

UNDERGRADUATE EDUCATION AND FUTURE ANNUAL SALARY

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Abstract

Rising tuition in the United States is causing parents to become increasingly concerned with where their children should attend college. A liberal arts education is considered by many to be one of the best undergraduate educations money can buy. However, much scrutiny has arisen concerning whether more selective liberal arts college graduates receive higher future annual salaries when compared to less selective undergraduate college and university graduates. I hypothesize that liberal arts graduates will receive greater future annual salaries than non-liberal arts private and public college and university graduates. To test my hypothesis, I use data from the 2003 Baccalaureate and Beyond Longitudinal Study, which is a third follow-up of a national sample of students who completed their bachelor degrees at the end of the 1992-1993 academic year.

KEYWORDS: (Liberal Arts, Salaries, Undergraduate)

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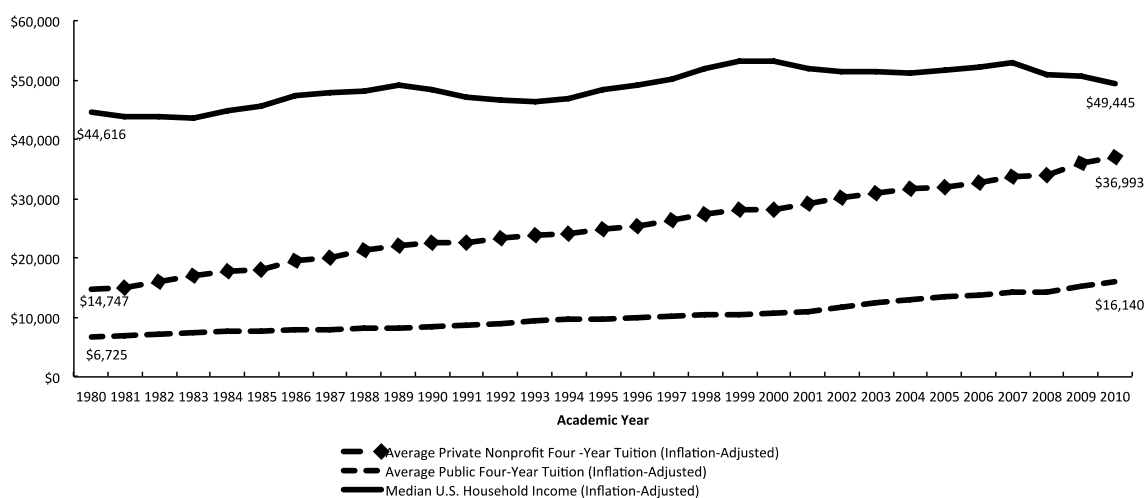
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CHAPTER I

INTRODUCTION

Since 1980, United States tuition has skyrocketed, with average four-year private college tuition up 286% inflation-adjusted and average four-year public college tuition 359% inflation-adjusted.¹

FIGURE 1.1
TUITION TREND 1980-2010



SOURCES: College Board, *Trends in College Pricing 2011*; Carmen DeNavas-Walt, Bernadette D. Proctor, and Jessica C. Smith, *Income, Poverty and Health Insurance Coverage in the United States: 2010*.

¹ College Board, *Trends in College Pricing 2011* (College Board Advocacy and Policy Center, 2011). http://trends.collegeboard.org/college_pricing/ (Accessed March, 2012).

Median U.S. household income, accounting for inflation, has stayed relatively flat, rising only 10.8% since 1980.² Therefore, today's parents are expected to pay a greater percentage of their annual income on their children's college education. College is simply not as affordable as it used to be. Parents of liberal arts students are especially concerned with rising tuition because the average liberal arts school's tuition has increased dramatically since 1980 in comparison to public school's average tuition.³ Logically, parents around the country have begun to question whether rising liberal arts school tuition is justified. Parents want to make "smart, practical choices" on where they send their children to school and do so by picking a particular type of undergraduate college that they believe yields high future annual returns for graduates. Many believe a college education should prepare students for future employment and consider higher education a "necessity for employment" and a liberal arts education as "irrelevant to this purpose."⁴ Liberal arts schools are deemed obsolete in comparison to more specialized or vocational majors offered at universities that prepare students for one career field.

However, growing evidence suggests that a liberal arts college graduate may acquire valuable skill-sets that non-liberal arts graduates don't.⁵ Inquiry and analysis, critical and creative thinking, written and oral communication, and teamwork and problem solving are skills students acquire and that employers emphasize a growing need for.⁶ These skill-sets are acquired through High-Impact Practices, which liberal arts

² Carmen DeNavas-Walt, Bernadette D. Proctor, and Jessica C. Smith, *Income, Poverty and Health Insurance Coverage in the United States: 2010* (United States Census Bureau, 2010). <http://www.census.gov/prod/2011pubs/p60-239.pdf> (Accessed March 7, 2012).

³ James Monks. "The Returns to Individual and College Characteristics: Evidence from the National Longitudinal Survey of Youth." *Economics of Education Review* 19, no. 3 (2000): 279-289.

⁴ Ibid.

⁵ George D. Kuh. *High-Impact Educational Practices* (Washington: Association of American Colleges and Universities, 2008), 5.

⁶ Ibid.

schools employ in their academic curriculums. High-Impact Practices are campus activities that “increase rates of student retention and student engagement.”⁷ They are active learning tools that “contribute to student’s cumulative learning” and allow them to carry knowledge into the workplace.⁸ High-Impact Practices include first year seminars, learning communities, writing-intensive courses, collaborative assignments and projects, undergraduate research, diversity and global learning, service and community-based learning, and capstone courses and projects.⁹

High-Impact Practices result in liberal arts graduates who are “better able to communicate with greater precision and style, think more clearly, analyze more rigorously, become more ethically discerning and be more knowledgeable and active in civic affairs.”¹⁰ These qualities are particularly attractive to employers, who believe the future of our nation depends on the productivity, knowledge, and skill-set of college graduates.¹¹ In an AT&T Foundation survey on “key liberal arts stakeholders,” 63% of the CEOs surveyed said they “value long-term outcomes of a college education.”¹² Firms are looking for graduates who have great upward mobility potential. Liberal arts graduates may lack the knowledge that comes from an emphasis on a pre-professional major, but bear cognitive, presentational, and social skills that other undergraduates

⁷ George D. Kuh. *High-Impact Educational Practices* (Washington: Association of American Colleges and Universities, 2008), 9-11.

⁸ *Ibid.*

⁹ *Ibid.*

¹⁰ Derek Bok. *Our Underachieving Colleges* (New Jersey: Princeton University Press, 2006), 4.

¹¹ George D. Kuh. *High-Impact Educational Practices* (Washington: Association of American Colleges and Universities, 2008), 9-11.

¹² Richard H. Hersh, “Intentions and Perceptions A National Survey of Public Attitudes Toward Liberal Arts Education,” *Change*, March 25, 2010, <http://www.tandfonline.com/doi/pdf/10.1080/00091389709603100> (Accessed March 7, 2012).

don't.¹³ Liberal arts graduates are fast learners, critical thinkers, effective communicators, and work well with others.¹⁴ High-Impact Practices give students the ability to inquire and analyze, critically and creatively think, write and speak effectively, and solve problems in teams. These skills give liberal arts students greater upward mobility in the workforce, making them more attractive to potential employers. Past research has argued liberal arts graduates have greater upward mobility potential than non-liberal arts graduates, suggesting they will end up with higher paying jobs later in their careers.¹⁵

The purpose of this thesis is to answer the question: Do students with a liberal arts undergraduate degree earn higher annual salaries than non-liberal arts private or public college graduates? I believe liberal arts graduates receive more value from their undergraduate education because of skill-sets acquired from High-Impact Practices available in college. Inquiry and analysis, critical and creative thinking, written and oral communication, and teamwork and problem solving skills should give liberal arts graduates greater upward mobility in the workforce and a higher likelihood of landing a lucrative position.

