeper in debt?

Future research is also warranted to explore heterogeneity not just by institution type and major but also by demographic characteristics. While not an original focus of this study, supplementary descriptive analyses by race/ethnicity (available in the appendix) indicate that Black graduates face an increasingly negative employment differential (perhaps due to the depth of the recent recession) relative to non-Black graduates. Black graduates from the 2008 cohort also have substantially higher rates of graduate school enrollment (47 percent, versus 39 percent on average) and dramatically higher rates of graduate school debt (with 40 percent ever borrowing for graduate school, compared with 24 percent overall) than other students. Again, will this greater investment in graduate school lead to a larger payoff over the long term, or simply higher levels of debt?

The 2008 cohort of the B&B will continue to be followed for several years, at which point these questions will bear reexamination. Overall, however, these patterns offer reassurance regarding the typical returns to bachelors' degrees, even for those graduating into the Great Recession, and even in light of growing debt loads.

References

Akers, B., & Chingos, M. M. (2014a). *Is a student loan crisis on the horizon?* Washington, DC: Brookings Institution. Retrieved from http://www.brookings.edu/research/reports/2014/06/24-student-loan-crisis-akers-chingos

Akers, B., & Chingos, M. M. (2014b). *Are college students borrowing blindly?* Washington, DC: Brookings Institution. Retrieved from http://www.brookings.edu/research/reports/2014/12/10-borrowing-blindly-akers-chingos

Arcidiacono, P. (2004). Ability sorting and the returns to college major. *Journal of Econometrics*, *121*(1–2), 343–375.

Autor, D., Katz, L., & Kearney, M. (2008). Trends in U.S. wage inequality: Revising the revisionists. *The Review of Economics and Statistics*, *90*(2), 300–323.

Barrow, L., & Rouse, C. E. (2005). Does college still pay? *The Economists' Voice*, *2*(4). Berkeley Electronic Press. Retrieved from http://ideas.repec.org/s/bpj/evoice.html

Becker, G. (1962). Investment in human capital: A theoretical analysis. *The Journal of Political Economy, 70*(5, Part 2), 9–49.

Behrman, J. R., & Birdsall, N. (1983). The quality of schooling: Quantity alone is misleading. *The American Economic Review, 73*(5), 928–947

Belfield, C., & Bailey, T. (2011). The benefits of attending community college: A review of the evidence. *Community College Review*, *39*(1), 46–68.

Benson, A., Esteva, R. K., & Levy, F. (2015). *Dropouts, taxes and risk: The economic return to college under realistic assumptions*. Cambridge, MA: Massachusetts Institute of Technology, mimeo. Retrieved from http://dusp.mit.edu/sites/dusp.mit.edu/files/attachments/publications/California%20Paper%20for%20Circulation.pdf

Berger, M. (1988). Predicted future earnings and choice of college major. *Industrial Labor Relations Review*, *41*(3): 418–429.

Brewer, D. J., & Ehrenberg, R. G. (1996). Does it pay to attend an elite private college? Evidence from the senior high school class of 1980. *Research in Labor Economics, 15*, 239–271.

Brewer, D. J., Eide, E. R., & Ehrenberg, R. G. (1999). Does it pay to attend an elite private college? Cross-cohort evidence on the effects of college type on earnings. *Journal of Human Resources, 34*(1), 104–123.

Card, D. (1999). The causal effect of education on earnings. In O. C. Ashenfelter and D. Card (Eds.), *The handbook of labor economics* (Vol. 3A, pp. 1801–1863). New York, NY: Elsevier Science, North-Holland.

Dale, S., & Krueger, A. (1999). *Estimating the payoff to attending a more selective college* (NBER Working Paper No. 7322). Cambridge, MA: National Bureau of Economic Research.

Dale, S., & Krueger, A. (2002). Estimating the payoff to attending a more selective college: An application of selection on observables and unobservables. *Quarterly Journal of Economics, 117*(6), 1491–1528.

Dale, S., & Krueger, A. (2011). *Estimating the return to college selectivity over the career using administrative earning data* (IZA Discussion Paper No. 5533). Bonn, DE: Institute for the Study of Labor.

Eide, E. (1994). College major choice and changes in the gender wage gap. *Contemporary Economic Policy*, *12*(2), 55–64.

