

**THE EFFECTS OF UNDERGRADUATE DEBT AND EDUCATION ON  
EMPLOYMENT, FURTHER EDUCATION, AND HOUSEHOLD DECISIONS**

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# THE EFFECTS OF UNDERGRADUATE DEBT AND EDUCATION ON EMPLOYMENT, FURTHER EDUCATION, AND HOUSEHOLD DECISIONS

William Bosshardt and William B. Walstad

**Abstract:** This study investigates the effects of the amount of undergraduate debt and also undergraduate education on the decisions college graduates make about employment, further education, and household formation. A logit model is specified and estimated for each type of decision using variables that control for the amount of debt, undergraduate record (average salary for the major earned, GPA, and course credits) plus demographic variables. The data come from the Baccalaureate and Beyond (B&B) longitudinal survey of the National Center for Education Statistics at the U.S. Department of Education. The results appear to show that an increasing amount of undergraduate debt at the time of graduation increases the likelihood of taking a job and delaying household formation (home buying, marriage, and having children), but not enrolling in further education. The undergraduate academic record of college graduates also significantly influences these life decisions in surprising ways: the better the record the more likely college graduates are to enroll in more higher education, but the less they are to take a job after college graduation or delay household and family formation.

**Keywords:** undergraduate debt, employment after college, graduate education, home buying, marriage, and Baccalaureate and Beyond

**JEL codes:** D14, I21

Undergraduate student loan debt is considered to be a burden after graduating from a college or university because the debtor has an obligation to re-pay a loan to the lender. The amount to be paid back can be substantial, requiring years of careful money management to save funds on a regular basis to repay the large amount of debt that often accrues for higher education. From a life cycle perspective, however, borrowing money to finance higher education need not be considered a burden if it leads to an improvement in human capital that provides more life-time benefits such as better career opportunities, higher long-term wage growth, and lower unemployment (Avery and Turner 2012).

The negative and positive incentives from undergraduate student loan debt are likely to have negative and positive effects on the decisions of college graduates in the years after graduation. Undergraduate borrowing may encourage college graduates to take a job rather than continue in higher education because they are credit constrained or adverse to being liable for larger amounts of debt. This debt may reduce enrollment in further education, such as for masters or doctoral degrees, because financing the debt places an additional debt burden on a college graduate, even if the rate of return for investing in further education is relatively high. Undergraduate debt also may adversely affect household formation related to such decisions as buying a home, getting married, or having a child. The management and paying of student loans competes with the use of available funds for other uses such as home buying and may reduce the available time to develop relationships or support a family.

This study investigates the likely effects of undergraduate debt on multiple decisions about employment, further education, and household formation that college graduates make in the first four years after graduation. The effects of this debt has been the subject of many studies over the years, but the studies tend to focus on just one type of outcome or decision, as described in the

literature review to follow. By contrast, this study explores the debt topic with a more comprehensive perspective that include these multiple decisions involving employment, enrollment in further education, and household formation to understand how undergraduate debt does and does not affect the different outcomes. The study also takes advantage of a recently released longitudinal data set from the Baccalaureate and Beyond study of a representative national sample of 2008 college graduates and two follow-up interviews of those graduates one and four year later. Another feature of the study is that it investigates the effects of academic achievement or undergraduate record along with student loan debt on those multiple decisions. In some cases, the academic records of college graduates may be more revealing about what is likely to affect these decisions than undergraduate debt. The set of variables related to debt, college records, and demographics are standardized across the analysis to show their likely effects and compare their influence on the different types of decisions.

## **REVIEW OF THE LITERATURE**

Extensive research on undergraduate borrowing or debt has been conducted over the past three decades. One line of investigation focused on employment decisions after college graduation. Minicozzi (2003), for example, found that male college graduates with more student loan debt were more likely to choose higher-paying jobs that have a lower prospect for wage growth. A reason given for this outcome is that college graduates burdened with debt face borrowing constraints and may prefer pay down their debt as soon as possible. The college graduates are willing to take job with the highest possible salary rather than continue their investment in education to obtain jobs with a greater prospect for long-term wage growth. Rothstein and Rouse (2011), using a sample from a highly selective university, studied a university policy that switched from one using student loans to one using grants and found that it encouraged college graduates to

switch from taking higher-salary jobs to pay down student loans and take lower-paid jobs in the public sector. They suggest that college graduates took higher-paying jobs after graduation under the student loan regime because they were credit constrained and also debt adverse.

Whether students take higher-paying jobs depends on what is available to students entering the job market and how competitive their job qualifications are for employment. Using national B&B data from 1993 and 1997, Price (2004) found that students with higher educational debt were more likely to earn lower average or less competitive salaries. Choi (2014) suggests that the national sampling in the Price study and also demographic characteristics (gender, race and ethnicity, and economic status) may explain some of the above differences in employment results in Price (2004) compared with Minicozzi (2003) and Rothstein and Rouse (2001). Regardless of whether a college graduate takes a higher- or lower-paying job after college graduation, the few available studies suggests that educational debt appears to encourage some type of employment.

One central research question investigated in other studies of undergraduate debt is its likely effect on educational outcomes such as enrollment in graduate school (Weiler 1991; Weiler 1994; Fox 1992; Monks 2001; Millet 2004; Kim and Otts 2010; Malcolm and Dowd 2012; Zhang 2013; Choi 2014; English and Umbach 2016). The findings have been mixed because of differences in the data sets used, research methods employed, and questions studied (Millet 2004; Dowd 2008; Malcolm and Dowd 2012; Zhang 2013). The majority of studies found that undergraduate debt or borrowing had little or no significant effect on the decision to enroll in graduate school (Weiler 1991; Fox 1992; Weiler 1994; Monks 2001; Millet 2004; Choi 2014; English and Umbach 2016). Other studies report either insignificant effects or some negative effects of undergraduate debt on the subsequent enrollment in graduate school that depends on the

specific characteristics of college graduates (Perna 2004; Malcom and Dowd 2012; Zhang 2013). Choi (2014) provides a succinct review of some of this research literature.

A few studies have investigated the effects of undergraduate debt on decisions related to household or family formation, but these results too are often mixed. Houle and Berger (2015) investigated whether student loan debt contributes to declining homeownership among young adults and found only a slight negative association between undergraduate debt and homeownership. They concluded that what was more important were economic conditions and factors affecting the transition of young adults to adulthood. Mezza et al (2016), by contrast, using an extensive national data set, reported that a 10 percent increase student loan debt was associated with a 1 to 2 percent drop in homeownership five years after college graduation.

In addition, student loan debt may affect marriage according to some studies, but not others. Bostick and Estacion (2014), using 1992-93 B&B data, found that an increase of student loan debt was related to a decline in the probability of marriage for female college graduates, but not for male college graduates. Aldo (2014) reported that young women with student loan debt, but not young women without debt, were more likely to delay cohabitation and marriage. Gicheva (2016) found that the amount of accumulated debt was associated with a lower probability of marriage for college graduates who registered for the Graduate Management Admissions test. In contrast, Zhang (2013) reported no effect of student loan debt on whether college graduate married within four years of graduation.

A related household or family formation decision is whether to have children. Baum and O'Malley (2004) present results from financial aid surveys from 1997 to 2003 showing that as student loan debt rises there is an increase in respondents reporting delaying both marriage and having children. Nau, Dwyer, and Hodson (2015) investigated the relationship between student

loan debt and family formation and found that high levels of undergraduate debt may affect fertility among young women.

Other variables, either in conjunction with undergraduate debt or separate from it, have been used to control for or explain the likely effects on different life decisions related to employment, further education, and household formation. These variables typically include demographic factors such as gender, race and ethnicity, and also a range of other variables (e.g., Monks 2001, Minicozzi 2001; Millett 2003; Perna 2004; Price 2004; Kim and Eyerman 2006; Dowd 2008; Rothstein and Rouse 2011; Malcolm and Dowd 2012; Bozick and Estacion 2014; Houle and Berger 2015; and Mezza 2016). The results show that one best variable specification does not exist for investigating these life choices and the selection of variables in estimated equations will often differ based on the availability of data and the questions addressed in a study.