The research results will aid parents and children concerned with rising tuition and expected undergraduate future payoffs. If liberal arts graduates receive higher annual salaries, then the higher tuition costs will be justified. The research will also give liberal arts colleges and non-liberal arts private and public schools advice on raising future annual salaries of students and let employers know whom they should hire.

¹³ Ibid.

¹⁴ Ibid.

¹⁵ George D. Kuh. *High-Impact Educational Practices* (Washington: Association of American Colleges and Universities, 2008), 9-11.

This thesis is organized in the following manner. Chapter II will review all of the relevant literature and theories pertaining to undergraduate education and future annual earnings. Chapter III will discuss the data and methodologies used while Chapter IV will examine the results. Chapter V will discuss the thesis studies' findings in light of past research, and also propose directions for future research studies.

CHAPTER II

LITERATURE REVIEW AND THEORY

The purpose of Chapter II is to discuss the literature and theory pertaining to undergraduate education and future annual salary. The origins of education and earnings will be discussed first, followed by the literature pertaining to socio-demographic, individual ability, pre-collegiate academic characteristics, college quality, collegiate experience, and post-collegiate experience variables. Next, arguments made for a liberal arts education, looking at key High-Impact Practices employed at Liberal Arts schools and the skills they contribute to graduates will be examined, ending with the arguments made against a liberal arts education, including parent's doubts and the myth of uniqueness.

Origins of Education and Earnings Research

In 1974, Jacob Mincer pioneered income distribution research by analyzing “observed distributions and structures of earnings from information on the distribution of accumulated net investments in human capital among workers.”¹ Mincer believed earnings were a function of net investment in human capital. His research utilized two

¹ Jacob A. Mincer, “Schooling, Experience, and Earnings,” (National Bureau of Economic Research, 1974), <http://www.nber.org/chapters/c1764.pdf> (Accessed March 11, 2012).

models, the Schooling Model and Post-School Investments Model.² The Schooling Model had the present value of an individual's lifetime earnings at the start of schooling (V_s) as a function of n , length of working life plus length of schooling, (Y_s), annual earnings of an individual with s years of schooling, r , a discount rate, t , time in years, and d , the difference in the amount of schooling in years:

$$V_s = Y_s \sum_{t=s+1}^n (1/1+r)^t$$

Mincer also utilized the Post-School Investments Model. Net earnings in year j (Y_j) are a function of resources devoted to further job skills and acquire job knowledge (C_j), and earnings capacity (E_j):

$$Y_j = E_j - C_j$$

Mincer's work with income distribution spurred a large field of earnings research starting in the 1970s and continuing to the present day. The next sections examine these research findings.

Undergraduate Education and Future Earnings

The purpose of this thesis is to answer the question: Do students with a liberal arts undergraduate degree receive higher annual salaries than non-liberal arts private or public college graduates? In order to best answer the research question, all possible exogenous variables that may affect annual salary must be accounted for. The literature

² Ibid.

on undergraduate education and effects on salary point to six variable categories: socio-demographics, individual ability, pre-collegiate academic characteristics, college quality, collegiate experience, and post-collegiate experience. The socio-demographic variable set will be examined first.

Socio-demographic

The socio-demographic variable set includes ethnicity, gender, need-based aid received and parent's highest education. It accounts for possible affects on annual salary that individual ability, pre-collegiate academic characteristics, college quality, collegiate experience or post-collegiate experience variables don't. Kingston and Smart examined the economic payoff of prestigious colleges in a study of respondents to the 1971 and 1980 Cooperative Institutional Research Program survey.³ Ten thousand, three hundred and twenty six students from 487 different colleges and universities responded to the survey upon entering college in 1971 and again in 1980 so "collegiate experiences could be accounted for."⁴ When testing for "effects on career success," socio-demographic factors had to be taken into account.⁵ Ethnicity, gender, total need based aid received and parent's highest education must be included in the regression model to control for individual differences in individual's backgrounds.

The study, when accounting for socio-demographic factors, quality, pre-collegiate academic and person characteristics, college experiences, and professional degrees, found that elite graduates earned on average \$2,102 more in a post-collegiate job than other

³ Paul William Kingston and Lionel S. Lewis, *The High-Status Track* (New York: State University of New York Press, 1990), 150.

⁴ Paul William Kingston and Lionel S. Lewis, *The High-Status Track* (New York: State University of New York Press, 1990), 151.

⁵ Paul William Kingston and Lionel S. Lewis, *The High-Status Track* (New York: State University of New York Press, 1990), 153.

college graduates.⁶ This suggests that the undergraduate college has the biggest impact on future annual earnings, not socio-demographic factors. The research hypothesis may be correct if liberal arts schools are deemed elite institutions. However, the variable was not significant at the 0.05 level, meaning it is more likely that graduates from elite colleges or universities don't experience increased earnings in comparison to less selective college graduates.

James Monks also examined socio-demographic factors in a 2000 study looking at returns to individual and college characteristics. Monks noted that previous career earnings studies ignored demographic variables.⁷ However, ethnicity, gender, total need based aid and parents' highest education are all prominent determinants of future earnings and must be included in an earnings regression model. Each variable may influence where a student wants to go to college or ultimately where he or she is admitted. Monks claims that "labor market and higher education opportunities may differ across these groups."⁸ In turn, differing "returns" in annual salary may arise among different socio-demographic groups.⁹

Monks found a premium attached to "graduating from a graduate degree granting or research institution relative to graduating from a liberal arts college."¹⁰ This refutes the thesis' hypothesis that the value of a liberal arts degree leads to higher future salaries. Monk's study suggests that on average, students that graduate from graduate degree

⁶ Paul William Kingston and Lionel S. Lewis, *The High-Status Track* (New York: State University of New York Press, 1990), 159.

⁷ James Monks. "The Returns to Individual and College Characteristics: Evidence from the National Longitudinal Survey of Youth." *Economics of Education Review* 19, no. 3 (2000): 279-289.

⁸ Ibid.

⁹ Ibid.

¹⁰ Ibid.

granting or research schools take home higher paychecks. Socio-demographic factors, when controlled for, don't have as significant of an effect on future career earnings as college quality variables.

Individual Ability

In order to properly analyze the effects of college quality on career earnings, individual ability must be accounted for. A common measure of ability in the relevant literature is average SAT scores.¹¹ SAT scores give a pre-collegiate ability score to survey respondents. Student's ability levels are separated from college quality effects. To properly measure the effects of a liberal arts college on a graduate's success, pre-collegiate ability variables must be included in the earnings regression model.

Past research suggests college quality plays a major role in determining future annual salary.¹² Where one goes to college ultimately determines what he or she earns in the workforce. However, contrary to this belief is the argument that an undergraduate education doesn't lead to increased earnings, but is positively correlated with them.¹³ A highly selective undergraduate college may produce graduates who receive higher annual job salaries. This doesn't guarantee that the institution plays a part, if any, in preparing students for well-paying jobs. If a student attends Stanford or Princeton, he or she is not assured a lucrative job.

¹¹ Ibid.

¹² James Monks. "The Returns to Individual and College Characteristics: Evidence from the National Longitudinal Survey of Youth." *Economics of Education Review* 19, no. 3 (2000): 279-289.

¹³ Miguel Palacios Lleras, *Investing in Human Capital* (United Kingdom: Cambridge University Press, 2004), 11.

