

Implications of Attrition from Graduate Education to Labor Market Outcomes

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Abstract

The economic return of higher education has been broadly studied for undergraduate and graduate degree recipients. However, no empirical study focuses on the economic outcomes of those who received some graduate education but left without earning a formal degree. Guided by human capital theory, the current study examines labor market outcomes – specifically, labor force participation, employment, earnings, and student loan repayment status – of a cohort of first-time baccalaureate degree recipients four years after earning their degrees. The study found no statistically significant difference in labor market outcomes between those who pursued a graduate/professional degree but left without earning one and those who never pursued graduate education. The findings were counter to the conventional understanding that more education or training results in better paying employment, thus calling for more scrutiny into application of the human capital investment perspective.

Introduction

Graduate and professional education increasingly plays an integral role in preparing an educated workforce to meet the demands of the 21st-century economy. According to the U.S. Bureau of Labor Statistics (2016), jobs that typically require master's degrees at the entry level are expected to grow by 16.7% and jobs that typically require a doctoral or professional degree at the entry level are expected to grow by 13.1% over the next decade between 2016 and 2026, the fastest rate among all education levels. Particularly, the fastest growth is expected to be in positions such as physician assistants (37%), nurse practitioners (36%), statisticians (34%), and postsecondary health specialties teachers (26%). Over one million new jobs will require an entry-level minimum of graduate and professional degrees between 2016 and 2026 (U.S. Bureau of Labor Statistics, 2016). Additional highly educated workers will be needed to fill in existing jobs that require graduate and professional degrees as their current holders move from entry-level to mid- and senior-level positions. On average, U.S. Bureau of Labor Statistics (2016) reports that occupational openings for jobs that require master's, doctoral, or professional degrees are expected to be about 560,000 in the same 10-year time span.

On the supply side, over the last decade, the number of graduate and professional degrees conferred by U.S. institutions of higher education has also been rising. According to the National Center for Education Statistics (NCES), in 2015–16, U.S. higher education institutions conferred over 950,000 master's and doctoral degrees, 200,000 more than a decade ago in 2006–2007 (National Center for Education Statistics,

2018). Graduate degree holders constitute a large share of the U.S. workforce with bachelor's degrees or higher. In 2017, about 20 million (9.1%) out of 224 million U.S. workers over the age of 25 hold master's, doctoral, or professional degrees, compared to 33.5 million holding only bachelor's degrees (U.S. Bureau of Labor Statistics, 2018). More individuals are also entering graduate programs. Graduate applications to U.S. colleges and universities grew on average by 5.7% each year in the past decade, while first-time graduate enrollment rose by on average 2.9% (Okahana & Zhou, 2017). However, not all those who begin graduate programs earn degrees.

The U.S. Census Bureau (2016) also reports that 31% of those in the workforce who have pursued education beyond the baccalaureate level do not hold a formal graduate or professional degree. This subset of the population may have completed formal or informal programs at the post-baccalaureate level at institutions of higher education (e.g., certificates, professional development courses, etc.), as increasingly more graduate-level certificates are awarded by U.S. colleges and universities (Okahana & Zhou, 2017). This subset also may have withdrawn from graduate, professional, and/or other post-baccalaureate education without earning any formal academic or professional credentials. Studies on labor market outcomes by postsecondary education attainment have largely focused on those of degree recipients (e.g., Baum et al., 2013; Dale & Krueger, 2002 & 2011; Leslie & Brinkman, 1988; McMahon, 2009; Paulsen, 2001; Perna, 2003). However, those who pursued some post-baccalaureate education but did not earn a formal degree are often bundled with those holding only bachelor's degrees when examining their labor market outcomes. Thus, this study aims to fill this literature

gap on the labor market outcomes of first-time baccalaureate degree holders who received some graduate education without degree attainment.

The paper is structured in the following manner: We start with a literature review to situate this topic within empirical studies. Then we identify knowledge gaps from extant studies and develop research questions to address the issue. Further, we select an appropriate conceptual framework to serve as the theoretical lens for the research questions. Data sources and methodology are presented, leading to the discussion and conclusion. Finally, we present implications for education researchers, policy makers, students, and institutions.

Review of Relevant Literature

Labor Market Outcomes Differentials by Educational Attainment

Studies on the benefits of higher education have typically focused only on degree holders, although there are complexities in calculating earning differentials. There is a direct cost associated with the investment in human capital, including tuition and debt on financing education associated with college costs; indirect cost can be foregone earnings (Mincer, 1974). The amount of time it takes for education to pay off in the form of salary depends on a variety of factors; most likely the longer one has been in the labor market, the more one earns (Rumberger & Thomas, 1993; Thomas, 2000; Carnevale et al., 2014).

The body of literature on baccalaureate degree earning differentials suggests that college graduates, on average, are likely to earn more than those without a college degree (Dale & Krueger, 2002 & 2011; Eckstein & Nagypal, 2004; Grogger & Eide, 1995;

Grubb, 1992; Hoekstra, 2009; Leslie & Brinkman, 1988; McMahon, 2009; Murphy & Weleh, 1989; Paulsen, 2001; Perna, 2003). Studies also suggest that the college earnings premium, or the relative monetary return on baccalaureate attainment, has increased over time (Eckstein & Nagypal, 2004; Goldin & Katz, 2009). However, the magnitude of earnings premiums for baccalaureate degree recipients is not uniform across all college degree graduates and differs by institutional characteristics (Brewer, Eide, & Ehernberg, 2009; Dale & Krueger, 2002 and 2011; Hoektstra, 2009; Long, 2007; Monks, 2000; Thomas, 2000), as well as sociodemographic characteristics (Perna, 2003 and 2005) and fields of study (Zumeta, Breneman, Callan, & Finney, 2012) of degree recipients.