Gill, A. M., & Leigh, D. E. (2001). Do the returns to community colleges differ between academic and vocational programs? *Journal of Human Resources, 38*(1), 134–155.

Griliches, Z. (1977). Estimating the returns to schooling: Some econometric problems. *Econometrica, 45*(1), 1–22.

Grogger, J., & Eide, E. (1995). Changes in college skills and the rise in the college wage premium. *The Journal of Human Resources, 30*(2), 280–310.

Grubb, W. N. (2002a). Learning and earning in the middle, part I: National studies of pre-baccalaureate education. *Economics of Education Review*, *21*(4), 299–321.

Grubb, W. N. (2002b). Learning and earning in the middle, part II: State and local studies of pre-baccalaureate education. *Economics of Education Review*, *21*(5), 401–414.

Hilmer, M. (1999). *Is there a post-graduation earnings penalty for community college transfer students who eventually receive baccalaureate degrees?* (Working Paper). San Diego, CA: San Diego State University, Department of Economics.

Hoekstra, M. (2009). The effect of attending the flagship state university on earnings: A discontinuity-based approach. *The Review of Economics and Statistics*, *91*(4), 717–724.

Hoxby, C. M. (2015). *Computing the value-added of American postsecondary institutions*. Retrieved from Internal Revenue Service website: https://www.irs.gov/pub/irs-soi/15rpcompvalueaddpostsecondary.pdf

James, E., Alsalam, N., Conaty, J., & To, D. (1989). College quality and future earnings: Where should you send your child to college? *American Economic Review, 79*(2), 247–252.

Kane, T. J., & Rouse, C. E. (1995). Labor market returns to two-year and four-year schools. *The American Economic Review, 85*(3), 600–614.

Lemieux, T. (2006). Association increasing residual wage inequality: Composition effects, noisy data, or rising demand for skill? *The American Economic Review*, *96*(3), 461–498.

Light, A., & Strayer, W. (2003). *Who receives the college wage premium? Assessing the labor market returns to degrees and college transfer patterns* (Working Paper 03–02). Columbus, OH: Ohio State University, Department of Economics.

Looney, A., & Yannelis, C. (2015). A crisis in student loans? How changes in the characteristics of borrowers and in the institutions they attended contributed to rising loan defaults. *Brookings Papers on Economic Activity*. Washington, DC: Brookings Institution.

Program integrity: Gainful employment-debt measures, 76 Fed. Reg. 34385 (June 13, 2011) (34 C.F.R. pt. 668). Retrieved from https://federalregister.gov/a/2011-13905

Rosen, S. (1976). A theory of life earnings. *The Journal of Political Economy, 84*(4, Part 2), S45–S67.

Rosen, S. (1986). The theory of equalizing differences. In O. Ashenfelter & R. Layard (Eds.), *Handbook of labor economics* (Vol. 1, pp. 641–692). Amsterdam, NL: Elsevier Science.

Rumberger R., & Thomas, S. (1993). The economic returns to college quality, major, and performance. *Economics of Education Review, 12*(1), 1–19.

Rumberger, R. (1984). The changing economic benefits of college graduates. *Economics of Education Review, 3*(1), 3–11.

Spending too much time and money on education? (2011, August 23). *The New York Times*. Retrieved from http://www.nytimes.com/roomfordebate/2011/08/23/spending-too-much-time-and-money-on-education

Thomas, S. (2000). Deferred costs and economic returns to college quality, major and academic performance: An analysis of recent graduates in Baccalaureate and Beyond. *Research in Higher Education, 41*(3), 281–313.

Thomas, S. (2003). Longer-term economic effects of college selectivity and control. *Research in Higher Education, 44*(3), 263–299.

U.S. Bureau of Labor Statistics. (n.d.) *Current population survey*. Retrieved from http://data.bls.gov/cgi-bin/surveymost

Zhang, L. (2003). *How college affects students: Toward the reconciliation of theory with empirical evidence* (Doctoral dissertation). University of Arizona, Tucson, AZ.

Zhang, L. (2004). *Advance to graduate education: The effect of college quality and undergraduate majors* (Working paper). Ithaca, NY: Cornell University.