Palacios argues it is “the productivity of the employee given by ability” that determines a student’s future career salary.¹⁴ One could argue that graduates from selective colleges are more productive than the average college graduate. However, this result would be due to individual ability, not the education received. Palacio’s hypothesis suggests that undergraduate college has minimal effects on a graduate’s career earnings. The findings would dispute the thesis’ hypothesis that liberal arts graduates receive higher salaries than non-liberal arts graduates. According to Palacios, a student’s undergraduate education is not necessarily indicative of higher future earnings.

Palacios is also an advocate of the “screening hypothesis,” which states that “highly capable individuals” distinguish themselves from “less capable individuals” by attending prestigious institutions.¹⁵ The screening process lets employers know whom they should hire.¹⁶ Employers believe graduates from prestigious colleges are endowed with greater ability and therefore, will be more productive workers. The screening hypothesis supports part of this thesis’ hypothesis in that it posits graduates from elite liberal arts colleges may acquire higher paying jobs. However, it ignores non-elite liberal art school graduates, suggesting that school prestige may have a bigger impact on annual salary than type of undergraduate institution attended.

Kingston and Smart also addressed the quality versus ability issue on future earnings. They found “institutional differences” might have little effect on a student’s future success.¹⁷ For example, attending a selective liberal arts school will yield

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ Paul William Kingston and Lionel S. Lewis, *The High-Status Track* (New York: State University of New York Press, 1990), 148.

approximately the same future annual salary as a moderately selective public university. Kingston and Smart argue that varying levels of student success are determined by “greater intellectual and personal endowments.”¹⁸ They believe an intelligent quotient is more indicative of a lucrative career than the higher education received. These findings dispute the thesis’ hypothesis because they indicate career success is mainly a function of in-born skills and intelligence, not the college education received.

Pre-Collegiate Academic Characteristics

Pre-collegiate academic characteristics refer to high school academic achievement and high school type.¹⁹ High school academic achievement encompasses high school GPA, class rank, and membership in the honor society while high school type indicates whether the school was a private-nonparochial or other type.²⁰ High school academic achievement plays a major role in determining which college a student can attend. A student with a high GPA, high class rank, and who was a member of the honors society is likely to be accepted at an elite institution. Similarly, if a student attends a private high school, he or she is more likely to gain entrance to a selective undergraduate college.

Pre-collegiate academic characteristics may prepare students for the workforce in ways that college doesn’t and in turn, lead to higher annual salaries. They must be included in an earnings regression to best explain the variance in college graduates’ annual salaries and help determine the extent that college quality contributes to future

¹⁸ Ibid.

¹⁹ Paul William Kingston and Lionel S. Lewis, *The High-Status Track* (New York: State University of New York Press, 1990), 153.

²⁰ Ibid.

earnings. Accounting for pre-collegiate academic characteristics will help answer the question of whether liberal arts graduates earn more in their respective careers.

College Quality

College quality is the major focus of this thesis. The research results should answer the question: Do students with a liberal arts undergraduate degree receive higher annual salaries than non-liberal arts private or public college graduates? To do so, the beta coefficients of the college quality variables must be analyzed, while holding socio-demographics, individual ability, pre-collegiate academic characteristics, collegiate experience and post-collegiate experience variables constant, to determine whether a liberal arts degree leads to higher annual earnings.

The effect of college quality on student earnings is a highly debated subject. Past literature is skeptical about the actual impact a college education has on annual salary. However, Behrman, Rosenzweig, and Taubman investigated the effects of college quality on earnings and found significant results when surveying the 1994 Minnesota Twin Registry of females.²¹ Their regression equation indicated that individuals who attend private Ph.D. granting colleges that had small enrollments, and well-paid professors, earned more in their respective careers.²² Small enrollments and well-paid professors fit the mold of most liberal arts institutions. This portion of the studies' results supports the claim that High-Impact Practices at liberal arts colleges are effective and increase graduate upward mobility in the workforce. An increase in upward mobility should lead to higher earnings. However, the Ph.D. granting college variable is not applicable to

²¹ Jere R. Behrman, B, Mark R. Rosenzweig, and Paul Taubman, "College Choice and Wages: Estimates Using Data on Female Twins." *The Review of Economics and Statistics* 78, no. 4 (1996): 672-685.

²² Ibid.

liberal arts schools. This leads to skepticism about whether liberal arts schools add actual value to a graduate's education.

Brewer, Eide, and Ehrenberg also studied the effects of an undergraduate institution and future annual salary. They found a "large labor market premium to attending an elite private institution."²³ Data from the National Longitudinal Study of the High School Class of 1972 examined the effects of college type on earnings six and ten years after high school.²⁴ The results indicated that some liberal arts colleges could possibly return large labor market premiums for graduates. However, it is difficult to obtain a definite answer from Brewer, Eide, and Ehrenberg's model because several liberal arts colleges are included in the elite private institution category while others are included in the "middle private" group.²⁵ Liberal arts colleges need to be separated from private institutions if the outcome of a liberal arts college degree on annual salary is to be realized. By separating liberal arts colleges from all private institutions, the total effect a liberal arts degree has on the percent variation in annual salary can be analyzed.

The results imply that elite liberal arts schools could give graduates an advantage in the workforce. Students that attend these schools may be better able to inquire, analyze, critically and creatively think, communicate and work well with teams to solve problems as a result of High-Impact Practices employed. The results also indicate that prestige of the college attended may lead to greater earnings. This disputes the thesis'

²³ Dominic J. Brewer, Eric R. Eide, and Ronald G. Ehrenberg, "Does It Pay to Attend an Elite Private College? Cross-Cohort Evidence on the Effects of College Type on Earnings." *The Journal of Human Resources* 34, no. 1 (1999): 104-123.

²⁴ Ibid.

²⁵ Ibid.

hypothesis if employers don't deem liberal arts institutions as "elite" and therefore aren't as likely to hire liberal arts graduates.

Black, Daniel and Smith also found college quality had a major effect on future earnings when they examined the 1979 National Longitudinal Survey of Youth.²⁶ Respondents between the ages of 14 and 21 in 1979 were re-interviewed once a year for nine years.²⁷ College quality had a "positive and significant effect" on future earnings, while holding ability, labor market experience, family background and high school quality constant.²⁸ The results suggest college quality does have a major impact on preparing students not only to land a job, but also acquire higher paying ones in the future. Graduates will earn higher wages because of the value of a liberal arts education. The value should come from the skills acquired through High-Impact Practices that promote upward mobility in the workforce.

In a 2000 study on the returns to individual and college characteristics, James Monks also found significant returns to college quality.²⁹ However, he discovered a premium from attending a "graduate degree granting or research institution relative to graduating from a liberal arts college."³⁰ The result disproves the thesis' hypothesis, as graduates from research universities appear to earn higher annual salaries than liberal arts graduates. This could be due to a short time period elapsed since graduating from college.

²⁶ Dan Black, Jeffrey Smith, Kermit Daniel, "College Quality and Wages of Young Men." *National Center for Postsecondary Improvement* (1997): 5-25.

²⁷ Ibid.

²⁸ Ibid.

²⁹ James Monks. "The Returns to Individual and College Characteristics: Evidence from the National Longitudinal Survey of Youth." *Economics of Education Review* 19, no. 3 (2000): 279-289.

³⁰ Ibid.