This study adds to the above literature in several ways. First, the study is comprehensive in the sense that it covers the analysis of choices or decisions in three areas—employment, further education, and household formation—rather than focusing on one type of choice or decision as is typically the case with other studies. The variable specification also is standardized across all the decisions evaluated so the results are comparable for interpretation. Second, a number of studies used previous versions of the B&B data set (e.g., 1992-93 undergraduate sample and/or 1997 follow-up) to investigate employment, educational, and household decisions after college graduation (Millett 2003; Perna 2004; Price 2004; Zhang 2013; and Bozick and Estacion 2014; English and Umbach 2016). This study takes advantage of the most recent B & B restricted-use data set (2007-2008 college graduates, 2009 follow-up interview, and 2012 follow-up interview) that was not released until 2015. This data set provide a nationally representative sample of college graduates for the analysis.

Other differences with the previous literature are worth noting. The analysis of the effects of student loan debt divides that debt into different levels to estimate the possible non-linear effects as has been done in some studies (e.g., Monks 2001; Perna 2004; Price 2004; Millett 2004). A number of other studies estimate the effects of total debt on the enrollment decision (e.g., Kim and Eyermann 2006; Rothstein and Rouse 2011; Zhang 2013; Bozick and Estacion 2014; Houle and Berger 2015; Mezza et al 2016), but what may be more influential or revealing is how the probability of a decision changes as the level of student debt increases.

Furthermore, the set of control variables includes typical demographic variables such as gender, race, and ethnicity, as has been used in most studies, but it incorporates a unique set of variables to control for the academic achievement or undergraduate record of college graduates (average salary of the major, GPA, and course credits). Velez and Woo (2017), in a descriptive study of student debt using the 2008 B&B data, found differences in debt levels among various college majors. Some previous studies have used majors or field of study as controls (e.g., Harrast 2004; Price 2004; Kim and Eyermann 2016; Bozick and Estacion 2014). The effects, however, of major or field of study on student loan debt or decisions are difficult to evaluate in a multivariate model because the interpretation depends on the omitted reference group. Instead of major, this study takes advantage of the transcript data in the B&B survey to tabulate the course credits earned in different subject areas. Emerging research shows that the number and type of course credits can influence financial behavior, such as the size of loans assumed after college graduation and establishing a retirement account (Bosshardt and Walstad 2015; Bosshardt and Walstad 2018). Variables associated with academic achievement or an undergraduate education may be significantly more important than educational debt in its likely influence on employment, further education, and household decisions as will be discussed in the findings to follow.



## **DATA AND MODEL SPECIFICATION**

This study uses the restricted-use B&B data in a longitudinal study conducted by the National Center for Education Statistics (NCES) of the U.S. Department of Education. The B&B data set contains a national representative sample of approximately 17,200 college graduates undergraduates who graduated from U.S. colleges and universities in 2008. The B&B data set includes transcript data about these bachelor's degree recipients, such their major, courses taken, credits earned, and overall GPA. It also includes data on the amount of undergraduate debt owed at the time of college graduation. Two follow-up interviews were conducted of the graduates. One interview was conducted one year later. The only information used from that interview was to construct a variable on the job salary for undergraduate majors. A second interview was conducted four years after graduation that provides data on subsequent employment, further education, and household decisions used for this analysis.<sup>1</sup>

Table 1 shows the definitions of all the variables in the study. The table includes the dependent variables for the analysis and control variables, which cover undergraduate debt in the year of college graduation, academic or college record, demographic factors, and some data on employment and degree completion. The data in table 1 are for the full sample of approximately 16,100 college graduates used for the study. The actual number of college graduates varies for a dependent variable, however, because the data include information from interview, transcript, and financial sources, any one of which may be missing for a graduate. Therefore, the survey analysis for the study uses what the NCES refers to as bookend weights to account for missing information from the various sources. In the work to follow subsamples are analyzed in some cases, but the switch to these subsamples will be noted or explained.

[Insert table 1 about here]

Some further explanation of the variables in table 1 should aid in understanding the analysis to follow. First, the dependent variables were constructed either from responses to follow-up interview questions or activities in which the college graduates reported they were engaged (e.g., enrolled in an advanced degree program). Second, initial undergraduate debt borrowed is divided into five discrete categories to estimate how different levels of debt affect the choices: \$0; \$1-14.9K; \$15.0-\$29.9K; \$30-\$44.9K; and \$50K or more. This categorization allows for the possibility of non-linear effects which would not be possible if only the total debt were used for the analysis. Third, the average salary for the major earned by undergraduates who reported a salary one year after graduation is an indicator of the market competitiveness and perhaps difficulty of the major. For example, the unweighted average salary (rounded) for an education major is about \$30,000 whereas for an engineering major it is about \$47,000. Fourth, undergraduate course credits were normalized to account for differences between semesters and quarters and other institutional characteristics. They were then divided into five discrete categories using B&B course credit codes. The average total number of credits in each category is shown in parentheses: calculus and statistics (4.9), science and engineering (14.9), business (14.5); economics (3.1); and all other course credits (non-STEM, non-business, and non-economics (78.2). The total average of 116 credit hours is a complete enumeration of the number of credit hours these undergraduates obtained for college graduation.

The base specification for each equation for the analysis is:  $A_i = f(B_i, C_i, D_i)$  where  $i$  is the individual respondent.  $A_i$  represents the choices or decisions made by college graduates related to employment, further education, and household formation after completing an undergraduate education.  $B_i$  represents the amount of college debt owed in the year of graduation in the different categories for debt.  $C_i$  controls for the academic record of undergraduates. It covers the average

salary for the type of major completed by a student, overall undergraduate GPA, the number and types of course credits earned during an undergraduate education.  $D_i$  includes demographic variables such as age and variables indicating gender (female), race and ethnicity (Hispanic, Asian, or black), and marital status in the year of college graduation.

## **ESTIMATION AND RESULTS**

A standard set of variables is used in the estimation of each dependent variable. The purpose of this standardization is to provide consistency in the analysis so that the effects of the variables can be compared within and across tables for the three major types of decisions. The estimation is conducted with logit analysis because the dependent variables are all specified as dichotomous (yes, no). The only exception is with the results in table 5 that report the estimates for the effects of the variables on total debt four years after graduation, in which case a tobit analysis is used, and also for the effects of variables on income, for which OLS is used.

### **Employment Decisions**

Table 2 shows the results from the estimations of employment decisions. The first dependent variable comes from a survey item that ask a college graduate if they took a job rather than enrolled in further education because of the cost of education. The results indicate that having undergraduate debt increases the probability of that survey respondents reported taking a job as opposed to enrolling because of the cost of education. That likelihood increases as debt increases, from 10 percent for students with the minimal level of debt to 27.5 percent for student with a high level of debt with no debt being the comparison group. This finding indicates that having debt and an increased amount of debt are likely to push or encourage college graduates to enter the labor force upon graduation. It is consistent with findings from past research and may well be due to risk

aversion for assuming more debt for further education or borrowing constraints from existing undergraduate debt (Minicozzi 2001; Rothstein and Rouse 2011; and Choi 2014).