Despite robust scholarship on the college earnings premium, few extant studies focus on those with graduate and professional degrees (Baum et al., 2013; Titus, 2007). This void is due in part to the assumption that graduate and professional degree holders generally earn more (Delisle & Holt, 2015; U.S. Department of Education, 2015), and partly due to the overwhelming policy interests, and thus research interests, in accessibility and affordability at the undergraduate level. Nevertheless, increasingly more attention is drawn to graduate and professional students, particularly related to their ability to repay federal student loans; thus, more studies are needed in this area. Presently the discussion of earnings differentials of advanced degree holders largely relies on descriptive evidence. According to the U.S. Census Bureau (2016), U.S. workers age 45 to 54 years old with master's degrees earn a mean annual salary of \$15,160 more than bachelor's degree holders; professional doctoral degree holders earn more than double the salary of bachelor's degree holders and \$19,730 higher than doctoral degree

holders. Baum et al. (2013) note a positive descriptive relationship between graduate and professional degree attainment and earnings; however, the study makes no distinction by field of occupation or graduate and professional degrees. Titus (1997) examined the NCES Baccalaureate & Beyond Study: 1993/1997 (B&B:93/97) for the earnings premium of master's degrees. The study, which controlled for fields of study and other characteristics, noted a statistically significant earnings premium for those who earned master's degrees in business/management but not in other fields (Titus, 1997). Similarly, a more recent study that employed data from the NCES Baccalaureate & Beyond Study: 2008/2012 (B&B:08/12) also noted positive returns on earning master's degrees, particularly in business and education (Gandara & Toutkoushian, 2017). Except for Gandara and Toutkoushian (2017), the analysis of graduate earnings premium does not account for those who have pursued but not earned a degree. Thus, this study focuses on this population.

Outcomes of Degree Non-Completers in Postsecondary Education

Some postsecondary education without a degree is a compound term that can include both those who pursued formal degree objectives and left without achieving them, as well as those who took a few courses for informal degree objectives. More often than not, the focus in the literature discussing those with some graduate education without a degree is in the context of attrition. Prior studies on attrition in postsecondary education have focused on attributional factors at the undergraduate level, such as demographic background, major, academic performance in high school and college, parents' education level, students' highest expected academic degrees,

confidence in attending college, and institutional commitment (Spady, 1970; 1971; Tinto, 1975). Similarly, factors associated with attrition from graduate and professional education have been studied, particularly at the doctoral level (e.g., Nerad & Miller, 1996; Lovitts & Nelson, 2000; Ampaw & Jaeger, 2011). A few studies on persistence and completion have focused on withdrawal from doctoral programs (e.g., Golde, 1998; Lovitts, 2001; Sowell, Allum, & Okahana, 2015, etc.), and financial factors influencing late-stage attrition at the doctoral level (Tuckman, Coyle, & Bae, 1990; Ehrenberg & Mavros, 1992).

Both scholars and practitioners, as well as policy makers, are interested in persistence and completion in postsecondary education—particularly at the baccalaureate level—in part because there are not only well-documented financial returns but also social returns to those who earn degrees, such as positive impacts on community, family, health, and civil engagement (McMahon, 2009; Topel, 1999). These benefits are more salient for individuals or groups who are less likely to pursue a college education than traditional college students (Brand & Xie, 2010; Carneiro et al., 2011; Hout, 2012).

In sum, while there is a body of scholarship that addresses value propositions for degree holders over non-degree holders, few studies have investigated these propositions specifically for those not completing a graduate degree. Regardless of one's highest degree level attempted, dropping out of any formal education process generally has an adverse effect on one's academic and professional trajectory (Belfield & Levin, 2007). At the graduate and professional degree levels, there exist some

anecdotal insights from those who withdrew without a formal degree, such as the recent article in *The Chronicle of Higher Education*¹; however, generally the scholarship generally focuses on causes of departures rather than on their implications and life after withdrawal.

Studies available on attrition largely focus on undergraduate-level attrition. Available data on the impact of dropping out of high school and college suggest negative implications for earnings (BLS, 2016a). Also, not completing a college degree is attributed to greater chances of student loan default (Gross et al., 2010; Lochner & Monge-Naranjo, 2014a; Perna, Kvaal, & Ruiz, 2017). Another study found that student borrowers who started at 4-year institutions and expected to earn a bachelor's degree, but left without one, were twice as likely to be unemployed compared to those who earned a degree (Gladieux & Perna, 2005). Yet the implications of attrition in graduate and professional education have not been discussed.

Research Questions

This study aims to fill this void in understanding the labor market outcomes of having some graduate education without a degree. The study contributes to the body of knowledge by adding a systematic and data-driven way to articulate the potential implications of withdrawing from graduate and professional degree programs. After controlling for covariates, this study particularly focuses on the implications to labor market outcomes of individuals with only some graduate or professional education measured by labor market participation, employment status, salary, and student loan

¹ Conley, J. (March 8, 2018). Just another piece of quit lit. *The Chronicle of Higher Education*. Retrieved online from: <https://www.chronicle.com/article/Just-Another-Piece-of-Quit-Lit/242756>

repayment status. More specifically, the following three research questions are asked in this study:

- Does the labor force participation and employment of college graduates with some graduate education but no graduate degree differ from those who have baccalaureate degrees only and those who completed graduate degrees? Do labor force participation and employment vary by demographic characteristics among all educational attainment groups?
- Do those who pursued but left graduate/professional education enjoy an earnings premium for having some post-baccalaureate education? Does the earning premium vary by demographic characteristics?
- Are those who left graduate education without a degree more likely to default on federal student loans compared to degree completers? Do the chances of default vary by demographic characteristics?