Nine years may not be an adequate time period for graduates to reach their highest paying job, especially considering the difficulty for liberal arts graduates to land their first job out of college.³¹

In addition to Monk's findings, Marc Fox examined undergraduate school returns when analyzing data from the 1980 High School and Beyond survey of high school seniors.³² He studied the rate of return to educational quality and determined the rate of return of investing in a selective private school outweighs the rate of return of attending a less competitive public school.³³ As of now, the high costs of attending a selective college can be justified with the amount of income graduates make post-college. However, Fox indicated that price differences among selective private colleges and less selective public schools have widened, causing the rate of return differential to narrow.³⁴ This study supports the thesis' hypothesis because it recognizes graduates from more selective private schools, such as liberal arts colleges, receive higher wages post-college. Yet, the model only takes into account selective private schools, leading to the assumption that there are only a select few liberal arts schools that prepare students well for the workforce.

Dale and Krueger found a positive and significant effect to attending selective colleges during a student's "prime working years" for individuals who entered college in

³¹ Kathie Thomas and William Toombs, "Jobs and Liberal Arts Graduates: Some Critical Relationships." *Research in Higher Education* 4, no. 2 (1976): 131-148.

³² Marc Fox, "Is It a Good Investment to Attend an Elite Private College?" *Economics of Education Review* 12, no. 2 (1993): 137-151.

³³ Ibid.

³⁴ Ibid.

1976 and 1989.³⁵ The results support the research hypothesis because there's support that selective liberal arts colleges could produce higher earning graduates. The 2011 study also found that the "returns to selectivity increase over the course of a student's career."³⁶ Students earn more as they move into senior-level positions within their firm. Adequate time elapsed since college must be taken into consideration when creating the earnings model to make sure students have reached the highest paying job in their respective careers.

Dale and Krueger also found that attending selective, presumably higher quality institutions helps some students more than others.³⁷ A less selective college may provide more value to a student from a disadvantaged background than a selective school. Certain attributes gained by a particular student from a less selective college might be more beneficial than originally perceived.³⁸ Therefore, liberal arts colleges may suit the needs of certain races or socio-demographic groups better than large research-based institutions.

Past models have accounted for college quality by dividing private and public undergraduate colleges by selectivity measures as Kingston and Smarts did through a study of the "economic payoff-off of prestigious colleges."³⁹ Schools were divided into selectivity categories based on the average SAT scores of incoming students, including

³⁵ Stacy Dale and Alan B. Krueger, "Estimating Return to College Selectivity over the Career Using Administrative Earning Data," Working paper No. 563. Princeton: Princeton University Industrial Relations Section (2011), 23-26, <http://www.nber.org/papers/w17159.pdf> (Accessed March 11, 2012).

³⁶ Ibid.

³⁷ Stacy Dale and Alan Krueger, "The Payoff to Attending a More Selective College: An Application of Selection on Observables and Unobservables," Princeton University, Industrial Relation Section, Working Paper No. 409 (1998), 1524-1525, <http://www.nber.org/papers/w7322.pdf> (Accessed March 11, 2012).

³⁸ Ibid.

³⁹ Paul William Kingston and Lionel S. Lewis, *The High-Status Track* (New York: State University of New York Press, 1990), 147-150.

elite, private highly selective, public highly selective, private medium selectivity, public medium selectivity, private low selectivity, and public low selectivity.⁴⁰ More selective colleges were deemed higher quality institutions. However, Behrman, Rosenzweig, and Taubmans's research concluded that college characteristics like total cost, student-faculty ratio, and average faculty salary are better estimators of college quality.⁴¹ Total cost can be used to estimate college selectivity while low student-faculty ratios and greater average faculty salaries signal higher quality schools.

Monks admitted that he knew of no studies that "examined the earnings of liberal arts college graduates from larger research-oriented institutions" or other private non-liberal arts schools.⁴² Therefore, this thesis will fill a void in the higher education literature field. Liberal arts schools will be separated from the "private institution" category in order to quantify the effect the quality of a liberal arts education has on future earnings.

College Experience

College experience variables refer to what students did while enrolled in college. The research must determine whether liberal arts students had High-Impact Practices available on campus and whether they took advantage of them. High-Impact Practices signal a higher quality school.

⁴⁰ Ibid.

⁴¹ Jere R. Behrman, B, Mark R. Rosenzweig, and Paul Taubman, "College Choice and Wages: Estimates Using Data on Female Twins." *The Review of Economics and Statistics* 78, no. 4 (1996): 672-685.

⁴² James Monks, "The Returns to Individual and College Characteristics: Evidence from the National Longitudinal Survey of Youth." *Economics of Education Review* 19, no. 3 (2000): 279-289.

Past research suggests that what students do in college far outweighs the type of undergraduate school they attended when examining factors influencing future earnings.⁴³ Alsalam, Contay, James, and To used the National Longitudinal Study of the High School Class of 1972 and the fifth follow up of the group in 1986 to study the effects of institutional characteristics and higher education experience on future annual salary.⁴⁴ Selectivity and school location had positive effects on annual salary but more importantly “what matters most is not which college you attend but what you do while you are there.”⁴⁵ Students who were involved in more extracurricular activities, participate in school programs, had higher GPA’s, major in pre-professional subject areas, like engineering, are more likely to receive higher future annual wages.⁴⁶ The previous finding supports the thesis’ hypothesis because liberal arts students who take advantage of school programs including High-Impact Practices like undergraduate research, internships, and senior capstone projects, gain vital skill-sets that prepare them for higher paying jobs.⁴⁷ The skill-set produces higher earnings, suggesting liberal arts school curriculums may give graduates an upper hand in the job market.

⁴³ Estelle James, et al., “College Quality and Future Earnings: Where Should You Send Your Child to College?” *The American Economic Review* 79, no. 2, Papers and Proceedings of the Hundred and First Annual Meeting of the American Economic Association (1989) : 247-252.

⁴⁴ Ibid.

⁴⁵ Ibid.

⁴⁶ Ibid.

⁴⁷ George D. Kuh. *High-Impact Educational Practices* (Washington: Association of American Colleges and Universities, 2008), 10-11.

The 2008 National Survey of Student Engagement also examined students' experiences at an undisclosed public institution in a case study.⁴⁸ "Enriching Education Experiences" (EEE), such as having conversations with students of differing ethnicities, participating in a practicum, internship, field experience program or learning community and completing a senior year project were measured for 460 seniors.⁴⁹ Results indicated that there was a serious lack of participation in Enriching Education Experiences at the public university. Only 46% of business majors participated in a practicum, internship, or field experience program while enrolled in the university.⁵⁰ Therefore, 54% of the 460 surveyed that were business majors didn't take advantage of crucial Enriching Education Experiences offered at their school.

The case study reinforces the idea that not every student takes advantage of academic resources available at school. Therefore, students who attend less selective colleges could potentially earn more than an elite private school if they participate in more Enriching Education Experiences or High Impact Practices. The case study also confirms the idea that even if High-Impact Practices are available to liberal arts students, they may not take advantage of them. This would disprove the thesis' hypothesis because if liberal arts graduates did achieve higher future salaries it would be due to innate ability, not the education received.

⁴⁸ National Survey of Student Engagement, "Promoting Engagement for All Students: The Imperative to Look Within." (National Survey of Student Engagement, 2008), http://nsse.iub.edu/NSSE_2008_Results/docs/withhold/NSSE2008_Results_revised_11-14-2008.pdf (Accessed March 7, 2012).

⁴⁹ Ibid.

⁵⁰ Ibid.

Similarly, the “Spielberg Model” reinforces the idea that college experiences, apart from college quality, lead to future success.⁵¹ Steven Spielberg was rejected from the UCLA and USC, two of the top film schools in the country. Spielberg attended Cal State Long Beach, a less prestigious film school. However, he became one of the most successful movie directors of all-time after graduating from Cal State Long Beach. It’s clear that college quality didn’t have a major impact on Spielberg’s career. His “motivation, ambition, and desire to learn” and ability caused him to become a world-renowned director.⁵² Spielberg’s personality and love of films pushed him to take advantage of the programs offered at Cal State.