[Insert table 2 about here]

Another apparent incentive for college graduates to go to work rather than continue their education is the average salary for their major. Here the results are quite revealing and contradictory to what might be expected. The results show that the *lower* the average salary of the major, the more likely college graduates report taking jobs rather than continuing their higher education because of the financial cost. This outcome perhaps occurs because undergraduates with majors that have lower average salaries anticipate fewer long-term financial or personal benefits from investing more time in higher education and see few reasons to assume more debt or spending to pay for that higher education. In this case the opportunity cost of enrolling in additional higher education is perceived to be relatively high compared with the immediate benefit of gainful employment, even if the salaries or wages for undergraduates with certain major are lower than average. The findings are consistent with prior research showing an inverse relationship between educational debt and salaries (Price 2004) and also with research showing undergraduates taking jobs with low prospects for long-term wage growth (Minicozzi 2003) or higher salary jobs instead of lower-paid public service jobs when having to pay off student loan debts (Rothstein and Rouse 2011).

The results for undergraduate GPA are similar in effect to the average salary of the undergraduate major. College graduates who showed lower academic achievement are more likely to report taking a job rather than continuing in higher education because of the financial cost. Such college graduates likely struggled to complete their undergraduate education or may have less interest in obtaining more higher education and paying for it. A lower GPA also is a signal that

they may not have the necessary skills or ability to be successful in obtaining an advanced degree (English and Umbach 2016).

A few demographic variables are statistically significant and worth noting. Blacks compared with whites and Hispanics compared with non-Hispanics show a higher probability of reporting that they took a job rather than enrolled in further education after college graduation because of the financial cost. These outcomes may be due to socio-economic factors such as having fewer financial resources to continue in higher education, finding job prospects more attractive, being the first college graduate in a family (see Perna 2004, Price 2004, Malcolm and Dowd 2012 and English and Umbach 2016 for studies that focus on the likely effects of these demographic factors to the counterpart to the taking the job decision, which is to enroll in further education).

Similar results for taking a job, undergraduate debt, the average salary of an undergraduate major, and overall GPA show in a related survey item that asked college graduate if they took a less desirable or out of field job after college graduation. It is reasonable to assume that college graduates with undergraduate debt may want to begin working to pay for that debt as soon as possible after graduation and thus are more willing to accept less desirable jobs or jobs outside of a major or field of study. That willingness to take a less desirable job or an out of field job appears to increase with the level of debt, from 8.6 percent to 25.1 percent as compared to having no debt. The likelihood for positive response at the upper end of the debt spectrum for this desirability item is about the same as the negative response for the same level of debt for the job taking item (25.1 versus 27.5 percent). It should be noted that these are marginal effects, and the mean of taking a less desirable job was higher than the mean of not enrolling (38.9 vs. 29.7). Undergraduates who earn majors that have less market appeal and show a relatively lower level of academic achievement (GPA) also may have fewer job opportunities to consider, and therefore must settle

for whatever is available when offered in a job, even if it is outside of their major or academic and personal interest.

A few demographic characteristics, such as age, marital status and race, appear to influence thinking about the job market and the willingness to accept less desirable or out of field jobs. Maturity appears to make a difference. Older college graduates and married college graduate are significantly less likely to take a less desirable job or work outside of their major or field of study. Conversely, black college graduates are more likely to do so. Some likely reasons for this last outcome are differences in income and economic conditions affecting blacks and whites in labor markets that make difficult to find the most rewarding work (Daly, Hobijn, and Pedtke 2017).

Undergraduate debt seems to affect how much people are willing to work. Undergraduates with debt state that they work more than desired. The propensity to give such a response increases with each level of debt, from 8.6 to 27.2 percent. A lower average salary of the college major, and a lower the overall college GPA, increases the propensity for a respondent to state they are working more hours than desired. Nevertheless, undergraduate education appears to have a positive influence in certain cases. Students who earn more calculus or statistics credits, or more economics credits, while undergraduates (which may be a proxy for quantitative academic ability) are less likely to report working more hours than desired. As for demographics effects, blacks are significantly more likely to express viewpoint that they are working more hours than they prefer, perhaps because of they earn less income after college graduation (see table 5).

### **Further Education Decisions**

Table 3 presents the results from the estimations for whether college graduates enrolled in some type of further education (e.g., bachelor's or associate's degree, master's degree, or doctoral degree) after receiving their undergraduate degree. Separate estimates also were calculated

master's or doctoral degrees and reported in table 3 because of the importance of enrollment in graduate education, but the differences for these separate categories with the overall enrollment results were minor, so for brevity, only the combined results for enrollment in any type of further education are discussed.

[Insert table 3 about here]

For this decision, undergraduate debt, regardless of the level, did not appear to dissuade these enrollees from pursuing more higher education upon graduation from a college or university regardless of the type of degree sought. This result is consistent with the majority of the past findings on the enrollment decision (e.g., Choi 2014). Presumably college graduates who have made the decision to apply to graduate school, or to obtain another bachelor's degree, and subsequently do enroll, have already made a decision that likely accepts whatever undergraduate debt they have accrued, and they expect net benefits from this investment in further education.

What does appear to dissuade these college graduates from enrolling in further education was a key variable related to their undergraduate education: the average salary for the undergraduate major earned. Undergraduates with a lower average salary for their college majors appear more likely to enroll in more higher education. The outcome is in contrast to the finding reported in table 2 showing that students with a lower average salary for their majors are more likely to report taking a job rather than enrolling in more higher education because of cost. The likely reason for this outcome is that the dependent variable in table 2 asks if they took a job because of the cost incurred, which probes their motivation. The dependent variable in table 3 reports whether they had enrolled in further education without probing for motives.

A breakdown of the approximate average salaries of the major based on the intersection of the two dependent variables is revealing: (1) enrolled and did not report taking a job because of

education cost (\$32,200); (2) enrolled and reported taking a job because of education cost (\$31,300); (3) never enrolled and did not take a job because of education cost (\$34,800); and (4) never enrolled and did take a job because of education cost (\$32,500). In general, college graduates who enrolled in further education had lower average salaries for their majors (\$32,200 or \$31,300) than those college graduates who never enrolled (\$34,800 or \$32,500). Those college graduates who reported taking a job because of education costs had lower average salaries for their majors (\$31,300 or \$32,500) compared with those who did not report taking a job because of education cost (\$32,200 or \$34,800). For the enrollment situation, the idea of opportunity cost prevails. Higher salaries for an undergraduate major lure college graduates to take jobs. As for the question of whether debt played a role, those with lower salaries prospects are more likely to report being encouraged to take a job rather than enrolling because of education costs.

Overall GPA of students plays a more predictable role. The higher the undergraduate GPA, the more likely college graduates are to obtain more higher education. This finding was expected because overall GPA provides an estimate of academic achievement and ability, and is likely predictive of future success in higher education (English and Urbach 2016). Undergraduates with higher GPAs also are often encouraged by their faculty mentors to pursue more higher education rather than taking a job when faced with that career or education decision. In addition, good students are more likely to receive graduate education scholarships, thus lowering the cost of enrolling in graduate school. This finding about the positive effects of overall GPA on enrollment in further education is consistent with its negative mirror image in table 2, namely that students with a lower overall undergraduate GPA are more likely to take a job instead of enrolling in more education after college graduation because of education cost.



Other transcript variables reveal who is more likely to enroll in further education after college graduation. College graduates with more calculus or statistics credit hours, and also more science or engineering credit hours, are more likely to enroll in further education. Courses in calculus, statistics, the sciences, and engineering are among the most challenging courses in an undergraduate curriculum. The more credits undergraduates earn in these course, the better the signal to admission officers and graduate committees that these undergraduates are sufficiently prepared for or capable of future academic success, especially in more quantitative subjects.

Age and household status seem to affect enrolling in further education in predictable ways. Undergraduates who are younger at the time of their graduation are more likely to pursue further education than older college graduates. The outcome likely occurs because younger students who enroll in further education have fewer competing job opportunities, or have fewer outside interests or other responsibilities compared with older students. College graduates who are married are less likely to pursue more higher education probably because they have more family responsibilities and may need to earn a higher income now rather than invest time and money in further education.

