THE DETERMINANTS OF STUDENT COLLEGE DEBT

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ABSTRACT

This paper examines the determinants of average college student debt. The data set is derived from U.S. News & World Reports and comprises 196 educational institutions. Regression results indicate the primary determinants of average student debt at an institution are percent of college students with debt, tuition and fees rates, size of the institution, value of the institution's endowment, percent of classes with fifty or more students, the alumni giving rate, and percent of Hispanic students. The most significant single determinant of student average debt is tuition and fees, implying the recent trend of rising tuition and fees are being financed by students via increasing loans.

INTRODUCTION

A college education has long been the path to a better life. A bachelor's degree results in higher average income than non-college graduates. The average U.S. income for a college graduate is $54,444 while an individual with only a high school diploma earns $30,732. College graduates earn 48.5% more than the U.S. median income of $36,660 and those with advanced degrees earn 72.6% more than the median income (BLS: Current Population Survey, 2006). Although the return to higher education has been increasing over time, the price of a college education has also been increasing. Because the premium to higher education is so large and because of growing demands on budgets, state legislatures have decided that students should bear more of the cost of higher education (Ehrenberg, 2006). The result is that the cost of higher education has been shifting to students and financed by the use of student loans. The increased use of debt has led some researchers to question whether too much of the burden has been shifted to students (Baum & O'Malley, 2003 and Baum & Schwarts, 2006).

The purpose of this research is to empirically analyze the determinants of average student debt of college students with a focus on financial, institutional, and demographic variables. This paper is divided into four sections. First, a survey of the related literature is discussed. The second section provides the model specification and variable discussion. This is followed by an empirical evaluation of the determinants of average student debt for 196 educational institutions employing data from the 2005-06 academic year. The final section offers concluding remarks.

SURVEY OF THE LITERATURE

There is very little empirical research in the literature covering the topic of student debt. Most of the related literature is qualitative but not quantitative. Lack of

state funding for higher education is often put forth as the primary reason for rising student debt. With greater demands on state budgets for health care, prisons, and transportation, education has had to fight for funding. Higher education has lost out to other demands and to elementary and secondary education within the education appropriations. Higher education is only 11.5% of general revenue expenditures by state legislatures. This is down from 14.9% in 1990 (National Association of State Budget Officers, 2005). Even states with relatively stable state budgets, support of higher education is increasing slower than expected. Expenditures for Medicare are the most frequently cited reason for not increasing higher education funding (Jones, 2003 and Walters, 2006). When there is more money available for funding, colleges that cater to minorities receive a greater percentage (Fischer, 2006).

While more education leads to higher wages, wage growth has not kept pace with tuition increases at institutions of higher education. Wage growth for white collar occupations has increased at a rate of 3.5% over the last five years and 2.7% over the last decade, which is about half the rate of tuition and fee increases (BLS: National Compensation Survey, 2006). The cost of college tuition and fees has increased at a rate greater than 6% annually for the last two decades. For the last five years, the rate of increase has exceeded 7% annually. In comparison, the overall Consumer Price Index has risen at a rate of less than 3% over the same time periods. In contrast, health care costs have grown at a rate of 4% to 4.5% over the time period, one-third slower than tuition costs (BLS: Consumer Price Index, 2006). In the National Report Card on Higher Education 2006, 43 states received an F for affordability. Only two states, Utah and California earned a C. Five states (Hawaii, Idaho, Minnesota, New Jersey and Washington) earned Ds. All other states earned Fs. The report also found that many students choose cheaper schools instead of schools that they are qualified for and best fit their career goals in a process called trading down (Callan, 2006).