These are questions of importance because labor force participations, employment status, and earnings affect fulfillment of the growing market for post-baccalaureate-level jobs, as well as repayment of graduate student loans. Understanding what withdrawal from graduate and professional education means to labor market outcomes has implications for broader policy discussions surrounding support for advanced education.

Conceptual Framework

Human Capital Theory

The study is guided by the human capital perspective, which theorizes that education and training is the most important investment in human capital, resulting in productivity gains in labor force (Becker, 1993). This framework, widely used in studies on economic benefits of postsecondary education (e.g., Perna, 2005; Titus, 2007), posits that students incur monetary and nonmonetary costs to further their education and in return, they expect raises, promotions, and better career prospects (McMahon, 2009; Paulsen, 2001). The framework itself does not make a distinction between education and attainment of a formal degree or credential. Thus, one may argue that even if a student withdraws from graduate or professional education without a degree, or drops out, he or she still has accumulated additional education and thus made an investment in human capital; thus he or she can expect some returns.

Most studies operationalize this framework by examining earnings differentials of degree holders and non-degree holders. Results, indeed, indicate an earnings premium for attaining a bachelor's degree (Dale & Krueger, 2002 & 2011; Eckstein & Nagypal, 2004; Grogger & Eide, 1995; Grubb, 1992; Hoekstra, 2009; Leslie & Brinkman, 1988; McMahon, 2009; Murphy & Weleh, 1989; Paulsen, 2001; Perna, 2003) as well as some master's degrees (Gandara & Toutkoushian, 2017; Titus, 1997). Existing research does not seem to address returns on years or credit-hours of additional education, except perhaps, Gandara and Toutkoushian (2017), which observed small economic returns from the mere pursuit of master's-level education. Nevertheless, those with some graduate education without a degree still accumulated additional education beyond the baccalaureate degree. Thus, from the human capital investment

perspective, we hypothesize that those with some graduate education are better off economically than those without any graduate education.

Signaling Theory

While the human capital investment perspective leads us to hypothesize that any additional education will yield some positive returns on investment, available evidence seems to suggest otherwise. For example, when examining employment (Gladieux & Perna, 2005) and earnings (U.S. Bureau of Labor Statistics, 2016) of those with only a high school diploma and those with only some college education but no degree, studies suggest negative implications for individuals. Furthermore, those who dropped out from college were more likely to struggle with loan repayment, even if they borrowed less than those who earned bachelor's degrees (U.S. Senate Committee on Health, Education, Labor, and Pensions, 2015). This calls into question the utility of the human capital theory in explaining labor market outcomes of graduate-degree non-completers.

Thus, we also consider signaling theory (Spence, 1973) as a framework for examining labor market outcomes of those with some graduate education but without a degree. This theory posits that employers respond to formal education credentials, such as graduate and professional degrees, but not courses taken or trainings received when awarding higher salaries to employees. However, the empirical evidence is mixed (e.g., Weiss, 1995; Bedard, 2001; Chevalier et al., 2004). In other words, earnings differentials and other labor market outcomes may not be realized by merely having "some" graduate education. Instead, students need to attain a formal credential, such as a

graduate or professional degree, to accrue the benefits of additional education beyond the baccalaureate level. From this standpoint, we can also offer a competing hypothesis that those who pursued graduate and professional education, but did not earn a degree, are no different in terms of labor force participation, employment status, earnings, and loan repayment status when compared to those who never enrolled in graduate or professional education. In the sections that follow, we discuss how we address these hypotheses.

Research Methods

Data

The study employed the restricted-use data set of the Baccalaureate & Beyond Longitudinal Study 2008–2012 (B&B:08/12, License Control Number 16020011), which is a nationally representative, longitudinal survey conducted by the National Center for Education Statistics (NCES) that follows a cohort of baccalaureate degree recipients. The baseline sample of B&B:08/12 includes approximately 19,000 members in the 2007–08 National Postsecondary Student Aid Study (NPSAS:08). This is a nationally representative sample of college graduates in the 2007–2008 academic year; follow-up surveys were conducted in 2009 and 2012 to examine their workforce participation, income and debt repayment, and entry into and persistence through graduate school programs, among other indicators. B&B:08/12 also captures baccalaureate degree recipients' undergraduate experience and demographic backgrounds. The design of the B&B survey series is appropriate for studies of labor market outcomes and other indicators in relation to educational experiences.

This study includes 13,575 members in the B&B:08/12 cohort, who are U.S. citizens or permanent residents who earned their first bachelor's degrees in 2007–08. Among them, 11,696 were in the labor force in 2012, 10,272 were employed with earnings, and 10,482 borrowed federal loans as of 2012. The data was weighted by standardized panel weight. Descriptive analyses, including cross-tabulation (see Table I) and analysis of variance, and two-way ANOVA to compare group mean differences on salary (see Table III) were performed to explore the data. The methodology of the study is not sufficient for drawing causal inference. This serves as a first-step relational analysis that is essential for future studies.