Post-Collegiate Experience

Post-collegiate experience refers to choices graduates make after college that affect their future annual wages. Such variables include occupation, highest degree completed and amount of work experience. Black, Daniel, and Smith in a 1995 study controlled for labor market experiences and industry of employment when measuring the effects of college quality on wages of men.⁵³ Even when controlling for post-college experience, individual ability, family background, and high school quality, they still found a “robust relationship” between college quality and future earnings.⁵⁴ This suggests

⁵¹ Christopher Farrell, “On the Payoff to Attending an Elite College,” (The National Bureau of Economic Research, 2012). <http://www.nber.org/digest/dec99/w7322.html> (Accessed March 7, 2012).

⁵² Ibid.

⁵³ Dan Black, Jeffrey Smith and Kermit Daniel, “College Quality and Wages of Young Men.” *National Center for Postsecondary Improvement* (1997): 4.

⁵⁴ Ibid.

that college quality is the main determinant of graduate's future earnings, not post-collegiate experience.

Laura W. Perna also studied the effects of exogenous variables on graduates' earnings in a 2003 study. Using data from the 1980 High School and Beyond longitudinal study of high school sophomores and 1992 follow-up, Perna found the "earnings premium increased with level of educational attainment."⁵⁵ Additional schooling is expected to increase worker productivity, and in turn, annual earnings.⁵⁶ The studies' results indicate that liberal arts students who obtain an advanced degree might receive high future wages. High-Impact Practices utilized in college coupled with an advanced degree could lead to higher earnings than graduates from non-liberal arts colleges who received an advanced degree.

Arguments for a Liberal Arts Education

Proponents of a liberal arts education argue liberal arts schools best prepare students for the "transformative changes- environmental, global, intercultural, technological, scientific" – that are presently occurring in modern day United States.⁵⁷ The changing time period calls for different skill-sets in the workforce. Employers want students with inquiry and analysis, critical and creative thinking, written and oral communication, global knowledge, self-direction, adaptation, teamwork, and problem solving skills.⁵⁸ High-Impact Practices significantly add value to a liberal arts education

⁵⁵ Laura W. Perna, "The Private Benefits of Higher Education: An Examination of the Earnings Premium." *Research in Higher Education*, Vol. 44, No. 4, (2003): 467.

⁵⁶ Ibid.

⁵⁷ George D. Kuh. *High-Impact Educational Practices* (Washington: Association of American Colleges and Universities, 2008), 2.

⁵⁸ George D. Kuh. *High-Impact Educational Practices* (Washington: Association of American Colleges and Universities, 2008), 5.

by giving students these skills. The perceived skill-set received give graduates greater upward mobility in the workforce, leading to higher annual earnings. The next section will examine key High-Impact Practices utilized by liberal arts colleges and describe how they add to the needed labor force skill-set.

Learning Communities

Brownell and Swaner describe learning communities as a “collection of courses that a small group of students complete together.”⁵⁹ Although several hundred colleges and universities offer these courses to students, liberal arts schools are at an advantage.⁶⁰ Typically, universities only offer learning communities to first year students, trying to ease the transition from high school to college. However, liberal arts schools offer small-capped classes like learning communities and frequently steer clear of large lecture classes. Therefore, liberal arts students are able to reap the benefits of learning communities not only in their freshman year, but also throughout their college education.

Learning communities foster more “intellectual risks and participation” in class.⁶¹ Small class sizes make students feel comfortable and more apt to speak in class. Critical thinking and oral skills are therefore refined. Students are forced to question what other students say and evaluate whether they believe what has been said. Year round small classes at liberal arts schools also promote class discussion, which encourages students to critically think about all sides of an issue and learn to have an educated opinion. Zhao and Kuh found in a 2004 study that learning community students “reported greater gains

⁵⁹ Jayne E. Brownell and Lynn E. Swaner, *Five High-Impact Practices* (Washington: Association of American Colleges and Universities, 2008), 13.

⁶⁰ Ibid.

⁶¹ Ibid.

in critical thinking and problem solving skills, and took a greater number of courses that require higher-order thinking skills.”⁶²

Zhao and Kuh also found that learning communities enhance student-faculty and student-to-student interaction.⁶³ Teachers have smaller classes and are better able to interact with students by promoting class discussion. Also, professors are able to have more one-on-one sessions with students and answer a greater number of questions.⁶⁴ Professors at liberal arts colleges have smaller “student loads” or students registered in their classes, giving them longer office hours and more student accessibility.⁶⁵ Students improve their inquiry skills because they are more apt to ask teachers questions after class. Learning community students are also more likely to work on homework with classmates, improving teamwork and problem solving skills.

Evidence suggests that learning communities also improve student’s writing skills. Duran et al. compared learning community student’s writing to non-learning community students and found “greater improvement in writing quality and clarity” for students who participated in learning communities.⁶⁶ Smaller class sizes allow for more writing-intensive courses, which require students to produce and revise various forms of writing for different audiences in different disciplines.”⁶⁷ Liberal art graduates are able to

⁶² C. Zhao and G.D. Kuh, “Adding Value: Learning Communities and Student Engagement.” *Research in Higher Education* 45 (2004): 115-138.

⁶³ Ibid.

⁶⁴ Lewis B. Mayhew, *The Smaller Liberal Arts College* (Washington: The Center for Applied Research in Education, Inc., 1962) 21.

⁶⁵ Ibid.

⁶⁶ Duran et al, “The Next Generation of Learning Communities: The University of Hartford First-Year Interest Group Model.” *Journal of the First-Year Experience and Students in Transition* (2005).

⁶⁷ George D. Kuh. *High-Impact Educational Practices* (Washington: Association of American Colleges and Universities, 2008), 10.

write well across all disciplines after refining their writing skills. Smaller class sizes also improve oral communication skills. One to two classes can be devoted to presentations at a liberal arts school whereas a university may take an entire semester to run through a class-worth of presentations.

Undergraduate Research

Kinkead defines undergraduate research as activities that include “scientific inquiry, creative activity, and scholarship.”⁶⁸ Students often work closely with faculty members to answer scholarly research questions. Evidence suggests that liberal arts colleges may contain more undergraduate research opportunities than large research institutions or universities. Bourque found in the 1998 Higher Education Data Service Study that there were only six research institutions in the top 30 PhD producing schools—the University of Chicago (5), Harvard (9), Yale (14), Princeton (17), Brandeis (25), and the University of California Santa Cruz (26).⁶⁹ Bourque explained the reason for this statistic is the growing number of undergraduates in liberal arts schools participating in “original research projects.”⁷⁰ Undergraduate liberal arts students have accessibility to research projects with faculty that research university students don’t. Research university students must compete with graduate students, who have first priority when it comes to research opportunities.⁷¹ Therefore, they have a significantly smaller chance of doing undergraduate research. Liberal arts students have first priority for research, “where the

⁶⁸ Kinkead, J., “Learning Through Inquiry: An Overview of Undergraduate Research.” *Valuing and Supporting Higher Education* (2005): 5-18.

⁶⁹ Susan C. Bourque, “Reassessing Research: Liberal Arts Colleges and Social Sciences.” (*Daedalus*, Vol. 128, 1999), <http://www.questia.com/googleScholar.qst?docId=5001247834> (Accessed March 7, 2012).