The one anomaly in the enrollment results is with race and ethnicity. Blacks are more likely to report taking a job (table 2) and also more likely to enroll in more higher education (table 3) relative to whites. Why this split occurs is a mystery. It may be an artifact of the other control variables in each estimation. Once those variables are accounted for, especially the key ones in table 2 for debt, average salary of the major, and GPA, and in table 3 for the average salary of the major, GPA, and particular course credits, then the decisions of blacks gets split—some decide to take a job because of the education cost and others decide to enroll in more education based on their financial or personal circumstances. For Hispanics, relatively to whites, their financial or

personal circumstances appear to affect the job decision, as they are more likely to report taking a job because of education cost (table 2), but it does not affect the enrollment decision (table 3).

The enrollment analysis now turns to those just those students sought more higher education to earn a master's degree (30% of college graduates, or about 4,500 in the sample). The reason for this more limited focus is that the B&B survey only has four-year follow-up data. Students pursuing a doctorate would be much less likely to have completed their degree in that time frame (Kim and Otts 2010). The sample of students working on another bachelor's degree was too small for conducting such a breakdown analysis. Most students who enrolled in a master's degree program, however, would have time to complete their degree within those four years.

Table 4 reports the results for the sample of college graduates who enrolled in a master's degree program *and completed it* (column 2). If only total undergraduate debt is considered instead of the breakdown of debt into different levels, it would show an overall negative effect of debt on completion of a master's degree. This overall result, however, would be misleading because the negative effect of undergraduate debt on master's degrees is substantially non-linear. Undergraduate debt does affect completion of master's degrees, but only for the college graduates with the most extreme amount of debt ( $\geq \$45,000$ ) relative to college graduates without any debt. The debt effect at the highest level of debt, however, appears to be relatively minor because it reduce the likelihood of not completing a master's degree by only 7.2 percent.

[Insert table 4 about here]

Aspects of an undergraduate education matters for the completion of master's degrees, but not in the same way as they affect the enrollment decision. Whereas the average salary of the undergraduate major appears to influence enrolling in further education, it had no significant effect once college graduates enroll and complete master's degrees. In contrast, overall undergraduate

GPA appears to positively influence both the enrollment and completion decisions. Each point increase in a GPA increases the likelihood of completing a master's degree program by 9.6 percent. In this respect, undergraduate record appears to matter even for success in later higher education as reported in other research (English and Umbach 2016).

None of the demographic variables appear associated with enrolling and completing master's degrees other than age at the year of obtaining an undergraduate degree. Those college graduates who are younger are more likely to complete master's degrees. Again the reasons for this outcome are likely due to younger college graduates having fewer outside commitments related to a family or lifestyle than older college graduates.

The one specification change to this master's completion equation was to add two dummy variables to capture the effects of time to earn the master's degree. What is revealing, although not unexpected, is the probability of completing the master's degree in different time periods. College graduates who begin their masters within two years of earning an undergraduate degree are 30.7 percent more likely to report finishing (four years later) than those who began the graduate studies later. Those college graduates who began within a year of their graduation are 47.7 percent more likely (the total of the two marginal effects).

Additional estimation was conducted for those students who quit pursuing a master's degree within the four years as shown in column 4 of table 4. The effect of undergraduate debt was positive, but insignificant in this decision regardless of the amount of debt. More important was the effect of the undergraduate GPA, which indicated that each point drop in a GPA was associated with 10.2 percent increase in the likelihood of quitting a master's degree program. This result for effect of negative effect of GPA on quitting a master's degree program is consistent with the result for the positive effect of higher GPA on completing a master's degree program.

## **Debt and Income Consequences of Further Education**

The decision to enroll in further education is not without additional cost. A significant portion of college graduates who continue their higher education assume more debt to finance that further education compared with what they owed at the time of their college graduation. In our B&B sample, about 38 percent of college graduates enrolled in a further degree program at some time in the four years after their college graduation. About 40.6 percent of college graduates with no debt enrolled in a degree program, but only about 37.0 percent of those college graduates with student loan debt enrolled (with a debt equal to about \$25,000 on average). Of those who had enrolled and who did not borrow as an undergraduate, 38.6 percent owed student loan debt four years later. The average debt owed was about \$26,000. For those college graduates who enrolled in further education and had existing undergraduate debt, 92.2 percent still owed debt four years later. The average debt still owed was about \$68,000.

The first column of results in table 5 shows the tobit estimates for those college graduates who enrolled in further education and had student loans that they owed four years after graduation. The base set of variables in the tobit model are the same as in the previous equations. The variables added to the specification include a set of dummy variables to control for the type of further education in which a student is enrolled after college graduation (bachelor's or associates degree; master's degree, or doctoral degree) compared with not being enrolled in any degree program (but not certificates as degree programs). Also included in the specification are variables to control for employment conditions during those four years, such as being unemployed (in months) and being out of the labor force (in months).

[Insert table 5 about here]

The major finding from this analysis is that additional debt owed four years after graduation increases, but in different amounts depending on the type of further education college graduates pursues. Relative to students who are not enrolled, the debt level increases by an average of \$15,057 for another bachelor's or associate's degree, \$33,452 for a master's degree, and \$100,713 for a doctoral degree. Of course these estimates do not control for the discipline or subject matter for the degree. Some advanced master's degrees such as an MBA can be quite expensive and may skew the average estimates upward. The cost for doctoral degree, such as those for medicine, law, and more quantitative subjects, also can significantly increase and skew the average upward. Nevertheless, the overall results provide a rough estimate of the additional debt burden that college graduates assume to finance further education. That amount is substantial four years after college graduation, especially for masters and doctoral students. In the case of doctoral students, the full debt costs are likely to be understated because many doctoral students do not complete their degree in approximately four years (only 42.7 percent did so), which was the date of the second interview for this B&B sample.

The characteristics of college graduates owing debt four years after graduation likely influences the assumption of debt. The effects of these characteristics are quite similar to the findings reported for the analysis of the decision to taking a job (table 2, column 2) or enrolling in further education (table 3, column 2). For many college graduates the decision to enroll in further education is a decision to assume more debt on top of what might be owed at the time of college graduation, so it should not be surprising that those college graduate with more undergraduate debt who enroll in further education have more debt that they owe four years later. Each debt category represents a \$15,000 increase in undergraduate debt owed. The coefficient for the first debt category show an increase of \$54,683 in total debt four years later, and thereafter each debt

category increases by about \$24,000 to \$25,000. The constant of -48.98 in table 5 (column 2) means that the absolute level of debt is not as high as an initial examination of the coefficients might indicate. For example, the average debt of college graduates who enrolled in a master's degree program with initial debt of \$1-\$14.9K was \$33,000.

Other student characteristics moderate the amount of debt after college graduation. If the average salary for the undergraduate major earned is low, those college graduates assumed more debt in four years, presumably because they obtain less financial aid for further education than college graduates with more competitive undergraduate major or have jobs offering less compensation if they should work at during their further education. Undergraduate achievement also likely affect entry into an advanced degree program and the assumption of more debt. Students with fewer calculus or statistics credits (a proxy for academic ability or achievement) accumulate more student debt four years later probably because they have more difficulty obtaining tuition assistance or graduate student support for the desired advanced degree and borrow funds to finance further education. By contrast, students with more science and engineering credits are more likely to assume more debt, probably because they assume that further education is a good investment, especially in more quantitative subjects or because further education in the sciences and engineer is more expensive. Racial factors also appear to influence the assumption of debt. Asians relative to whites owe \$9,562 less in debt and blacks relative to whites owe \$11,897 more.