Zhang, L. (2009). A value-added estimate of higher education quality of US states. *Education Economics*, *17*(4), 469–489.

Zhang, L., & Thomas, S. (2005). Investment in human capital: Sources of variation in the return of college quality. In J. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 20, pp. 241–306). Dordrecht, NL: Springer.

Zimmerman, S. D. (2014). The returns to college admission for academically marginal students. *Journal of Labor Economics*, *32*(4), 711–754. http://doi.org/10.1086/676661

Appendix

Appendix Table A1
Employment, Enrollment, and Debt Outcomes By Gender

Outcome	1992-93 Graduates		2007-08 Graduates	
	Male	Female	Male	Female
Currently employed	90%	88%	81%	79%
Currently employed full-time	85%	78%	74%	68%
Currently enrolled in school	15%	15%	15%	17%
Neither enrolled nor employed	5%	8%	13%	15%
Has earned any post-baccalaureate credential	13%	14%	21%	24%
Has earned post-bac credential, or still enrolled	26%	27%	33%	38%
Ever enrolled in post-baccalaureate education	35%	37%	36%	41%
Average annual earnings ($2012)	$ 47,860	$ 35,836	$ 44,062	$ 34,830
Avg. earnings, if employed full-time ($2012)	$ 55,561	$ 43,309	$ 57,434	$ 47,417
Median annual earnings ($2012)	$ 45,760	$ 35,750	$ 41,410	$ 34,840
Median earnings, if employed full-time ($2012)	$ 50,050	$ 40,040	$ 50,000	$ 43,000
Ever borrowed for undergraduate education	45%	46%	64%	69%
Avg. total amount borrowed for undergrad ($2012)	$ 6,803	$ 6,647	$ 16,440	$ 18,852
Avg. amount borrowed, if borrowed ($2012)	$ 14,973	$ 14,574	$ 25,860	$ 27,408
Median amt. borrowed, if borrowed ($2012)	$ 12,712	$ 12,712	$ 21,320	$ 22,706
Ever borrowed for graduate education	12%	12%	21%	26%
Avg. amount borrowed for grad school ($2012)	$ 5,785	$ 4,033	$ 11,203	$ 12,272
Avg. amount borrowed, if borrowed ($2012)	$ 47,002	$ 32,552	$ 54,538	$ 46,428
Median amt. borrowed, if borrowed ($2012)	$ 30,030	$ 21,450	$ 36,500	$ 34,126
Ever borrowed for undergrad/grad education	51%	51%	69%	74%
Total amount of student loans due ($2012)	$ 8,059	$ 6,663	$ 27,722	$ 32,179
Average monthly loan payment, incl. 0s ($2012)	$ 92	$ 80	$ 170	$ 185
Average student loan payments as % of income*	2	3	12	14
Average payment as % of income, if borrowed	4	6	17	19
Median payment as % of income, if borrowed	0	0	5	6
Student loan payment > 15% of income	2%	3%	15%	19%
Owes more on UG loans than borrowed**	12%	12%	17%	23%
Ever defaulted on any student loan	3%	3%	2%	3%
Ever defaulted, if borrowed	7%	6%	3%	3%
Sample size (rounded to nearest 10)	3,560	4,350	5,550	7,580

Source: Author's calculations using B&B:1993/97 and B&B:2008/12 restricted-use data.
Notes: Sample limited to U.S. citizens who responded to baseline, one-year follow-up and four-year follow-up surveys (weighted using wtc00 and wte000, respectively; alternative weights have little effect on percentages shown). Sample sizes rounded to nearest 10 per IES guidelines.
*Student loan payments include payments on all student loans, not just undergraduate loans.
**This measure refers to federal loans for undergraduate education only, and compares the amount originally borrowed to the amount owed four years after graduation.