⁷⁰ *Ibid.*

⁷¹ *Ibid.*

sole focus of attention is the undergraduate and a faculty member's only real hope of getting research assistance is a well-trained undergraduate.”⁷² Liberal arts students are better able to reap the rewards of undergraduate research.

Undergraduate research has been found to improve “writing and communication skills, frequency and quality of interaction with faculty and peers, problem solving and critical thinking skills, and the likelihood of going to graduate school.”⁷³ These skills add value to a liberal arts student’s education by increasing upward mobility in the modern-day workforce. Employers want workers who have the skills to communicate effectively, solve problems, and think critically about issues faced by the firm.

Bauer and Bennett also found gains to undergraduate research when surveying approximately 1,000 college graduates in 2003. They found that those who took part in undergraduate research reported, “gains in...time-management skills.”⁷⁴ Time management skills are crucial in today’s work world. It’s essential to be able to complete all required daily tasks and even get ahead when busy times are on the horizon. By participating in undergraduate research, liberal arts students learn how to not only learn fast, but also manage large workloads.

Critical and creative thinking skills are also acquired through undergraduate research. Students are exposed to “actively contested questions, empirical observation, and cutting edge technologies” when assisting a professor with his or her research.⁷⁵ They

⁷² Ibid.

⁷³ Hu et al. *Reinventing Undergraduate Education: Engaging College Students in Research and Creative Activities*. San Francisco: Joey-Bass, 2008.

⁷⁴ Ibid.

⁷⁵ Ibid, 10.

are able to help professors analyze past research on an academic subject and help him or her in formulating a scholarly answer to a research question.

Diversity and Global Learning

Diversity and global learning refers to “courses and programs that help students explore cultures, life experiences, and worldviews different from their own.”⁷⁶ Liberal arts students are exposed to human differences including “racial, ethnic, gender inequality” and “struggles around the globe for human rights, freedom, and power.”⁷⁷ They are expected to take classes that not only study the sciences, mathematics, and social sciences, but the humanities, histories, languages, and the arts as well.⁷⁸ Liberal arts students broaden their global knowledge by participating in an academic curriculum that requires taking classes in all the disciplines. Liberal arts schools emphasize “broad abstractions and basic principles rather than specialized advanced work in any subject area.”⁷⁹ Liberal arts students learn about numerous cultures, ideologies, and theories rather than predominantly one subject area for four years.

Global knowledge is an indispensable skill for graduates to possess. According to a 2008 national survey on employer views on essential worker skills, global knowledge was the skill graduates had the most deficiency in.⁸⁰ Only 18% of the respondents believed employees had an adequate amount of global knowledge while 46% believed

⁷⁶ George D. Kuh. *High-Impact Educational Practices* (Washington: Association of American Colleges and Universities, 2008), 10.

⁷⁷ Ibid.

⁷⁸ George D. Kuh. *High-Impact Educational Practices* (Washington: Association of American Colleges and Universities, 2008), 4.

⁷⁹ David G. Winter, David C. McClelland and Abigail J. Stewart, *A New Case for the Liberal Arts* (San Francisco: Jossey-Bass Publishers, 1981), 4.

⁸⁰ George D. Kuh. *High-Impact Educational Practices* (Washington: Association of American Colleges and Universities, 2008), 5.

graduates weren't prepared at all.⁸¹ Liberal arts graduates have the most well rounded education, dabbling in courses outside of their majors that deal with differing cultures and ideals than their own. Having global knowledge skills above those of large research institutions and universities will give liberal arts graduates an advantage in the workforce. They will have a better opportunity to move up within their respective jobs and earn higher salaries.

Arguments Against a Liberal Arts Education

Approximately 100 years ago, more than 70% of the US attended liberal arts colleges.⁸² There was a consensus among parents and children that liberal arts schools provided the highest quality education. Nowadays, less than 5% percent of U.S. students attend liberal arts colleges.⁸³ One explanation is the rising cost of tuition and the fact that more people are attending college than in the early 20th Century. However, past research suggests parents and some business executives doubt the effectiveness of a liberal arts education in preparing capable graduates. In the following sections, this thesis discusses parent's concerns with liberal arts colleges and the myth of uniqueness surrounding a liberal arts education.

⁸¹ Ibid.

⁸² Richard H. Hersh, "Intentions and Perceptions A National Survey of Public Attitudes Toward Liberal Arts Education," *Change*, March 25, 2010, <http://www.tandfonline.com/doi/pdf/10.1080/00091389709603100> (Accessed March 7, 2012).

⁸³ Ibid.

Parent's Concerns

A growing number of parents view higher education as a “necessity for employment.”⁸⁴ Education is viewed as solely preparing students for the workforce. Parents believe they must send their kids to an undergraduate college that properly prepares students for the workforce. Well-paying jobs are seen as a must and many parents cast doubt in a liberal arts college’s ability to prepare students for the working world.⁸⁵

Parents and employers believe liberal arts graduates lack certain skills necessary for success in the workplace. In a 1997 survey conducted by the AT&T Foundation on “key liberal arts stakeholders,” a majority of parents and business executives speculated that liberal arts students needed to better develop certain skill-sets.⁸⁶ Included were oral and written communication skills, self-discipline and time management, and independent and critical thinking skills.⁸⁷ A large percentage of the parents and employers who responded to the 1997 survey believe a liberal arts education doesn’t accomplish what it preaches. Through small discussion classes and high teacher interaction, liberal arts students are commonly thought to develop good communication, time management, and critical thinking skills. However, there are clearly many skeptics who believe the value gained from attending a research-based school far exceeds the one received by attending a liberal arts college.

⁸⁴ George D. Kuh. *High-Impact Educational Practices* (Washington: Association of American Colleges and Universities, 2008), 5.

⁸⁵ Richard H. Hersh, “Intentions and Perceptions A National Survey of Public Attitudes Toward Liberal Arts Education,” *Change*, March 25, 2010, <http://www.tandfonline.com/doi/pdf/10.1080/00091389709603100> (Accessed March 7, 2012).

⁸⁶ *Ibid.*

⁸⁷ *Ibid.*

Parents are also concerned with liberal arts colleges due to the difficulty liberal arts graduates have landing their first job. Toombs and Thomas found that liberal arts graduates struggle when trying to find their first job out of college in their preferred career field.⁸⁸ Data compiled from 1960-1970 supports this claim. In 1960 a reported 19% of liberal arts graduates reported no difficulty getting their first job out of college.⁸⁹ However, in 1970, 44% of graduates reported difficulty getting their first job, clearly highlighting one of the growing problems for liberal arts graduates.⁹⁰ Parents believe a pre-professional major at a research university or non-liberal arts school would give their children a better chance at landing a job out of college.

Liberal arts graduates face problems finding their first job because they lack the skills and exposure to certain desired fields of work.⁹¹ For example, a liberal arts major interested in pursuing a business career may have taken 2% or less of his or her courses in business-related fields of study because of strict liberal arts graduation requirements.⁹² He or she is at a distinct disadvantage when applying for a job in a business-related field against a non-liberal arts or public research university graduate who has taken more business classes in college.

⁸⁸ Kathie Thomas and William Toombs, "Jobs and Liberal Arts Graduates: Some Critical Relationships." *Research in Higher Education* 4, no. 2 (1976): 131-148.

⁸⁹ Ibid.

⁹⁰ Ibid.

⁹¹ Michael Useem, *Liberal Education and the Corporation*, 69.

⁹² Ibid.