Student aid and grants are important sources of financial assistance for higher education. States are increasing student-aid programs. Appropriations for student-aid programs have grown at a rate of 2.56% annually over the last five years and at an annual rate of 4.4% over the last decade (Fischer, 2006). The rate of growth of student-aid programs is still less than the rate of growth of tuition and fees. Federal grants have stayed steady at 31% to 33% of total grants to students. Institutional grants have fallen from 46% to 42% over the last nine years. Private and employer grants have risen from 12% to 15% of total grants. State grants have stayed steady at 11% to 12% of total grants (College Board: Trends in Higher Education, 2005). Pell Grants are need-based federal grants that had been the starting point for low-income students to attend college. In 1985-86, the maximum Pell Grant would have covered 25% to 30% of the tuition and room and board at a public institution. By 2004-05, the maximum Pell Grant covers less than 15% (College Board: Trends in Higher Education, 2005).

The largest financial change in the funding of student access to higher education has come in the area of loans. Subsidized Stafford loans are loans that must be repaid but the federal government pays the interest while the student is in school. With unsubsidized Stafford loans, the government does not pay the interest. Instead, interest accrues and is added to the total loan balance while the student is in school. PLUS loans are Parent Loans to Undergraduate Students. While the interest accrues on PLUS and unsubsidized Stafford loans, the interest rates are limited by government law. Subsidized Stafford loans have fallen from 54% to 36% of total loans. Unsubsidized Stafford loans have stayed steady at about 32% to 34% of loans.

PLUS loans have increased from 8% to 11%. To compensate for the decrease in subsidized Stafford loans, nonfederal loans have tripled from 6% to 18% over the last nine years (College Board: Trends in Higher Education, 2005). If one looks at the total dollar value of Stafford loans, the total amount in the program has risen. However, the increase is from the number of loans issued not the dollar value of each loan. Parental borrowing is affected by many factors. Cha, Weagley and Reynolds (2005) analyzed the 1992-93 Baccalaureate and Beyond Longitudinal Study. They found that parents borrowed more if the family size was small and if they were college graduates. Increases in home equity encouraged borrowing while the child's age and income reduced parental borrowing. White parents borrowed more than non-white parents. Cha, Weagley, and Reynolds also find that rising tuition and fees increased borrowing while increases in grants decreased borrowing.

The increased use of loans to pay for higher education has resulted in a greater strain on lower income students. Many of the new forms of aid are geared toward the middle-class. The Hope and Lifetime Learning tax credits were created in the 1990s to encourage more families to help support college student children. However, forty-three percent of the education tax credits and 70% of the federal income tax tuition deduction go to families with incomes over $50,000 (College Board: Education Pays, 2005). The tax credits do little for students whose family incomes are too low. The financial strain is viewed as one reason why students from low-income families have lower graduation rates (College Board: Education Pays, 2005). It is not just low-income students that are borrowing more. While 71% of student borrowers from low-income families graduate with student debt, forty-four percent of students from families with incomes greater than $100,000 graduated with student debt. Wealthier families are switching from using savings to loans to pay for college. Students from wealthy families have had the highest growth rate in indebtedness (King and Bannon, 2002).

Mixed in with student loans is the increased use of credit cards by college students and parental borrowing. Some students use loans for school and credit cards for daily living expenses. Credit card debt is more prevalent than student loan debt (National On-Campus Report, 2005). The use of credit cards with student loans increases the total debt burden. This financial burden is a main reason why students drop-out of college. They simply have to go to work (Matz, 2005). Work also forces some students to attend part-time. Of entering freshman, seventy-nine percent of part-time students work while 44.3% of full-time students work (BLS, 2006). Christou and Haliassos (2006) found that students with college educated parents were more likely to work while students from low income families were more likely to use loans. Grants reduced the amount of work and loans proportionally.

One aspect of financial burden is student knowledge about debt. Students are not completely aware of the true cost of borrowing. King and Frishberg (2001) find that 78% of students underestimated the total cost of their loans. Students also overestimated how much they could pay each month upon graduation. Underclassmen were the least likely to understand how much debt they could afford and what the true cost of the debt is.

The ability to repay student loans is having an impact on student bankruptcy and career choices. Over indebtedness is a situation where a household can't afford to make payments on a loan or that the payments put a strain on household choices. The household must choose between making debt payments and other basic expenditures such as health insurance or food. A long held rule is that student debt repayment should not exceed 8% of monthly gross income (Baum & Schwartz, 2006).