Employment, Enrollment, and Debt Outcomes By Self-Reported Race/Ethnicity

Outcome	1992-93 Graduates					2007-08 Graduates				
	White	Black	Hispanic	Asian	All Other	White	Black	Hispanic	Asian	All Other
Currently employed	89%	90%	86%	78%	81%	83%	72%	76%	68%	72%
Currently employed full-time	81%	87%	78%	72%	64%	73%	64%	65%	61%	64%
Currently enrolled in school	15%	11%	19%	21%	12%	15%	23%	15%	18%	20%
Neither enrolled nor employed	7%	6%	10%	12%	11%	12%	20%	18%	22%	20%
Has earned any post-baccalaureate credential	14%	11%	12%	18%	13%	22%	23%	20%	24%	26%
Has earned post-bac credential, or still enrolled	27%	21%	29%	36%	23%	35%	43%	33%	40%	42%
Ever enrolled in post-baccalaureate education	35%	38%	40%	44%	37%	38%	47%	36%	40%	43%
Average annual earnings ($2012)	$ 41,572	$ 38,212	$ 38,513	$ 40,510	$ 37,490	$ 40,203	$ 33,060	$ 32,924	$ 37,774	$ 36,687
Avg. earnings, if employed full-time ($2012)	$ 49,147	$ 43,657	$ 47,471	$ 56,744	$ 54,255	$ 52,119	$ 48,523	$ 46,844	$ 59,869	$ 54,759
Median annual earnings ($2012)	$ 40,040	$ 37,180	$ 37,180	$ 41,184	$ 34,320	$ 38,500	$ 32,843	$ 35,100	$ 35,100	$ 35,776
Median earnings, if employed full-time ($2012)	$ 44,170	$ 40,040	$ 42,900	$ 49,078	$ 50,050	$ 46,000	$ 42,000	$ 44,232	$ 53,550	$ 45,000
Ever borrowed for undergraduate education	44%	62%	57%	37%	63%	65%	83%	68%	58%	70%
Avg. total amount borrowed for undergrad ($2012)	$ 6,686	$ 8,197	$ 6,458	$ 4,761	$ 9,495	$ 17,416	$ 25,136	$ 17,374	$ 12,771	$ 18,279
Avg. amount borrowed, if borrowed ($2012)	$ 15,177	$ 13,219	$ 11,416	$ 13,037	$ 15,033	$ 26,756	$ 30,433	$ 25,376	$ 22,188	$ 26,300
Median amt. borrowed, if borrowed ($2012)	$ 12,712	$ 11,123	$ 7,945	$ 11,123	$ 9,534	$ 21,949	$ 28,463	$ 20,787	$ 17,298	$ 21,320
Ever borrowed for graduate education	12%	15%	16%	16%	10%	22%	40%	25%	21%	28%
Avg. amount borrowed for grad school ($2012)	$ 4,568	$ 4,170	$ 7,055	$ 8,554	$ 3,074	$ 11,100	$ 18,334	$ 10,530	$ 14,443	$ 11,396
Avg. amount borrowed, if borrowed ($2012)	$ 38,664	$ 27,719	$ 44,996	$ 54,373	$ 30,639	$ 50,112	$ 46,197	$ 42,457	$ 69,518	$ 40,754
Median amt. borrowed, if borrowed ($2012)	$ 25,740	$ 17,160	$ 30,030	$ 38,610	$ 14,300	$ 33,888	$ 38,614	$ 33,850	$ 46,500	$ 29,077
Ever borrowed for undergrad/grad education	49%	68%	65%	43%	65%	71%	88%	73%	65%	77%
Total amount of student loans due ($2012)	$ 6,917	$ 8,723	$ 10,037	$ 9,939	$ 7,223	$ 28,006	$ 52,726	$ 29,949	$ 26,253	$ 33,679
Average monthly loan payment, incl. 0s ($2012)	$ 83	$ 117	$ 112	$ 61	$ 97	$ 182	$ 183	$ 169	$ 143	$ 179
Average student loan payments as % of income*	2	3	3	1	11	12	19	14	13	17
Average payment as % of income, if borrowed	5	3	6	3	22	17	21	19	20	22
Median payment as % of income, if borrowed	0	0	0	0	0	6	4	4	2	5
Student loan payment > 15% of income	2%	3%	3%	1%	11%	16%	23%	18%	17%	23%
Owes more on UG loans than borrowed**	11%	15%	15%	14%	8%	17%	48%	23%	12%	21%
Ever defaulted on any student loan	2%	13%	10%	2%	4%	2%	7%	4%	1%	6%
Ever defaulted, if borrowed	4%	18%	18%	4%	7%	2%	8%	6%	1%	7%
Sample size (rounded to nearest 10)	6,710	460	370	290	40	9,780	1,070	1,160	670	460