Myth of Uniqueness

Liberal arts critics believe in the “myth of uniqueness” phenomenon, which states colleges claim to offer a unique liberal arts education when in reality, they don’t deliver on the goals of a liberal arts curriculum.⁹³ If the myth of uniqueness holds true, then students may not learn to think critically, learn how to learn, think independently, see all sides of an issue, exercise self-control, express leadership ability, demonstrate mature social and emotional judgment, and participate in new cultural experiences.⁹⁴ Parents and employers concerns about a liberal arts education are justified because it’s extremely difficult to assess whether a college or set of colleges deliver on their academic goals.

There’s also evidence that modern liberal arts schools may be shifting their academic curriculums to more “professional disciplines” in order to draw a “broader student population.”⁹⁵ Liberal arts institutions claim to be unique with their broad academic curriculums and small class sizes but may be modeling their new academic structures on research universities to draw more students to the colleges. This gives colleges a large applicant pool to draw from, which lowers their acceptance rating. A lower acceptance rate is commonly associated with a more prestigious and high quality school, something a liberal arts college always strives for.

This thesis’ goal is to determine whether High-Impact Practices at liberal arts colleges lead to greater future earnings. Learning communities, undergraduate research, and diversity and global learning are hypothesized to increase graduate upward mobility

⁹³ Michael Deluchi, "Liberal Arts" Colleges and the Myth of Uniqueness. *The Journal of Higher Education* 68, no. 4 (1997): 414-426.

⁹⁴ David G. Winter, David C. McClelland and Abigail J. Stewart, *A New Case for the Liberal Arts* (San Francisco: Jossey-Bass Publishers, 1981), 12-13.

⁹⁵ Michael Deluchi. "Liberal Arts" Colleges and the Myth of Uniqueness. *The Journal of Higher Education* 68, no. 4 (1997): 414-426.

by giving them inquiry and analysis, critical and creative thinking, written and oral communication, global knowledge, self-direction, adaptation, teamwork, and problem solving skills. The research model proposed in the following methodology chapter will conclude the validity of this claim.

CHAPTER III

METHODOLOGY

The objective of this study is to determine whether students with a liberal arts undergraduate degree receive higher annual salaries than non-liberal arts private or public college graduates. Past research has failed to acknowledge the effects of High-Impact Practices used at liberal arts colleges on graduate's future success. Past research on earnings has used the following equation to determine the effects on salary:

$$\ln W_i = \beta_0 + \beta_1 Q_i + \beta_2 X_{1i} + \beta_3 X_{2i} + \varepsilon_i^1$$

with Q_i measuring the selectivity of the college student i attended and X_1 and X_2 measuring characteristics that affect earnings including observable data assigned to X_1 and non-observable data assigned to X_2 .

The proposed quantitative model for this research study will help determine the effects a liberal arts degree have on future annual earnings, while accounting for socio-demographic (i.e. ethnicity, gender, need-based aid, parent's highest education), individual ability (i.e. SAT score), pre-collegiate academic characteristics (i.e. high school type), college quality (i.e. total college costs, Carnegie code), college experience

¹ Stacy Dale and Alan B. Krueger, "Estimating Return to College Selectivity over the Career Using Administrative Earning Data," Working paper No. 563. Princeton: Princeton University Industrial Relations Section (2011), 23-26, <http://www.nber.org/papers/w17159.pdf> (Accessed March 11, 2012).

(i.e. GPA, undergraduate major) and post-collegiate experience (i.e. current salary, occupation, highest degree attained) variables. The following regression model was utilized for this thesis:

$$W_i = \beta_0 + \beta_1 Soc_i + \beta_2 Abil_i + \beta_3 P_i + \beta_4 Q_i + \beta_5 Exp_i + \beta_6 Post_i$$

Wage (W_i) is a function of socio-demographic (Soc_i), individual ability ($Abil_i$), pre-collegiate academic characteristics (P_i), college quality (Q_i), college experience (Exp_i) and post-collegiate experience variable categories. The next section will outline the model and explain how the necessary data was collected.

Sample, Variables, and Data Sources

The sample consists of 11,290 respondents and their responses to thirteen questions. The dependent variable, current salary, and all independent variables were compiled by the 1993/2003 Baccalaureate and Beyond Longitudinal Study (B&B: 93/03).²

Sponsored by the National Center for Education Statistics (NCES), U.S. Department of Education, the study followed a cohort of students who graduated from college during the 1992-93 academic year. Students were first interviewed following graduation in 1993 and again in 1994, providing academic transcripts from their undergraduate schools. A follow-up interview was conducted in 1997 with the final interview taking place in 2003. Post-baccalaureate education, employment and career development, family formation, and finances were provided during the 2003 interview.

² National Center for Education Statistics, "1993/03 Baccalaureate and Beyond Longitudinal Study (B&B: 93/03)," (NCES, 2005). <http://nces.ed.gov/pubs2006/2006166.pdf> (Accessed March 7, 2012).

The data set was compiled from the 1993/2003 Baccalaureate and Beyond Longitudinal Study (B&B: 93/03) for several reasons. It provided all of the necessary variables needed to test the effects of a liberal arts education on future earnings. The survey respondents provided information regarding socio-demographics, individual ability, pre-collegiate academic characteristics, college quality, college experience, and post-collegiate experience. Within these sub-categories, data concerning annual earnings, ethnicity, gender, need-based aid, parent's highest education, SAT score, high school type, total college costs, Carnegie code, college GPA, undergraduate major, occupation, and highest degree attained were retrieved.

The goals of the study are well aligned with the goals of this thesis. The Baccalaureate and Beyond Study wanted to determine the effect a bachelor's degree had on student's future lives, accounting for occupation and earnings. This thesis also wants to determine the effects a bachelor degree has on the occupation and pay of graduates.

The Baccalaureate and Beyond Study is also representative of all 50 states and offers responses from students of differing genders and ethnicities that attended selective and non-selective liberal arts schools as well as all non-liberal arts school types. This accompanied with a large-scale quantitative sample size of 11,290 improves the likelihood that the data sample is representative of all U.S. undergraduate outcomes.

Variables

Current Salary

The dependent variable, current salary, lists the current or most recent salary for the survey respondents. Current salary was coded in thousands of dollars and used as a proxy for the value added by an undergraduate degree. Salary ranged from \$1 to \$500,000, with a mean value of \$55,193.

Socio-Demographic

Socio-demographic variables consisted of ethnicity, gender, need-based aid and parent's highest education. Ethnicity listed the respondent's race. Ethnicity variables were dummy-coded, with white and non-Hispanic respondents receiving a 1 and all others a 0. Approximately 82.6% of the respondents were white and non-Hispanic.

Gender indicated whether the respondent was male or female. The gender variable was dummy-coded, with male respondents receiving a 1 and females a 0. Approximately 54.4% of the respondents were female, with 45.2% being male.

Need-based aid represented the total need-based aid received by the respondent for college attendance, with 37.6% needing aid. Parent's highest education refers to the highest degree received by either parent of the respondent. This variable was dummy-coded, with parent's receiving a bachelor's degree or above assigned a 1 and those receiving below a bachelor's degree a 0.

Individual Ability

Individual ability consisted of the respondents' SAT score. The reported scores ranged from 400 to 1600, with a mean value of 997.

Pre-Collegiate Academic Characteristics

Pre-collegiate academic characteristic variables were defined by high school type. This variable was dummy-coded, with private high school responses receiving a 1 and all others a 0. Of the respondents, 10.5% attended a private high school.