Student loan repayment constituted more than 8% of gross income for 48% of borrowers (Baum & O'Malley, 2003). Once the percent of repayment exceeded 17% of gross income, borrowers felt overly burdened by student loan debt. Seventeen percent of respondents fell into this category. Furthermore, 54% of respondents would borrow less if they were to do it again (Baum & Schwartz, 2006). For 2001, the median debt burden for graduates paying on student loans was 6.9% (National Center for Educational Statistics, 2006). The ability to repay debt is a big concern in certain majors, particularly teaching and social work. Swarthout (2006) compared the starting salaries for public school teachers and social workers with average debt repayment for each state. He found that 23% of teachers and 37% of social workers graduate with too much debt to service their loans. Low interest rates have kept the monthly payments on student debt lower than normal (Kelley, 2005). With rates increasing, the debt burden is expected to rise on college gradates. Individuals aged 18-34 have the second highest rate of bankruptcy (Dymi, 2005). The new bankruptcy law does not apply to student loans. Students are still responsible for many student loans even after filing for bankruptcy. Students that do graduate are more likely to choose higher paying initial employment opportunities. However, Minicozzi (2005) found that these jobs have lower wage growth and the choice results in lower total wages.

DATA AND MODEL

The primary source of cross-sectional data employed in this study is the U.S. News & World Reports website (usnews.com). The subscription component of the website not only offers traditional information on several colleges but has recently added student debt information for almost 200 colleges and universities. The general model in this study used to evaluate the determinants of average student debt is comprised of a total of thirteen independent variables from three general categories: four financial variables, five institutional variables, and four demographic variables. The explicit empirical model employed to investigate the determinants of average student debt is specified below as:

$$AVDEBT_i = B_0 + B_1PERCENTDEBT_i + B_2PPGRANTS_i + B_3TUITIONFEES_i + B_4ROOMBOARD_i + B_5SIZE_i + B_6PUBLIC_i + B_7ENDOWMENT_i + B_8LARGECLASS_i + B_9ALUMNIGIV_i + B_{10}FULLTIME_i + B_{11}FEMALE_i + B_{12}AFAMERICAN_i + B_{13}HISPANIC_i + u_i,$$

where AVDEBT is average student debt for an undergraduate after graduation at an institution of higher education, PERCENTDEBT is the percent of students graduating with debt, PPGRANTS is the percent of students receiving Pell Grants, TUITIONFEES is the 2005 rate of institutional tuition and fees, ROOMBOARD is the 2005 estimated room and board expense at an institution, SIZE is the total number of undergraduate students at the institution, PUBLIC is a categorical variable separating public and private institutions, ENDOWMENT is the size of the endowment at an institution, LARGECLASS is the percent of classes offered with more than fifty students, ALUMGIV is the percent of alumni giving to the institution, FULLTIME is the percent of students attending school full-time, FEMALE is the percent of female students at the institution, AFAMERICAN is the percent of African-American students at the institution, and HISPANIC is the percent of Hispanic students at the institution. Several alternative model specifications were considered including control variables for student/faculty ratio, acceptance rate,

institutional ranking, categorical variables for various regions of the country, and freshman retention. Inclusion of these variables into the model affected the standard errors of the coefficients but not the value of the remaining coefficients or they suffer from excessive multicollinearity with variables included in the model. For these reasons they are not included in the final model.

Descriptive statistics for the model variables are presented in Table 1. Average student debt for the data set is $18,367 with a standard deviation of $4,709. Twenty-one institutions have an averaged student debt level above $25,000 including University of Miami, Idaho State University, Duke University, Wake Forest University, University of Notre Dame, Rensselaer University, George Washington University, and Iowa State University. Five institutions have an average student debt level below $10,000. The five represent a diverse grouping of institutions as follows: Princeton University, Harvard University, University of Texas El Paso, University of Hawaii at Manoa, and California Institute of Technology.