Variables and Methodology

The study is interested in exploring how levels of post-baccalaureate education attainment might explain four outcome variables: labor force participation, employment status of those in the labor force, salary of those employed in 2012, and federal loan repayment status in 2012. Labor force participation, employment status, and federal loan repayment status are both expressed as dichotomous variables: in the labor force or not, employed (full-time and part-time) or unemployed, and repaying a federal loan or not. Logistic regression analyses (Hosmer, Lemeshow, & Sturdivant, 2013) were performed to explain probabilities of being in the labor force, of being employed in 2012, and of not repaying a federal loan (including forbearance, deference, and default statuses) in 2012. Interaction between demographic characteristics and educational attainment were added to test whether the difference in outcomes varies by demographic characteristics. Salary variable is transformed as a standardized natural log

to remove outliers and adjust to normal distribution. Multiple regression (Fox, 2008) was performed to explain differences in earnings in 2012 and interaction analysis was included to detect whether the difference varies by demographic characteristics.

The independent variable of interest, post-baccalaureate education attainment (see Table I), is a categorical variable of six levels: never enrolled, enrolled but not degree, currently enrolled but no degree, currently enrolled with degree, enrolled with master's degree, and enrolled with other graduate degree. First, never enrolled refers to students who never pursued graduate/professional degrees (hereafter "bachelor's degree group"). Second, enrolled but no degree refers to those who pursued graduate/professional degrees since earning their first bachelor's degree in 2007-08 but who were no longer enrolled as of 2012 and had not earned a formal degree (hereafter "reference group"). Third, currently enrolled but no degree refers to those who were pursuing graduate/professional degrees in 2012 but had yet to earn a graduate degree. Fourth, currently enrolled with degree refers to those who were still pursuing graduate/professional degrees in 2012 with a previously earned graduate degree. Fifth, enrolled with master's degree refers to those who earned only a master's degree as of 2012 (hereafter "master's degree group"). Sixth, enrolled with other graduate degrees refers to those who earned graduate/professional degrees other than a master's degree as of 2012 (hereafter "other graduate degree group"). Reference group was used as the baseline for comparison.

== Insert Table I about Here. ==

The covariates in the model are: demographic characteristics, undergraduate education background, financial support for education, undergraduate institutional characteristics, and post-baccalaureate enrollment and employment history, are informed by prior studies focusing on the relationship between higher education and labor market outcomes (e.g., Malcom & Dowd, 2012; Melguizo, Kienzl, & Alfonso, 2011; Titus, 2007; Xu, 2014). The decision on the selection of demographic characteristics was suggested by previous empirical studies (Perna, 2005; Titus, 2007; Gladieux & Perna, 2005) finding them to be predictors of labor market outcomes and loan repayment status. Demographic characteristics include gender, race/ethnicity (four categories: Underrepresented Minority (URM) includes Black, Hispanic, and Native American; Asian; Multiple races; White), first-generation status, low-income status in 2006 (defined by low-income levels that are eligible for the federal TRIO program in 2006), marital and family status (four categories: single with or without children, married with or without children), and age. Undergraduate educational background is represented by standardized GPA and major. Financial support for education is transformed into natural log of federal loan amount borrowed as of 2012, financial aid status (three categories: borrowed only for undergraduate education, borrowed only for graduate education, borrowed for both undergraduate and graduate education). Undergraduate institutional characteristics are the region of institution, highest degree offered by the institution, and the selectivity and control of the institution. Post-baccalaureate enrollment history is the sum of months of enrollment. Post-baccalaureate employment history includes

the total months of post-baccalaureate employment, employment status in 2009 and 2012, and occupation in 2012.

Findings

Full regression table (Table II) are included in the appendix. The results of labor market outcomes and federal loan repayment status are presented by comparisons of reference group (bachelor's degree holders who entered graduate school but did not earn a degree), bachelor's degree group, master's degree group, and other graduate degrees group (professional doctorate degree holders).

Labor Force Participation and Employment Status

With regard to labor force participation, we found no statistical difference between people who left graduate and professional programs and those who never enrolled in graduate school. Descriptively, 91% of the reference group were in the labor force compared to 90% in the bachelor's group, 91% in the master's group, and 85% in the other graduate degrees group. Employment rates among those who were in the labor force in 2012 varied slightly between the reference group and others. Of those in the labor force in 2012, 86% in the reference group were employed part-time, full-time or in multiple jobs as opposed to 91% in the bachelor's group, 89% in the master's group, and 86% in the other graduate degrees group.

After controlling for demographic factors, education, and employment history, the other graduate degrees group are significantly more likely to be in the labor force than the reference group ($b = 1.61, p < .01$). Not surprisingly, those who were currently enrolled in graduate and professional degree programs were less likely to be in the labor

force. However, there was no statistically significant difference in terms of labor force participation between the reference group, bachelor's degree group, and master's degree group. Also, race/ethnicity, gender, undergraduate major, socioeconomic status were not significant predictors of labor force participation in this model. Those who were married with children were less likely to be in the labor force ($b = -0.68, p < 0.001$). Standardized undergraduate GPA is negatively correlated with labor force participation.