It also is possible to estimate the effect of completing further education or an advanced degree on income four years after college graduation. This equation (column 3) specifies income as a function of completing another degree and controlling for the base specification of variables plus several employment variables (months unemployed or out of the labor force). The main result for the different types of degrees completed shows an increasing positive effect from investing in

further education. At the lower end of the income contribution is further education to obtain another bachelor's degree or an associate's degree. It adds \$3,048 to annual income. The income effect for completing a master degree (\$4,789) increases income relative to the bachelor's degree by adding \$1,784 to annual income. The doctoral degree, however, outpaces all other degrees because it adds \$17,575 to annual income, or about 5.8 times what another bachelor's or associate's degree contributes annually to income and 3.7 times what earning a master's degree contributes annually to income.

A college graduate's academic record also has a likely effect. Undergraduates who earn a major with a higher overall salary appear to earn a higher income. Demographic factors too seem to explain differences income, with females earning \$5,872 less in annual income than males. As for race and ethnicity, the results show less income earned by blacks (-\$5,904) and Hispanics (-\$3,582) compared with whites. Finally, employment seems to matters because each month unemployed or out of the labor force is associated with about \$700 or 800 less in annual income.

The debt and income results in table 5 can be used to compare the costs and benefits of completing different degrees within the four year period after college graduation. The comparison assumes that the income benefits will accrue annually over time. The debt cost to annual income benefit ratio of another bachelor's or associate's degree is 4.9, indicating that it will require about five years to recoup that debt investment in education. Completion of a master's degree is more costly in terms of the income payback period (7.0 years). The income payback on the doctoral degree (5.7 years), or about 1.3 years less than the masters.

### **Household Decisions**

Other life decisions are explored in this section to provide breath to the analysis and to check for the robustness of the other findings that already have been reported. Three household

decisions are analyzed, one related to the accumulation of household assets (real estate), a second about forming a joint household relationship (marriage), and a third about family formation (having children). The results are reported in table 6.

[Insert table 6 about here]

The B&B survey included an item that asked the respondents if they delayed buying a house because of the cost of higher education. The results from a logit analysis reveals that many of the variables apparently affecting whether a college graduate takes a job instead of enrolling in further education because of the education cost (table 2) have similar effects on home buying (table 6). For example, the greater the amount of undergraduate debt, the greater the likelihood that a respondent reported delaying home buying, from 9.2 percent for the lowest level of debt to 28.5 for the highest level of debt. The findings are consistent with research reported in a national analysis by Mezza et al. (2015). The likely reasons are fairly obvious. A real estate purchase to obtain an asset often requires assumption of a mortgage loan. College graduates already burdened with the financial liability of undergraduate debt are less likely to have the financial resources to qualify for mortgages and purchase a home.

Undergraduate academic records that are more competitive for future academic work, such as obtaining a major that has a higher average salary relative to other majors and earning a higher overall undergraduate degree GPA, appear to contribute reduce the chance of reporting delays in home buying or asset accumulation. Presumably, those who are likely to be earning more and who have done well academically are less likely to find themselves constrained by debt and they may be less risk averse because they see better prospects for their financial future.

The propensity to delay home buying appears related to demographic factors. Those undergraduate who were married at the time of college graduation are significantly less likely to



report delaying home buying, probably because they were already down that path of life at time of college graduation. Also, undergraduates who were younger when they earned their degree are more likely to report delaying home buying, presumably because they are less mature for handling real estate responsibilities and less interested in owning a fixed and illiquid asset. As for race and ethnicity, both blacks and Hispanics relative to whites report are more likely to report delaying home buying, which may be related to weaker prospects for obtaining a job and lower income when working (table 5).

The B&B survey contained a question that asked the respondents if they delayed getting married because of the cost of higher education. The signs and significance of the variables in this equation are almost identical to those found with the results for the home buying decision and even the job-taking decision (table 1). More undergraduate debt is associated with an increased likelihood of delaying marriage by 5.3 percent at the lowest level of debt to 16.1 percent at the highest level of debt. The general result is consistent with previous research (Addo 2014; Bozick and Estacion 2014; and Gicheva 2016). The likely reasons are only speculative, but probably relate to economic concerns. Undergraduate debt is a burden that is brought into a marriage and can adversely affect joint household finances. Just as the level of undergraduate debt appears to push college graduates into the job market or to delay home buying until household finance conditions improve, so to it likely discourages college graduates from forming relationships and households through marriage because of the short-term and long-term financial burden from undergraduate debt. Interestingly, the debt burden tends to impact the financial decision of buying a home more than the relatively non-financial decisions of marriage (or having children) at each level of debt.

As for the academic record of undergraduates, it too appears to affect the marriage decision. College graduates who obtained a major with a higher average salary relative to other majors and

earned a higher overall undergraduate degree GPA are less likely to report delaying marriage. Again the reasons for this outcome is similar to the home buying decision. Undergraduates with a better academic record may be less debt constraint or less risk adverse because they expect a improved financial circumstances in the future.

A few demographic factors appear to affect the marriage decision, but they are same as they are for the home buying decision. College graduates who were married at graduation are significantly less likely to report a delay getting married since they obviously already have married. Students who were younger when they earned their degree are more likely to report a delay in marriage, most likely because of maturity factors and less time to find a suitable marriage partner. Relative to whites, both blacks and Hispanics are more likely to report delaying home buying, which again are probably related to more difficult financial circumstance affecting employment and income.

One other life decision is worth considering because it too related to household formation and that is whether a couple delays having children because of the financial cost of higher education. The signs and significance of the variables in this equation too are similar to those found with the results for the two other household formation decisions. More undergraduate debt is associated with an increased likelihood of delaying having children by 4.4 percent at the lowest level of debt to 18.6 percent at the highest level of debt, which is about the same effects of debt on delaying marriage. This likely effect is again consisted with the limited research on this topic (e.g., Nau, Dwyer, and Hodson 2015).

The academic record of undergraduates appear to affect the having children decision in the same way it affects the marriage decision. College graduates who obtained a major with a higher average salary relative to other majors and earned a higher overall undergraduate degree GPA are

less likely to report delaying having children. The direction of the effects of demographic factors for delaying having children also are the same as those for delaying marriage: higher among younger adults, blacks, and Hispanics.

## CONCLUSIONS

The findings from this study suggest that debt to finance an undergraduate education affects life decisions in predictable and unpredictable ways. One predictable finding is that undergraduate debt appears to encourage or push college graduates into taking a job after graduation, taking a less desirable job or one outside their field of undergraduate study, and also to work more hours than desired. The extent of the encouragement or push is likely related to the amount of undergraduate debt. College graduates with a minimal level of debt (less than \$15,000) were only about 9-10 percent more likely to report taking a job, taking a less desirable job, and working longer hours, but those college graduates with the highest levels of undergraduate debt were about 25-27 percent more likely to supply those job-related responses. A likely reason for this outcome is that college graduates with student loan debt, especially those with high levels of debt, are borrowing or credit constrained and thus must balance their finances. They also may be risk averse for assuming more debt even if it was available and prefer to obtain a job to pay off that debt.

An unexpected finding is associated with the average starting salary for the major. The results show that the *lower* the average salary of the major, the more likely college graduates report taking jobs, taking less desirable jobs, and working more because of the cost of higher education. These results probably occur because college graduates with less marketable majors expect fewer long-term financial or personal benefits from investing more time or money in higher education. In this case obtaining more higher education is likely perceived to be relatively more costly compared with the immediate benefit of gainful employment, and perhaps paying down

undergraduate debt, even if the starting salaries for some majors are lower than average. The signals from an undergraduate GPA probably reinforce this decision because college graduates with lower GPAs are less likely to be good candidates for further education, and thus are more likely to enter the workforce and take less satisfying or rewarding jobs. The general point is that undergraduate college record and decisions matter for the likelihood of entry into the labor force and these factors together with undergraduate debt influence job market decisions.