TABLE 1
SUMMARY STATISTICS: AVERAGE STUDENT DEBT (2005)

Variable	Mean	Maximum	Minimum	Standard Dev.
AVDEBT	18,367	31,723	4,030	4,709
PERCENTDEBT	55	92	15	13.5
PPGRANTS	23	57	1	9.9
TUITIONFEES	13,845	34,030	2,955	10,833
ROOMBOARD	7,625	12,554	4,155	1,866
SIZE	13,726	37,509	896	8,585
PUBLIC	0.63	1	0	0.48
ENDOWMENT	811,930,000	22,587,305,000	463,000	222,000,000
LARGECLASS	11.4	29	0	6.3
ALUMNIGIV	17	61	3	10.1
FULLTIME	87.2	100	44	10.1
FEMALE	51.8	74	19	9.3
AFAMERICAN	8.6	84	0	9.9
HISPANIC	6.4	75	0	8.2

n = 196

A discussion of the independent variables and their expected impact on average student debt is in order. The four financial variables are PERCENTDEBT, PPGRANTS, TUITIONFEES, and ROOMBOARD. PERCENTDEBT is expected to have a positive impact on average debt as institutions with a high percentage of students with debt are also expected to have a relatively high average debt level.

Howard University is the institution with the highest percentage of graduates with debt at ninety-two percent, while Princeton University has the lowest percent at only fifteen percent. PPGRANTS is expected to have a positive impact on average student debt as an institution with a large student population receiving Pell Grants is also likely to encompass a student body that needs loans to support the educational investment. Idaho State University leads the way with fifty-seven percent of students receiving Pell Grants versus only one percent receiving Pell Grants at Princeton University. The direct financial cost of education via tuition & fees (TUITIONFEES) and room & board (ROOMBOARD) should have a positive impact on average student debt. George Washington University has the data set distinction of having the highest tuition and fees at $34,030 per year versus the low of $2,955 per year at the University of Florida. Room and board expenses reach a high of $12,554 per year at the University of California at Berkley versus a low of $4,155 at Louisiana Tech University. It should be noted that the level of institutional support can affect average student debt. The model does not explicitly take into account the level of scholarship support that each institution provides because the information is not readily accessible. Posted tuition and fees are generally not what students pay.

The five institutional variables are SIZE, PUBLIC, ENDOWMENT, LARGECLASS, and ALUMNIGIV. SIZE is anticipated to have a positive impact on average student debt as large institutions have to spread available financial support across a greater number of students. The University of Texas at Austin is the largest program in the sample with 37,509 undergraduate students versus California Tech as the smallest institution with only 896 students. PUBLIC is expected to have a negative impact on average student debt as partially state subsidized public institutions are expected to be less expensive than private institutions. Sixty-three percent of the institutions in the data set are public institutions. ENDOWMENT, LARGECLASS, and ALUMNIGIV are expected to have a negative impact on average student debt as large institutional endowments and high alumni giving rates provide direct funding for student education beyond out-of-pocket expense, while large classes of fifty students or more spreads the cost of education across numerous students. The largest endowment in the data set is over $22 billion at Harvard University, while Princeton University has the highest alumni giving rate of sixty-one percent. The University of California at Davis has the highest percentage of classes fifty or students at twenty-nine percent. The alumni giving rate is a limited measure because alumni giving can be used for a wide array of things other than student financial support.

The four demographic variables are FULLTIME, FEMALE, AFAMERICAN, and HISPANIC. FULLTIME is expected to have a positive impact on average student debt as full-time students are limited in the amount of time they can work and are more likely to rely on student loans to pay for educational expenses. Several institutions including Harvard University, Cornell University, California Tech, and Boston College report 100 percent of the undergraduate student body at full-time status versus only forty-four percent at the University of Missouri at St. Louis. FEMALE, AFAMERICAN, and HISPANIC are expected to have a negative impact on average student debt based on the theory that more sources of financial support are available to minority student groups. Nova Southeastern University and Adelphia University have the highest percentage of female students at seventy-four percent, Howard University has the highest percentage of African-American students at eighty-four percent, and University of Texas at El Paso has the highest percentage of Hispanic students at seventy-five percent.