Among those who were in the labor force in 2012, the reference group were as equally likely to be employed in 2012 as the bachelor's degree group, master's degree group, and other graduate degrees group, holding all other covariates constant. The interaction analysis of employment status shows that the odds for Asians in the master's degree group ($b = 3, p < .05$) and other graduate degrees group ($b = 3.3, p < .05$) to be employed are 20 times and 26 times larger than Whites in the reference group respectively. Additionally, the odds of being employed for people who are single with children in the bachelors' degree group ($b = 2.4, p < .01$) and master's degree group ($b = 3.3, p < .01$) are 11 times and 27 times larger respectively than those who are single without children in the reference group.

Salary

Graduate degree holders earn significantly more than people who either left graduate school or never enrolled in graduate school. The reference group on average earns less than the bachelor's degree group 3-4 years post-undergraduate. Descriptive analyses (Table III) show the annual salary of those who were working with pay in 2012 varies by graduate education status. Table III suggests that about 77% of 2007–08

college graduates with first bachelor's degrees had some amount of income in 2012. Among college graduates with income in 2012, average salaries were slightly higher for the master's degree group (\$49,431) and substantially higher for the other graduate degrees group (\$54,850) than for the bachelor's degree group (\$49,062) and reference group (\$42,601), enrolled in 2012 without a previous graduate degree (\$43,613), or enrolled in 2012 with a previous graduate degree (\$34,681). Two-way ANOVA (Table III) shows that effects on average annual salaries in 2012 of gender, parents' education and income level, and marital and family status on salary vary by graduate educational status.

When comparing salaries of the master's degree group to the reference group, the gap between their average salaries was larger among women than for men. Among women, the average salary of those in the reference group was 20% lower than the master's degree group, while among men, it was 7% lower. Among URM and White students, respectively, average salaries were 49% and 19% lower for those in the reference group than the other degree groups. Master's degree earning premiums and college earning premiums are larger for URM than for White students, 28% and 12% respectively. When considering different levels of parents' education and family income, first generation and low-income students' mean salaries are much lower in the reference group (\$39,878 and \$44,602) than in the master's degree group (\$48,782 and \$48,281), and the other graduate degree group (\$58,267 and \$50,556). First-generation students in the bachelor's degree group, master's degree group, and other graduate degree group enjoyed more benefit in mean salary compared to the reference group

(46%, 22%, and 20% respectively) than non-first-generation students (19%, 10%, and 10% respectively). The trend is the opposite for low-income students with a master's degree (19% vs. 8%) and other graduate degrees (22% vs. 10%) earning premiums are higher for non-low-income students than for low-income students when compared to reference group. Compared to the reference group, the earnings premium of other graduate degrees was slightly higher among individuals married with children (54%) than individuals who were either married or single without children (18% and 35%). Students who were married with children also had the highest master's degree earning premium (25%) as opposed to those who were married without children (15%), single without children (9%), and single with children (17%).

Results of multiple linear regression without interaction terms (see Table IV) showed that the master's degree group ($b = 0.2, p < .001$) and other graduate degree group ($b = 0.2, p < .05$) earn significantly higher salaries than the reference group. There is no significant difference in salary between the reference group and bachelor's degree group. The interaction analysis (see Table IV) shows no variation between salary and graduation status in relationship to gender, first generation status, low-income status, and family and marital status. Statistically significant interaction in Table IV suggests that the relationship between graduate education status and salary varies by race and family and marital status. URM students in the bachelor's degree group, master's degree group, or other graduate degree group averaged incomes that were 27%, 21%, and 46% higher, respectively, than URM students in the reference group.

Loan Repayment Status

As of 2012, people who received other graduate degrees were significantly less likely to default on a federal loan than those who left graduate school without a degree. The odds of default for the other graduate degrees group are 35% of the odds for the reference group. Descriptive statistics show that the reference group had the highest percentage of not repaying a federal loan (19%), followed by 15% for the master's degree group, 14% for the other graduate degrees group, and 12% for the bachelor's degree group.

After controlling for demographic factors, total amount of federal loan borrowed, education, and employment history, the mean probability of not repaying federal loans in 2012 for the other graduate degrees group (0.05) is significantly lower than the reference group (0.13) with $p < .01$. However, there is no significant difference between the bachelor's degree group (0.11) and the reference group, nor between the master's group (0.10) and the reference group. The more one borrowed in federal loans, the more likely one was to be in non-repayment status ($b = 0.6, p < .001$). The test of interaction shows that the relationship between graduate education status and federal loan repayment status does not vary by gender, first-generation status, low-income status, and family and marital status, but does vary by URM status. Relative to the reference group, the mean probability of URM students in the other graduate degrees group (0.04) to not be repaying a federal loan is significantly less than their White counterparts (0.07). Among URM students, those in the reference group (probability = 0.25) are significantly more likely not to be repaying their loans than those in the other graduate degrees group (probability = 0.04).

== Insert Table II about Here. ==

Limitations

Several limitations regarding the data and analysis must be noted. First, the sample size of our group of interest is relatively small (489) compared to other groups; for example, the bachelor's degree group contains 8,094 people. Small group size makes it difficult to examine some of the intersectionality of demographic characteristics since the breakdowns are too small to perform calculations. Second, the data do not capture the number of course credits completed by those with some graduate education but without a degree. In other words, we could not account for how close individuals might be to completing formal degree requirements. Finally, since the data only record a four-year follow-up after earning a baccalaureate degree, many are still pursuing graduate and professional education. Thus, this might not be the full picture of earnings differential by post-baccalaureate education attainment. However, despite these limitations, the study offers insights into where the group with some graduate education without a degree stands in terms of labor market outcomes relative to bachelor's degree holders and graduate and professional degree holders.