Undergraduate debt, however, does not appear to affect enrollment in further higher education such as for a master's or doctoral degree, a finding which is consistent with the majority of past studies (e.g. Choi 2014). Here again the likely reason for this outcome is that the undergraduate academic achievement or record of college graduates may be more important in influencing the enrollment decision. College graduates who had a higher overall undergraduate GPA are more likely to enroll in further education because they have a higher probability for success in future academic studies. In this case, the cost-benefit calculation from an investment in further education is likely to weigh positive side so undergraduate debt, regardless of the amount, is probably not a factor affecting the enrollment decision.

Borrowing and debt for an undergraduate education, however, seems to affect college graduates in other life decisions related to household formation. College graduates with undergraduate debt are more likely to report delaying buying a home, getting married or having children because of the cost of higher education. The percentages rise when comparing the likely effects at the lowest and highest levels of debt as compared to no debt, from 9 to 28.5 percent for delaying buying a home, from 5 to 16 percent for delaying marriage, and from 4 to 18.6 for delaying having children. Academic record also influences these life choices about household or family formation. College graduates with higher GPAs and also ones who earn majors with higher

average starting salaries than average are less likely to delay these decisions presumably because they expect a better financial future.

Previous research focused on the effects of undergraduate debt in different life decisions and reported contradictory results. As for the enrollment decision, this study found evidence that undergraduate debt did not appear to be all that influential, a result which is consistent with majority of findings reported previous studies. Undergraduate debt, however, appears to have a more important effect in encouraging or pushing college graduates into the labor market and in taking less desirable jobs, and working more hours than desired. At the same time undergraduate debt appears to delay decisions related to household and family formation. Nevertheless, in these life decisions undergraduate debt is only part of the explanation. What may be equally or more important than undergraduate debt (certainly in the case of the enrollment decision) is the academic record of college graduates, as measured by the average salary of the major earn, overall GPA, or even some case the type of undergraduate credits earned. Academic record too contributes valuable insights about these life decisions.

## NOTES

<sup>1</sup> Four years describe the period for the follow-up survey because at least four years had passed since college graduation. Some respondents, however, because of timing factors did not complete the follow-up survey until 4.5 years, or even 5 years, later.

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TABLE 1: Descriptions of Variables

| Dependent (A)               | Description   | Mean   | S.D.   |
|-----------------------------|---|--------|--------|
|                             | All students experience some financial costs as a result of their undergraduate and graduate education, whether they take out loans, pay for their education in other ways, or spend time on coursework that could have been spent working for pay. As a result of your financial costs for undergraduate and graduate education, have you: |        |        |
| Question:                   |   |        |        |
| Took job                    | Taken a job instead of enrolling for additional education? (Yes/No)   | 0.297  | 0.457  |
| Less desirable job          | Taken a job outside of your field of study, or a less desirable job? (Yes/No)   | 0.389  | 0.488  |
| Worked more                 | Had to work more than desired? (Yes/No)   | 0.340  | 0.474  |
| Delayed home buying         | Delayed buying a home (Yes/No)  | 0.374  | 0.484  |
| Delayed marriage            | Delayed getting marriage (Yes/No)   | 0.217  | 0.412  |
| Delayed children            | Delayed having children (Yes/No)  | 0.287  | 0.453  |
|                             | Enrolled in degree program (Associate, Baccalaureate, Masters, Doctoral) after graduation: (Yes/No)   | 0.382  | 0.486  |
| Enrolled                    |   |        |        |
| Enrolled Bac or Assoc       | Enrolled in associates or baccalaureate program after graduation  | 0.038  | 0.190  |
| Enrolled Doctoral           | Enrolled in doctoral program after graduation   | 0.076  | 0.266  |
| Enrolled Masters            | Enrolled in master's program after graduation   | 0.292  | 0.455  |
| Masters-completed           | Completed a master's degree within four years (Yes/No)  | 0.570  | 0.485  |
| Masters-quit                | Quit a master's degree (Yes/No)   | 0.114  | 0.312  |
| Loans owed+4                | Loans owed four years after college graduation (continuous)   | 30.532 | 49.400 |
| Income+4                    | Income four years after college graduation (continuous)   | 39.150 | 34.037 |
| Debt (B)                    | Cumulative loan amount borrowed for undergraduate education in thousands  | 16.495 | 18.999 |
| Debt\$0                     | Undergraduate debt is \$0   | 0.342  |        |
| Debt\$1K-14.9K              | Undergraduate debt ranges from \$1K to \$14.9K  | 0.197  |        |
| Debt\$15K-29.9K             | Undergraduate debt ranges from \$15K to \$29.9K   | 0.256  |        |
| Debt\$30K-44.9K             | Undergraduate debt ranges from \$30K to \$44.9K   | 0.122  |        |
| Debt $\geq$ \$45K           | Undergraduate debt ranges from greater than or equal to \$45  | 0.083  |        |
| College Record (C)          |   |        |        |
| Major-avg. salary           | Average salary of the major earned by an undergraduate one year after graduation in thousands   | 33.197 | 7.242  |
| GPA-undergrad               | <i>undergraduate GPA calculated from course transcript</i>  | 3.241  | 0.470  |
| Credits                     | <i>Total normalized credits</i>   |        |        |
| C-calculus-statistics       | Calculus or statistics credits  | 4.973  | 6.747  |
| C-science-engineering       | Science or engineering credits  | 14.917 | 20.567 |
| C-business                  | business (not economics)  | 14.542 | 22.343 |
| C-economics                 | economics   | 3.128  | 4.816  |
| C-other                     | all others, but not economics, business, or STEM  | 78.230 | 37.497 |
| Demographics (D)            |   |        |        |
| Age at degree               | age at year earned bachelor's degree  | 25.332 | 6.835  |
| Female                      | Gender: female=1; 0=male  | 0.574  | 0.494  |
| Hispanic                    | Hispanic=1; 0=non-Hispanic  | 0.092  | 0.289  |
| Asian                       | Asian=1; 0=other  | 0.070  | 0.255  |
| Black                       | black or African-American=1;0=other   | 0.104  | 0.004  |
| White                       | white=1; 0=other  | 0.813  | 0.390  |
| Married                     | marital status in year earned bachelor's degree (Yes/No)  | 0.224  | 0.417  |
| Employment                  | <i>(for equations: total loans owed (+4) and income (+4))</i>   |        |        |
| Unemployed                  | months unemployed since college graduation  | 3.177  | 7.164  |
| OutofLaborForce             | months out of labor force since college graduation,   | 7.483  | 13.962 |
| Enrollment                  | <i>(for equation: total loans owed (+4) after college graduation)</i>   |        |        |
| Enroll-associate /bachelors | Enrolled in associates or bachelor's degree after college graduation (Yes/No)   | 0.038  | 0.190  |
| Enroll-masters              | Enrolled in master's degree after college graduation (Yes/No)   | 0.292  | 0.455  |
| Enroll-doctorate            | Enrolled in doctoral degree after college graduation (Yes/No)   | 0.076  | 0.268  |
| Completion                  | <i>(for equation: income (+4) after college graduation)</i>   |        |        |
| Comp-associate/ bachelors   | Completed associates/ bachelor's degree after college graduation (Yes/No)   | 0.018  | 0.132  |
| Comp-masters                | Completed master's degree college graduation (Yes/No)   | 0.167  | 0.373  |
| Comp-doctorate              | Completed doctoral degree after college graduation (Yes/No)   | 0.033  | 0.002  |