TABLE 2
DETERMINANTS OF AVERAGE STUDENT DEBT (2005)

Variable	Full Model Coefficient	(t-statistic)	Reduced Model Coefficient	(t-statistic)
Intercept	8420.581	(1.62)	12580.28	(6.87)*
PERCENTDEBT	95.2738	(4.20)*	93.8699	(4.29)*
PPGRANTS	-6.4893	(-0.17)		
TUITIONFEES	0.27941	(4.24)*	0.2333	(6.51)*
ROOMBOARD	-0.1516	(-0.74)		
SIZE	0.10731	(2.16)*	0.11271	(2.36)*
PUBLIC	1091.99	(0.64)		
ENDOWMENT	-0.000042	(-2.75)*	-0.000041	(-2.76)*
LARGECLASS	-189.668	(-2.93)*	-177.563	(-3.06)*
ALUMNIGIV	-72.0415	(-1.85)**	-76.0415	(-2.01)*
FULLTIME	39.0927	(1.14)		
FEMALE	17.7984	(0.52)		
AFAMERICAN	4.1782	(0.13)		
HISPANIC	-88.6273	(-2.35)*	-102.0051	(-3.10)*
R Square	0.4143		0.4071	
Adjusted R Square	0.3724		0.3850	
F-Value	9.902		18.439	

Notes: *$p<.05$, **$p<.10$, and $n = 196$.

DETERMINANTS OF AVERAGE STUDENT DEBT

The estimated empirical relationship between the explanatory variables and average student debt is presented in Table 2. Two model specifications are presented. The first is a linear specification offering results from the full thirteen independent variable model. The second specification employs a reduced model where insignificant variables are eliminated via a stepwise elimination process in order to reduce potential multicollinearity among the numerous independent variables. None of the independent variables have a correlation in absolute value higher than 0.71 (TUITIONFEES and PUBLIC has the highest correlation), suggesting that excessive multicollinearity is not a problem in the analysis. On the other hand, ten paired independent variable correlations have an absolute value above 0.50 implying that the stepwise elimination procedure might lead to more efficient estimates. The results of the two empirical models are extremely consistent. The full model explains forty-two

percent of the variance in average student debt, while the reduced model explains forty percent. Seven of the thirteen independent variables (the same seven) are statistically significant in both specifications, implying both models are equivalent and providing additional evidence that multicollinearity is not a concern. It should be noted that a semi-log model specification was also estimated but not presented as the results yield the same seven significant variables but with coefficients that are not as applicable as the linear specifications.

Two of the four financial variables in the model are statistically significant. The results indicate that institutions with a large percentage of students with debt (PERCENTDEBT) also tend to have a high and significant level of average student debt. Clearly debt is a ubiquitous problem for students at some institutions in both magnitude and size. The TUITIONFEES variable is also positive and highly significant. The positive coefficient on the tuition and fees variable indicates that rising tuition and fees in higher education are being partially financed by students via increasing debt levels. The results provide credence to the argument that rising tuition and fees are one of the reasons modern graduates are leaving college with higher debt levels than previous generations. A broader policy concern is that mounting debt and liquidity constraints might limit access to higher education to some deserving and capable students. Percent of students receiving Pell Grants (PPGRANTS) and the cost of room and board (ROOMBOARD) both have negative but highly insignificant coefficients. The Pell Grant variable being insignificant is not a complete surprise as the financial support is both an indicator of need but also a source of financial support. The insignificance of the room and board variable appears to imply that the variation in living expense across institutions is not a significant cost as a percent of the total cost of an undergraduate education. The summary statistics of Table 1 indicate a room and board standard deviation of less than $2,000 with an average room and board annual cost of $7,625.