Discussion

Based on the analysis, three themes for discussion emerged. First is that the results suggest, in general, no penalty in terms of labor market outcomes for pursuing some graduate education without a degree, compared to those without any graduate or professional education. However, only having some graduate education without a degree may disadvantage underrepresented minorities (URMs) in terms of labor market

outcomes. Finally, there appears to be a clear advantage in earning a formal degree over only having some graduate education without a degree. Discussion of each theme follows.

No Penalty for just having Some Graduate Education

First, the findings suggest no statistically significant differences in terms of labor force participation, employment status, and salary between those without any graduate education and those who have some graduate education without a degree. On one hand this suggests that unlike those with some college education without a degree compared to those with only a high school diploma (Gladieux & Perna, 2005), at least in the short term, there is no economic penalty for pursuing but leaving graduate education without a formal degree. In other words, the result suggests that the labor force may be forgiving of “testing out” possible further education beyond baccalaureate degrees. At least in the first four years after earning their baccalaureate degrees, pursuing a few additional years of education without obtaining formal degrees appears not to negatively impact the labor force participation or employability of college graduates.

Pursuing some graduate education is not completely without cost to those who do, since they still incur tuition and other expenses as well as some opportunity losses. However, the study suggests that within four years after earning their baccalaureate degrees, individuals with some graduate education but without a degree are still equally employable and have similar earnings potential compared to those who never pursued graduate or professional education. Furthermore, individuals with some graduate

education but without a degree are as likely to repay their federal loans as those without any graduate or professional education. This is in contrast to Perna, Kvaal, & Ruiz (2017)'s findings that default rates are higher for non-degree-completers than for degree holders.

Underrepresented Minorities and Some Graduate Education

Second, only having some graduate education without attaining a formal degree appears to negatively affect URM students, at least in the short term. Although, in general, those with some graduate education without a formal degree fared well in terms of labor market outcomes against those without any graduate or professional education, it was not the case for URM students and their earnings in 2012. The results suggest URM students with some graduate education, but without a degree, earned statistically less than those URM students who never entered graduate and professional education. This difference was not found for White and Asian students and is in contrast to Thomas (2000), who found no salary difference in the first post-baccalaureate job among different race/ethnicity groups. Also in the interaction model, URM students earned, after controlling for other variables, less than their white counterparts; women also earned less than their male counterparts.

Greater Earnings Potential for Degree Holders

Finally, the results suggest that those who earned a graduate or professional degree earned more salary within four years of attaining their first baccalaureate degrees. Only having some graduate education does not set them back in terms of labor force participation, employment status, earnings, and loan repayment status compared

to those without any graduate or professional education. We also found that earning formal graduate or professional degrees boosted their earnings, as demonstrated by analysis of only URM students. The earnings premium of advanced degrees is well-established in the literature, yet it is still striking to see differentials between degree recipients and non-degree recipients emerging within four years after graduating from college. The study also suggests that those who completed graduate and professional degrees earned more than those with only baccalaureate degrees. This is consistent with reports on lifetime earning differentials by education attainment and age. If people are of a similar age, there is a positive correlation between their salary and education attainment (Carvevale et al., 2014).

Using the human capital investment perspective (Becker, 1993), we examined the presence of any additional education and training, but not having earned a formal degree or credential, and expected to see some earnings differential or other positive labor market outcomes for those with some graduate education but no completed degree or credential. However, the results of the study instead suggest that salary growth is realized by degree attainment at the postsecondary level. One explanation is that economic benefits of graduate education are better explained by signaling theory (Spence, 1973) rather than human capital. The results suggest that only degree holders enjoy the benefit of increase in salary regardless of how much education they actually receive and the degree or certificate serves as a signal to employers that its holder is capable of performing particular jobs.

Implications and Future Directions for Research

Several implications are drawn from this study. First is that it reaffirms the importance of earning a formal degree to reap positive labor market outcomes associated with graduate and professional education. Even as early as within four years of attaining their first baccalaureate degrees, those who earned a master's degree or other graduate/professional degree earned more than those with no or only some graduate education. This suggests that there may be premiums to entry-level salaries of having advanced degrees. However, another consideration may be that those who sought employment after earning their graduate or professional degrees might have entered the job market as the economy began recovering from the Great Recession; thus, they might have had more optimal starting salaries regardless. This is an interesting area for future inquiry.

Second, those with some graduate education without a formal degree appear—except for underrepresented minorities, which we will discuss below—to be effectively treated in the workforce as “college graduates.” This signaling effect poses some concerns in how graduate and professional education might be valued in the workforce. Graduate school does not only provide courses toward formal academic credentials or degrees; it offers training on a broad range of skills as well as opportunities for networking and space to build communities and networks. With or without a formal degree, one may benefit from exposure to additional education and training. Thus, there may be different ways to articulate and signify the value propositions of additional education beyond a baccalaureate to employers. There are a handful of emerging studies on micro-credentialing as a way of demonstrating the benefit of students'

acquired skills through education and training, although most studies are small-scale and exploratory in nature (Hole, 2014; Wolfe & Andrews, 2014).

Considering the time during which this cohort received their bachelor's degrees, meaning the job market was less prosperous due to the Great Recession, many might have waited for employment opportunities while taking additional courses. In other words, while they pursued "some graduate education" they might have continued to be in the job market for college graduates. After all, job descriptions very often use formal academic degrees and credentials in describing minimum qualifications; thus having "some graduate education" does not put individuals in a different job market. Therefore, their labor market outcomes much more closely mirror individuals without any graduate or professional education. Further inquiry about post-baccalaureate course taking and enrollment patterns is warranted.