Appendix Table A3
Employment, Enrollment, and Debt Outcomes By Highest Parental Education

Outcome	1992-93 Graduates				2007-08 Graduates			
	<=HS	Some Col	BA/BS	>BA/BS	<=HS	Some Col	BA/BS	>BA/BS
Currently employed	91%	90%	89%	85%	79%	81%	83%	79%
Currently employed full-time	83%	83%	82%	75%	70%	72%	74%	68%
Currently enrolled in school	11%	14%	17%	20%	14%	15%	15%	19%
Neither enrolled nor employed	6%	7%	7%	8%	17%	15%	12%	13%
Has earned any post-baccalaureate credential	10%	14%	12%	19%	18%	19%	23%	27%
Has earned post-bac credential, or still enrolled	20%	25%	27%	36%	30%	32%	36%	44%
Ever enrolled in post-baccalaureate education	31%	34%	35%	44%	34%	36%	37%	45%
Average annual earnings ($2012)	$ 42,597	$ 41,168	$ 41,703	$ 39,011	$ 38,462	$ 38,155	$ 39,674	$ 38,872
Avg. earnings, if employed full-time ($2012)	$ 48,979	$ 47,968	$ 49,770	$ 49,215	$ 52,200	$ 50,294	$ 51,260	$ 53,387
Median annual earnings ($2012)	$ 40,755	$ 40,040	$ 40,040	$ 38,610	$ 37,000	$ 37,300	$ 39,000	$ 36,400
Median earnings, if employed full-time ($2012)	$ 44,330	$ 42,900	$ 44,330	$ 42,900	$ 46,000	$ 45,000	$ 46,500	$ 46,000
Ever borrowed for undergraduate education	55%	53%	39%	35%	75%	75%	65%	55%
Avg. total amount borrowed for undergrad ($2012)	$ 8,090	$ 7,532	$ 6,025	$ 5,113	$ 20,846	$ 22,053	$ 15,967	$ 13,844
Avg. amount borrowed, if borrowed ($2012)	$ 14,729	$ 14,322	$ 15,422	$ 14,613	$ 27,745	$ 29,433	$ 24,709	$ 25,150
Median amt. borrowed, if borrowed ($2012)	$ 12,712	$ 12,712	$ 12,712	$ 12,186	$ 25,184	$ 25,584	$ 21,054	$ 20,996
Ever borrowed for graduate education	9%	13%	13%	16%	24%	24%	23%	25%
Avg. amount borrowed for grad school ($2012)	$ 2,951	$ 5,085	$ 4,989	$ 6,763	$ 9,477	$ 10,347	$ 11,128	$ 15,317
Avg. amount borrowed, if borrowed ($2012)	$ 33,770	$ 39,156	$ 39,359	$ 42,202	$ 40,028	$ 42,596	$ 49,420	$ 61,159
Median amt. borrowed, if borrowed ($2012)	$ 21,450	$ 28,600	$ 25,740	$ 28,600	$ 30,551	$ 33,000	$ 35,000	$ 41,000
Ever borrowed for undergrad/grad education	57%	57%	45%	44%	78%	78%	70%	64%
Total amount of student loans due ($2012)	$ 6,604	$ 7,815	$ 6,975	$ 8,045	$ 31,826	$ 34,086	$ 26,731	$ 29,067
Average monthly loan payment, incl. 0s ($2012)	$ 99	$ 99	$ 74	$ 71	$ 196	$ 204	$ 181	$ 147
Average student loan payments as % of income*	3	2	1	2	15	15	13	11
Average payment as % of income, if borrowed	6	4	4	7	19	19	18	16
Median payment as % of income, if borrowed	0	0	0	0	6	6	6	4
Student loan payment > 15% of income	3%	2%	1%	2%	20%	20%	16%	14%
Owes more on UG loans than borrowed**	8%	11%	12%	16%	28%	23%	18%	14%
Ever defaulted on any student loan	4%	3%	2%	2%	4%	2%	3%	1%
Ever defaulted, if borrowed	8%	6%	7%	4%	5%	3%	4%	2%
Sample size (rounded to nearest 10)	2,460	1,500	1,900	2,050	2,610	3,160	3,430	3,800