Four of the five institutional variables in the model are statistically significant. The variable SIZE is positive and statistically significant. Large institution with over 30,000 undergraduate students like the University of Texas, the University of Michigan, and Michigan State University have too many students for the amount of institutional financial support relative to smaller institutions with a copious amount of relative financial aid like California Tech, Harvard University, and Princeton University. The variable PUBLIC is the only institutional variable that is not statistically significant. Although public institutions are generally much less expensive than private institutions, this is somewhat negated by additional financial support often available at private institutions. Several of the private Ivy League and most expensive institutions such as Princeton, Yale, and Harvard offer full financial support to many undergraduate students. The variables ENDOWMENT, LARGECLASS, and ALUMNIGIV all have a negative impact on average student debt and are statistically significant. Institutions with large endowments such as Harvard and Princeton have the financial resources to offer significant financial educational assistance for high quality students that might need loans at other institutions with a smaller endowment. An important implication is that all institutions may need to aggressively fund raise in the future and increase endowments and alumni giving in order to reduce student debt in an environment of rising tuition and fees. Large classes of fifty or more can lead to economies of scale associated with the cost of education. University of California at Davis, University of Texas at Austin, Iowa State University, Michigan State University, and Texas Tech University are all institutions with over twenty percent of course offerings featuring a

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class size of fifty or more students. Alumni giving rate is often considered to be a proxy for graduate satisfaction with the educational institution. A positive externality associated with alumni giving is that some of the donated funds can provide financial assistance to current students and lower the need for student loans and debt.

Only one of the four demographic variables is statistically significant. The HISPANIC variable is negative and statistically significant implying Hispanic students accrue less debt. Hispanic students as a percent of the total population are the most underrepresented demographic group at many institutions. Hispanic Serving Institution (HSI) classification is granted to institutions with at least twenty-five percent enrollment of Hispanic-origin students and often leads to access to additional federal and state financial aid and grants as a means to assist Hispanic students seek higher education (Fischer, 2006). The University of Texas at El Paso is an HSI with a much lower than average student debt level (seventy-five percent Hispanic with an average student debt level of only $6,041). Additional funding opportunities for women (FEMALE) and African-Americans (AFAMERICAN) appear to be limited as both variables are positive and highly insignificant. The insignificance of the FULLTIME variable is a bit of a surprise as it is expected that full-time students may have a greater need for student loans. The FULLTIME variable is positive as expected but the statistical insignificance merits discussion. A review of the data set reveals that many of the institutions with a ninety-eight percent full-time student status or higher also have a less than average level of average student debt. The high full-time student status with lower than average student debt includes Harvard, Princeton, California Tech, Dartmouth College, Rice University, University of California at San Diego, and Stanford University. In addition, several institutions with high levels of average student debt have full-time student status below seventy-five percent including Idaho State University, Nova Southeastern University, University of New Orleans, University of Memphis, Indian University Purdue University Indiana, and Wayne State University.

CONCLUSION

Student average debt has been steadily increasing over the last decade as taxpayers have steadily shifted the burden of higher education to students as a user fee. The issue of student debt has become ubiquitous in the television and print media but little empirical research has been put forth in the literature. Employing a multiple regression statistical model, seven statistically significant determinants of average student debt are identified. One of the more interesting results is the negative and statistically significant impact associated with being Hispanic. Financial support for Hispanic students appears to be more available than to students from other demographic groups at the present time as institutional and government support attempt to address the issue of Hispanic students being underrepresented in higher education. The results of this study indicate the demographic variables full-time status, female, and African-American are not statistically significant determinants of average student debt. The size of the institution, tuition and fees, and the percent of students with debt are shown to have a positive and significant impact on average student debt at an institution of higher education. The positive and statistically significant impact rising tuition and fees has on average student debt is a result with broad policy implications as the trend of higher education replacing public funds with user fees appears to lead to mounting debt problems for graduates and could limit educational access. Large classes of fifty or more, the alumni giving rate, and size of

the institutional endowment are all negative and statistically significant determinants of average student debt. Large classes may lower the cost of education by spreading the cost of instruction across several students. Alumni giving and endowment monies provide institutional financial support to students and negate the need for student loans. One avenue for future research is to explore the determinants of percentage of students with debt as a related topic to the focus of this study on average student debt. A second research extension is to study student debt with panel data and explore the investment component of debt as graduates earn a return in the job market.

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