Finally, the negative implications for the earnings of underrepresented minorities with some graduate education but without a degree is concerning. While having some graduate education without a degree did not appear to negatively affect White and Asian students when compared against their peers with no graduate or professional education, it did for URM students. This suggests that the stakes for degree completion may be higher for URM students than for their White and Asian counterparts. Having some graduate education without a degree might signal differently to employers about URM students than their White and Asian counterparts in the labor market, or there may be different circumstances and factors that influence these URM students who only had some graduate education differently than their peers. Further inquiry into

the circumstances of URM students' not earning a formal graduate or professional degree in relation to their labor market outcomes is warranted.

The study shed light on the labor market outcomes of some graduate education without a degree in relation to those who never enter graduate or professional education and to those who earned graduate and professional degrees. The study found that those with some graduate education without a degree are seen, at least in the short term, more as "college graduates" than as graduate or professional degree holders. For White and Asian students, exploring graduate education options without earning a degree might not have negative implications for their earnings; however, it does for URM students. Further studies are warranted to explore implications of this study; however, the study affirms that for URM students, the stakes are particularly high for them to complete graduate and professional degrees they have begun to pursue.

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Table I.

Descriptives of Graduate Education Status by Demographic Characteristics

Graduate Education Status	Enrolled But No Degree	Never Enrolled	Currently Enrolled And No Degree	Currently Enrolled And With Degree	Enrolled And With Only Master's	Enrolled And with Other Grad Degrees
Total N = 13,575	489 (3.6%)	8094 (59.6%)	1884 (13.88%)	433 (3.2%)	2028 (15.0%)	647 (4.8%)
Gender						
Male	176	3,413	787	182	717	286
Female	313	4,681	1,097	251	1,311	361
Race						
White	316	6,017	1,249	292	1,446	464
URM*	135	1,437	396	92	404	77
Asian	22	436	173	31	114	92
Other	3	18	4	3	6	2
More than one Race	13	186	62	15	58	12
Parents' Education Level						
First Generation	274	4,081	867	177	939	219
Not First Generation	215	4,013	1,017	256	1,089	428
Parents' Income Level in 2006						
Low Income	186	2,614	572	117	532	189
Not Low Income	303	5,480	1,312	316	1,496	458
Marital & Family Status in 2012						
Single without Children	230	4,040	1,127	291	1,172	398
Single with Children	59	514	102	16	93	7
Married without Children	103	1,703	367	75	448	161
Married with Children	97	1,837	288	51	315	81
Age (Mean, SD)	26 (7.5)	25 (6.6)	24 (5.4)	23 (5.8)	24 (5.7)	22 (2.7)

Source : Descriptive Analyses of BB:08/12 Restricted Data

* URM: Racially underrepresented minority including African American, Hispanic, American Indian or Alaska Native and Native Hawaiian/other Pacific Islanders

Table II - Continue

Multiple Logistic Regression for Labor Force Participation, Employment Status, and Federal Loan Repayment Status in 2012

Variable	Outcome I: Labor Force Participation			Outcome II: Employment Status			Outcome III: Federal Loan Repayment Stat		
	b	(SE)	p	b	(SE)	p	b	(SE)	p
Intercept	0.44	(0.55)	0.424	-0.38	(0.61)	0.539	-6.85	(0.96)	<.001
Undergraduate Major (Arts & Humanities)									
Agricultural Sciences	-0.47	(0.43)	0.279	0.25	(0.50)	0.619	-1.01	(0.47)	0.031 *
Business	0.13	(0.23)	0.571	0.30	(0.22)	0.169	-0.56	(0.19)	0.003 **
Education	-0.17	(0.24)	0.495	0.57	(0.30)	0.057	-0.38	(0.22)	0.083
Engineering	-0.44	(0.34)	0.200	1.31	(0.47)	0.006 **	-0.88	(0.47)	0.060
Health Sciences	0.15	(0.25)	0.564	1.12	(0.38)	0.003 **	-0.19	(0.25)	0.451
Mathematics & Computer Sciences	-0.04	(0.45)	0.938	0.39	(0.40)	0.327	-0.44	(0.40)	0.276
Bio/Physical Sciences	-0.37	(0.24)	0.118	-0.01	(0.25)	0.968	0.14	(0.21)	0.521
Public Administration	0.13	(0.39)	0.731	0.44	(0.34)	0.198	-0.37	(0.32)	0.242
Social & Behavioral Sciences	-0.13	(0.19)	0.492	-0.23	(0.20)	0.245	-0.15	(0.17)	0.389
Other Fields	-0.17	(0.19)	0.378	0.13	(0.19)	0.486	-0.37	(0.16)	0.022 *
Undergraduate Institution									
Region (New England)									
Mideast	0.10	(0.25)	0.683	-0.09	(0.27)	0.726	-0.01	(0.26)	0.964
Great Lakes	0.22	(0.26)	0.387	0.14	(0.28)	0.626	-0.05	(0.25)	0.829
Plains	0.21	(0.28)	0.458	0.07	(0.29)	0.812	-0.34	(0.27)	0.214
Southeast	-0.06	(0.24)	0.810	0.12	(0.26)	0.658	0.06	(0.25)	0.810
Southwest	-0.28	(0.29)	0.330	-0.11	(0.34)	0.739	-0.13	(0.28)	0.638
Rocky Mountains	-0.68	(0.30)	0.021 *	-0.29	(0.35)	0.412	-0.51	(0.39)	0.193
Far West	-0.29	(0.26)	0.261	-0.15	(0.28)	0.595	0.02	(0.27)	0.949
Outlying areas	0.61	(0.49)	0.218	0.66	(0.48)	0.163	-0.26	(0.59)	0.662
Highest Degree Offered (Bachelor's & Below)									
Master's	-0.11	(0.21)	0.590	0.39	(0.22)	0.085	-0.34	(0.19)	0.070
Doctoral	-0.25	(0.21)	0.232	0.26	(0.23)	0.261	-0.44	(0.20)	0.028 *