TABLE 2: Logit Analysis of Employment Decisions

|                       | Took Job            |                 | Less Desirable Job  |                 | Work More than Desired |                 |
|-----------------------|---------------------|-----------------|---------------------|-----------------|------------------------|-----------------|
|                       | b/se                | Marginal Effect | b/se                | Marginal Effect | b/se                   | Marginal Effect |
| Debt \$1-14.9K        | 0.570**<br>(0.096)  | 0.100           | 0.412**<br>(0.080)  | 0.086           | 0.444**<br>(0.095)     | 0.086           |
| Debt \$15-29.9K       | 0.746**<br>(0.082)  | 0.136           | 0.545**<br>(0.073)  | 0.116           | 0.747**<br>(0.083)     | 0.153           |
| Debt \$30-44.4K       | 1.092**<br>(0.113)  | 0.213           | 0.817**<br>(0.098)  | 0.179           | 1.100**<br>(0.098)     | 0.236           |
| Debt > \$45K          | 1.358**<br>(0.120)  | 0.275           | 1.128**<br>(0.122)  | 0.251           | 1.246**<br>(0.124)     | 0.272           |
| Major-Average Salary  | -0.028**<br>(0.005) | -0.005          | -0.060**<br>(0.005) | -0.013          | -0.019**<br>(0.005)    | -0.004          |
| GPA-undergrad         | -0.571**<br>(0.066) | -0.110          | -0.564**<br>(0.064) | -0.122          | -0.363**<br>(0.067)    | -0.076          |
| C-calculus&statistics | -0.010<br>(0.007)   | -0.002          | -0.003<br>(0.006)   | -0.001          | -0.017**<br>(0.006)    | -0.004          |
| C-science&engineering | -0.003<br>(0.002)   | -0.001          | -0.006**<br>(0.002) | -0.001          | -0.001<br>(0.002)      | -0.000          |
| C-business            | -0.005<br>(0.002)   | -0.001          | 0.001<br>(0.002)    | 0.000           | -0.001<br>(0.002)      | -0.000          |
| C-econ                | -0.001<br>(0.010)   | -0.000          | -0.010<br>(0.009)   | -0.002          | -0.018*<br>(0.008)     | -0.004          |
| C-other               | -0.001<br>(0.001)   | -0.000          | -0.000<br>(0.001)   | -0.000          | 0.001<br>(0.001)       | 0.000           |
| Age at Degree         | 0.010<br>(0.005)    | 0.002           | -0.011*<br>(0.005)  | -0.002          | -0.004<br>(0.006)      | -0.001          |
| Female                | 0.116<br>(0.061)    | 0.022           | 0.054<br>(0.068)    | 0.012           | 0.123<br>(0.070)       | 0.026           |
| Hispanic              | 0.306**<br>(0.111)  | 0.059           | -0.065<br>(0.130)   | -0.014          | 0.047<br>(0.109)       | 0.010           |
| Asian                 | 0.047<br>(0.137)    | 0.009           | 0.176<br>(0.136)    | 0.038           | 0.092<br>(0.140)       | 0.019           |
| Black                 | 0.353**<br>(0.105)  | 0.068           | 0.308**<br>(0.087)  | 0.066           | 0.240**<br>(0.083)     | 0.050           |
| Married               | -0.019<br>(0.093)   | -0.004          | -0.201*<br>(0.080)  | -0.043          | -0.022<br>(0.084)      | -0.005          |
| Constant              | 1.161**<br>(0.320)  |                 | 3.317**<br>(0.307)  |                 | 0.649*<br>(0.322)      |                 |
| N                     | 12,000              |                 | 12,000              |                 | 12,000                 |                 |

Marginal change in probability to right of coefficients. \* p<.05, \*\* p<.01

TABLE 3: Logit Analysis of Enrollment Decisions

|                       | Enrolled            | Marginal Effect | Enrolled Masters    | Marginal Effect | Enrolled Doctoral   | Marginal Effect |
|-----------------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
|                       | b/se                |                 | b/se                |                 | b/se                |                 |
| Debt \$1-14.9K        | -0.145<br>(0.088)   | -0.031          | -0.126<br>(0.097)   | -0.025          | -0.395*<br>(0.170)  | -0.028          |
| Debt \$15-29.9K       | -0.052<br>(0.077)   | -0.011          | -0.008<br>(0.088)   | -0.002          | -0.317*<br>(0.140)  | -0.023          |
| Debt \$30-44.4K       | 0.006<br>(0.098)    | 0.001           | 0.094<br>(0.106)    | 0.019           | -0.321<br>(0.227)   | -0.023          |
| Debt > \$45K          | 0.063<br>(0.108)    | 0.014           | 0.136<br>(0.116)    | 0.028           | -0.372<br>(0.242)   | -0.026          |
| Major-Average Salary  | -0.042**<br>(0.005) | -0.009          | -0.028**<br>(0.006) | -0.006          | -0.073**<br>(0.011) | -0.005          |
| GPA-undergrad         | 0.911**<br>(0.069)  | 0.195           | 0.832**<br>(0.078)  | 0.167           | 2.154**<br>(0.158)  | 0.150           |
| C-calculus&statistics | 0.021**<br>(0.007)  | 0.005           | 0.027**<br>(0.007)  | 0.005           | 0.009<br>(0.012)    | 0.001           |
| C-science&engineering | 0.011**<br>(0.002)  | 0.002           | 0.005*<br>(0.002)   | 0.001           | 0.021**<br>(0.003)  | 0.001           |
| C-business            | -0.004<br>(0.002)   | -0.001          | -0.002<br>(0.003)   | -0.000          | -0.020**<br>(0.006) | -0.001          |
| C-econ                | 0.000<br>(0.009)    | 0.000           | -0.008<br>(0.010)   | -0.002          | 0.024<br>(0.015)    | 0.002           |
| C-other               | 0.001<br>(0.001)    | 0.000           | 0.003*<br>(0.001)   | 0.001           | -0.005<br>(0.002)   | -0.000          |
| Age at Degree         | -0.023**<br>(0.006) | -0.005          | -0.018**<br>(0.006) | -0.004          | -0.149**<br>(0.046) | -0.010          |
| Female                | 0.063<br>(0.071)    | 0.014           | 0.152<br>(0.078)    | 0.030           | -0.537**<br>(0.135) | -0.037          |
| Hispanic              | 0.008<br>(0.109)    | 0.002           | -0.011<br>(0.125)   | -0.002          | 0.173<br>(0.236)    | 0.012           |
| Asian                 | 0.067<br>(0.115)    | 0.014           | -0.059<br>(0.134)   | -0.012          | 0.465*<br>(0.214)   | 0.032           |
| Black                 | 0.791**<br>(0.109)  | 0.169           | 0.763**<br>(0.119)  | 0.153           | 0.669*<br>(0.268)   | 0.046           |
| Married               | -0.341**<br>(0.077) | -0.073          | -0.270**<br>(0.085) | -0.054          | -0.806**<br>(0.226) | -0.056          |
| Constant              | -1.835**<br>(0.313) |                 | -2.658**<br>(0.355) |                 | -3.186*<br>(1.237)  |                 |
| N                     | 12,300              |                 | 12,300              |                 | 12,300              |                 |