Table II - Continue

Multiple Logistic Regression for Labor Force Participation, Employment Status, and Federal Loan Repayment Status in 2012

Variable	Outcome I: Labor Force Participation		Outcome II: Employment Status		Outcome III: Federal Loan Repayment Status	
	<i>b</i>	<i>p</i> (SE)	<i>b</i>	<i>p</i> (SE)	<i>b</i>	<i>p</i> (SE)
Intercept	0.44	(0.55)	-0.38	(0.61)	-6.85	(0.96)
Selectivity		0.424		0.539		<0.001
(Open Access & Minimally Selective)						
Moderately Selective	-0.03	(0.18)	0.35	(0.18)	0.00	(0.15)
Very Selective	-0.18	(0.20)	0.40	(0.21)	-0.15	(0.18)
Control		0.357		0.056		0.403
(Pubic)						
Private Nonprofit	-0.18	(0.12)	-0.33	(0.14)	0.03	(0.12)
Amount of Federal Loan Borrowed as of 2012 (Natural Log)		0.132		0.020 *	0.57	(0.08)
Financial Aid Status						<0.001 ***
Borrowed Only for Undergrad	0.16	(0.14)	0.01	(0.16)		0.781
Borrowed Only for Grad	-0.46	(0.24)	-0.19	(0.26)		
Borrowed for both Undergrad & Grad	-0.44	(0.17)	-0.27	(0.19)		
Post BA Months of Enrollment		0.008 **		0.161		
Post BA Months of Employment	0.09	(0.00)	0.08	(0.00)	0.00	(0.01)
Employment Status in 2009		<0.001 ***		<0.001 ***	0.00	(0.00)
(Out of Labor Force)						0.335
Unemployed	0.65	(0.24)	-0.47	(0.25)		
Employed Part Time	-0.50	(0.21)	-0.32	(0.25)		
Employed in Multiple Jobs	-0.58	(0.22)	-0.56	(0.27)		
Employed Full Time	-0.51	(0.19)	-0.49	(0.23)		
Employment Status in 2012		0.009 **		0.033 *		
(Out of Labor Force)						
Unemployed		0.008 **		0.058	0.45	(0.19)
Employed Part Time		0.018 *		0.205	-0.28	(0.23)
Employed in Multiple Jobs		0.009 **		0.036 *	-0.61	(0.27)
Employed Full Time		0.009 **		0.033 *	-0.49	(0.19)
Employment Status in 2012						0.008 **
(Out of Labor Force)						
Unemployed						0.016 *
Employed Part Time						0.220
Employed in Multiple Jobs						0.024 *
Employed Full Time						0.008 **

Table II - Continue

Multiple Logistic Regression for Labor Force Participation, Employment Status, and Federal Loan Repayment Status in 2012

Variable	Outcome I: Labor Force Participation			Outcome II: Employment Status			Outcome III: Federal Loan Repayment Status		
	b	(SE)	p	b	(SE)	p	b	(SE)	p
Intercept	0.44	(0.55)	0.424	-0.38	(0.61)	0.539	-6.85	(0.96)	<0.001
Occupation in 2012 (Other Occupations)									
Healthcare	0.05	(0.21)	0.831	0.17	(0.25)	0.497	-0.39	(0.18)	0.034 *
Legal	0.19	(0.76)	0.804	1.24	(0.54)	0.022 *	-0.13	(0.57)	0.815
Educators	-0.26	(0.18)	0.149	-0.18	(0.20)	0.390	0.21	(0.17)	0.225
Engineering	-0.06	(0.35)	0.873	0.46	(0.46)	0.319	-0.36	(0.39)	0.358
Business	-0.09	(0.16)	0.582	0.07	(0.16)	0.654	0.04	(0.15)	0.790
Computer/Information	0.42	(0.31)	0.167	0.34	(0.31)	0.266	-0.64	(0.29)	0.031 *
Social Services	-0.04	(0.24)	0.878	0.25	(0.30)	0.410	-0.04	(0.23)	0.877
Asian#Enrolled and With Master's Degree				2.99	(1.16)	0.010 *			
Asian#Enrolled and With Other Graduate Degrees				3.26	(1.26)	0.010 *			
Single with Children#Never Enrolled				2.39	(0.88)	0.007 **			
Single with Children#Enrolled and With Master's Degree				3.29	(1.03)	0.001 **			
URM#Enrolled and With Other Graduate Degrees							-1.90	(0.95)	0.047 *
Cases in Analysis for Outcome I			13,543						
Cases in Analysis for Outcome II			11,809						
Cases in Analysis for Outcome III			10,482						

Source: Analyses of Restricted-Use BB:08/12 Data

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Note: Data are weighted by normalized panel weight wte000. Calculated with STATA 14 software.