TABLE 4: Logit Analysis of Master's Degree Decisions

|                       | Completed Masters   |                 | Quit Masters        |                 |
|-----------------------|---------------------|-----------------|---------------------|-----------------|
|                       | b/se                | Marginal Effect | b/se                | Marginal Effect |
| Debt \$1-14.9K        | 0.143<br>(0.184)    | 0.024           | -0.292<br>(0.27)    | -0.026          |
| Debt \$15-29.9K       | -0.134<br>(0.156)   | -0.021          | 0.285<br>(0.2)      | 0.031           |
| Debt \$30-44.4K       | -0.306<br>(0.206)   | -0.047          | 0.418<br>(0.235)    | 0.047           |
| Debt > \$45K          | -0.481*<br>(0.218)  | -0.072          | 0.021<br>(0.284)    | 0.002           |
| Major-Average Salary  | 0.008<br>(0.009)    | 0.001           | -0.003<br>(0.013)   | 0               |
| GPA-undergrad         | 0.606**<br>(0.16)   | 0.096           | -1.022**<br>(0.193) | -0.105          |
| Age at Degree         | -0.038**<br>(0.011) | -0.006          | 0.032*<br>(0.014)   | 0.003           |
| Female                | 0.09<br>(0.137)     | 0.014           | -0.125<br>(0.164)   | -0.013          |
| Hispanic              | 0.02<br>(0.229)     | 0.003           | -0.143<br>(0.292)   | -0.015          |
| Asian                 | 0.242<br>(0.307)    | 0.038           | -0.379<br>(0.378)   | -0.039          |
| Black                 | 0.022<br>(0.184)    | 0.004           | -0.129<br>(0.22)    | -0.013          |
| Married               | -0.235<br>(0.177)   | -0.037          | 0.357^<br>(0.194)   | 0.037           |
| C-business            | -0.003<br>(0.004)   | 0               | -0.004<br>(0.005)   | 0               |
| C-econ                | 0.004<br>(0.016)    | 0.001           | -0.018<br>(0.018)   | -0.002          |
| C-calculus&statistics | 0.009<br>(0.011)    | 0.001           | -0.024<br>(0.016)   | -0.002          |
| C-science&engineering | -0.007^<br>(0.004)  | -0.001          | 0.011*<br>(0.005)   | 0.001           |
| C-other               | -0.001<br>(0.002)   | 0               | 0.002<br>(0.003)    | 0               |
| MasterInYear          | 1.069**<br>(0.141)  | 0.17            |                     |                 |
| MasterInTwoYear       | 1.937**<br>(0.142)  | 0.307           |                     |                 |
| Constant              | -2.408**<br>(0.738) |                 | 0.402<br>(0.851)    |                 |
| N                     | 3,900               |                 | 3,900               |                 |

Marginal change in probability to right of coefficients.

\* p<.05, \*\* p<.01

TABLE 5: Tobit Analysis of Loans Owed and OLS Analysis of Income

|                              | LoansOwed+4<br>b/se  | Income+4<br>b/se    |
|------------------------------|----------------------|---------------------|
| Enrolled Bac or Assoc Degree | 15.057**<br>(2.646)  |                     |
| Enrolled Masters Degree      | 33.452**<br>(1.594)  |                     |
| Enrolled Doctoral Degree     | 100.713**<br>(5.632) |                     |
| Completed Bac or Assoc. Deg. |                      | 3.048<br>(7.054)    |
| Completed Masters Degree     |                      | 4.789**<br>(1.086)  |
| Completed Doctoral Degree    |                      | 17.575**<br>(3.280) |
| Debt \$1-14.9K               | 54.683**<br>(2.858)  |                     |
| Debt \$15-29.9K              | 78.685**<br>(2.652)  |                     |
| Debt \$30-44.4K              | 104.028**<br>(3.392) |                     |
| Debt > \$45K                 | 129.647**<br>(3.201) |                     |
| Major-Average Salary         | -0.394**<br>(0.121)  | 0.839**<br>(0.082)  |
| GPA-undergrad                | -2.060<br>(1.505)    | 2.270<br>(1.161)    |
| C-calculus&statistics        | -0.711**<br>(0.153)  | 0.049<br>(0.083)    |
| C-science&engineering        | 0.180**<br>(0.048)   | 0.036<br>(0.031)    |
| C-business                   | 0.015<br>(0.046)     | -0.032<br>(0.036)   |
| C-econ                       | 0.089<br>(0.268)     | 0.219<br>(0.144)    |
| C-other                      | -0.007<br>(0.025)    | -0.073**<br>(0.017) |
| Age at Degree                | 0.050<br>(0.106)     | 0.213<br>(0.110)    |
| Female                       | 1.098<br>(1.339)     | -5.872**<br>(0.909) |
| Hispanic                     | 1.948<br>(2.434)     | -3.582**<br>(1.140) |
| Asian                        | -9.562*<br>(4.356)   | 0.469<br>(2.058)    |
| Black                        | 11.897**<br>(2.174)  | -5.904**<br>(1.686) |
| Married                      | -4.791**<br>(1.760)  | 0.891<br>(1.177)    |
| Months Out LF                | 0.410**<br>(0.071)   | -0.738**<br>(0.027) |
| Months Unemp                 | 0.322**<br>(0.075)   | -0.806**<br>(0.043) |
| Constant                     | -48.976**<br>(8.141) | 14.130**<br>(5.126) |
| N                            | 12,300               | 12,300              |

Tobit with lower bound of 0.

\* p&lt;.05, \*\* p&lt;.01

TABLE 6: Logit Analysis of Household Decisions

|                       | Delayed Buy Home    |                 | Delayed Marriage    |                 | Delayed Child       |                 |
|-----------------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
|                       | b/se                | Marginal Effect | b/se                | Marginal Effect | b/se                | Marginal Effect |
| Debt \$1-14.9K        | 0.453**<br>(0.096)  | 0.092           | 0.387**<br>(0.11)   | 0.053           | 0.252*<br>(0.1)     | 0.044           |
| Debt \$15-29.9K       | 0.745**<br>(0.078)  | 0.159           | 0.578**<br>(0.098)  | 0.084           | 0.544**<br>(0.084)  | 0.102           |
| Debt \$30-44.4K       | 1.157**<br>(0.101)  | 0.256           | 0.989**<br>(0.12)   | 0.158           | 0.796**<br>(0.111)  | 0.157           |
| Debt > \$45K          | 1.277**<br>(0.112)  | 0.285           | 1.003**<br>(0.123)  | 0.161           | 0.924**<br>(0.121)  | 0.186           |
| Major-Average Salary  | -0.023**<br>(0.005) | -0.005          | -0.012*<br>(0.006)  | -0.002          | -0.011*<br>(0.005)  | -0.002          |
| GPA-undergrad         | -0.303**<br>(0.059) | -0.065          | -0.310**<br>(0.074) | -0.048          | -0.242**<br>(0.074) | -0.047          |
| C-calculus&statistics | -0.002<br>(0.006)   | 0               | -0.008<br>(0.008)   | -0.001          | -0.012<br>(0.007)   | -0.002          |
| C-science&engineering | 0.004*<br>(0.002)   | 0.001           | 0.002<br>(0.002)    | 0               | 0.003<br>(0.002)    | 0.001           |
| C-business            | 0.001<br>(0.002)    | 0               | 0<br>(0.002)        | 0               | -0.001<br>(0.002)   | 0               |
| C-econ                | -0.022**<br>(0.008) | -0.005          | -0.018<br>(0.009)   | -0.003          | -0.016<br>(0.009)   | -0.003          |
| C-other               | 0.001<br>(0.001)    | 0               | 0<br>(0.001)        | 0               | 0<br>(0.001)        | 0               |
| Age at Degree         | -0.033**<br>(0.005) | -0.007          | -0.023**<br>(0.005) | -0.004          | -0.054**<br>(0.006) | -0.01           |
| Female                | -0.045<br>(0.067)   | -0.01           | -0.052<br>(0.085)   | -0.008          | 0.049<br>(0.075)    | 0.009           |
| Hispanic              | 0.288**<br>(0.1)    | 0.062           | 0.744**<br>(0.135)  | 0.115           | 0.491**<br>(0.098)  | 0.095           |
| Asian                 | -0.154<br>(0.122)   | -0.033          | 0.151<br>(0.137)    | 0.023           | -0.07<br>(0.131)    | -0.014          |
| Black                 | 0.202*<br>(0.1)     | 0.044           | 0.498**<br>(0.094)  | 0.077           | 0.384**<br>(0.083)  | 0.074           |
| Married               | -0.361**<br>(0.079) | -0.078          | -1.654**<br>(0.144) | -0.256          | -0.173*<br>(0.084)  | -0.033          |
| Constant              | 1.490**<br>(0.297)  |                 | 0.381<br>(0.342)    |                 | 1.209**<br>(0.329)  |                 |
| N                     | 12,300              |                 | 12,300              |                 | 12,300              |                 |

Marginal change in probability to right of coefficients.

\* p<.05, \*\* p<.01