College Quality

College quality variables were composed of total college costs and the Carnegie code. Total college costs ranged from \$530 to \$45,375, with a mean value of \$12,131. Carnegie code was respondents' classification code for their undergraduate school. The main Carnegie codes examined were Liberal Arts I and II institutions and Research I and II schools. Liberal arts I schools are "primarily undergraduate colleges with a major emphasis on baccalaureate degree programs. They award 40 percent or more of their baccalaureate degrees in liberal arts fields and are restrictive in admissions."³ Liberal Arts II schools are "primarily undergraduate colleges with major emphasis on baccalaureate degree programs. They award less than 40 percent of their baccalaureate degrees in liberal arts fields or are less restrictive in admissions."⁴

Research I schools "offer a full range of baccalaureate programs, are committed to graduate education through the doctorate, and give high priority to research. They award 50 or more doctoral degrees each year. In addition, they receive annually \$40

³ National Center for Education Statistics, "1993/03 Baccalaureate and Beyond Longitudinal Study (B&B: 93/03)," (NCES, 2005). <http://nces.ed.gov/pubs2006/2006166.pdf> (Accessed March 7, 2012).

⁴ Ibid.

million or more in federal support.”⁵ Research II institutions “offer a full range of baccalaureate programs, are committed to graduate education through the doctorate, and give high priority to research. They award 50 or more doctoral degrees each year. In addition, they receive annually between \$15.5 million and \$40 million in federal support.”⁶

This variable was dummy-coded in four ways. First, all Liberal Arts I schools received a 1 and any other undergraduate school a 0. Second, all Liberal Arts II schools received a 1 and any other undergraduate school a 0. Third, all Research I schools received a 1 and any other undergraduate school a 0. Lastly, all Research II schools received a 1 and any other undergraduate school a 0. Approximately 5% of the respondents attended a Liberal Arts I school while 9.7% attended a Liberal Arts II school. Also, 23.2% attended Research I colleges while 7.9% of the respondents went to Research II schools.

College Experience

College experience variables consisted of GPA and undergraduate major. GPA was respondents’ cumulative grade-point-average after the completion of college, ranging from 0.20 to 4.0 with a mean value of 3.17. Undergraduate major was the respondent’s undergraduate field of study. Biology Sciences, Business and Management, Education, Engineering, Health Professions, History, Humanities, Math and Science, Psychology, Public Affairs/Social Services and Social Science were the undergraduate majors

⁵ Ibid.

⁶ Ibid.

included. This variable was dummy-coded for each major, receiving a 1 if it matched the major and 0 if not.

Post-Collegiate Experience

Post-collegiate experience variables included occupation and highest degree attained. Occupation stated the occupational category that best described the respondent's job in 2003. Administrative/Clerical/Legal Support, Business and Management, Computer Science, Editors/Writers/Performers, Educators, Engineering/Architecture, Human/Protective Service/Legal Professional, Mechanics, Laborers, Medical Professionals, Research/Scientists/Technical and Service Industries were the occupations included. Each occupation was dummy coded, receiving a 1 if it matched the occupation and 0 if not. The highest degree attained variable refers to the highest degree the respondent had attained as of 2003. This variable was dummy-coded, with respondents who attained above a bachelor's degree receiving a 1, and those with a bachelor's degree or below a 0.

CHAPTER IV

RESULTS

Chapter IV examines a correlation matrix of the dependent variable, salary, and the independent variables. The following chapter also inspects 5 different regression model results. The first model shows the effects of all the independent variables on salary, while the next four account for the effects of Liberal Arts I, Liberal Arts II, Research I, and Research II schools on salary utilizing instrumental variables regression equations.

Correlations of salary and the independent variables are shown in Table 1. The correlation matrix shows little signs of multicollinearity. Education occupation and education major ($r = 0.421$), engineering occupation and engineering major ($r = 0.507$) and health occupation and health major ($r = 0.435$) are the only highly correlated independent variables.

Model I, as shown in Table 2, included salary and all of the independent variables. Gender was the only significant socio-demographic variable, with males earning approximately \$15,000 more annually than females. Ethnicity, need-based aid and parent's highest education all proved to be insignificant. Individual ability and pre-collegiate academic characteristic variables were also insignificant as SAT score and high

school type didn't have a major impact on future earnings.

Select college quality variables were significant. Total cost and Research I schools were positively associated and significant. Liberal Arts II schools were also significant, yet negatively associated. Research II and Liberal Arts I schools proved to be insignificant. These findings dispute the research hypothesis that liberal arts schools produce higher earnings employees. They indicate that students will earn significantly less money at a less selective liberal arts institution and earn more money at a large Research I school.

College experience variables also were significant, including GPA, education major, engineering major, humanities major, and psychology major. GPA and engineering major were positively associated while education major, humanities major, and psychology major was negatively associated.

Post-collegiate experience variables included several significant occupations. Business and management, computer science, human/protective service/legal professional, and medical professionals were positively correlated and significant. Highest degree obtained was also positively correlated and significant.

Models II-V, shown in Tables 3 and 4, consist of instrumental variable regression results. Instrumental variable regression equations were used to account for possible simultaneous effects on future graduate salary. The ability of each respondent to go to a specific college was determined by ethnicity, need-based aid, parent's highest education, SAT score, high school type, and total college cost. Each of these pre-collegiate variables doesn't have a direct effect on what a graduate earned but rather if he or she was admitted

to a certain college type. A regular OLS assumes that all of the pre-collegiate variables included in the research model also affect respondent's future earnings. Therefore, an instrumental variable regression must be utilized to improve estimations of graduate earnings.

The four selected college types, as shown in Table 3, were regressed against pre-collegiate variables. These variables strongly influence the ability of the studies' respondents to attend different types of colleges, designated by the four Carnegie codes. Each Carnegie code, including Liberal Arts I, Liberal Arts II, Research I, and Research II colleges, were "instrumented" against select "instrument" variables. This provided a predicted number of accepted respondents to each of the four school types. Salary was then regressed against the predicted accepted respondents, along with their accompanying college and post-collegiate variables, including GPA, undergraduate major, occupation, and highest degree obtained values from the selected respondent.

Model II executed an instrumental variable regression with the Liberal Arts I variable starting as the dependent variable, as shown in Table 3. The Liberal Arts I variable was regressed against ethnicity, gender, need-based aid, parent's highest education, high school type, SAT score, and total cost of college variables. It found ethnicity, gender, need-based aid, parent's highest education, SAT score, and high school type all significant and positively correlated with Liberal Arts I school attendees. The predicted Liberal Arts I school attendee variable, found in Table 4, was significant and positively correlated with salary. This model suggests that respondents who attend selective liberal arts schools will earn approximately \$20,000 more annually than those

who do not. The findings support the research hypothesis that students who attend liberal arts schools earn more in their respective careers. However, the findings suggest that only students who attend selective liberal arts schools earn higher salaries.

Current salary was then regressed against the predicted Liberal Arts I accepted student variable and college and post-collegiate variables, including GPA, undergraduate major, occupation, and highest degree obtained. Gender, GPA, engineering major, business and management occupation, computer science occupation, human/protective service/legal professional occupations, medical professional occupations, and highest degree obtained were positively associated with salary and significant. Education, humanities, and psychology major variables were significant and negatively correlated with salary.

Model III executed an instrumental variable regression with the Liberal Arts II variable starting as the dependent variable, as shown in Table 3, and was regressed against ethnicity, gender, need-based aid, parent's highest education, high school type, SAT score, and total cost of college variables. SAT score and parent's highest education were significant and negatively correlated with Liberal Arts II schools. Total cost of college was significant and positively correlated.

The predicted Liberal Arts II college attendee variable, found in Table 4, was insignificant and negatively correlated with salary. This finding disputes the research hypothesis that liberal arts graduates earn more in the workforce. Graduates from less selective colleges don't have a major impact on the dependent variable salary in the instrumental variable regression equation. Also, the Liberal Arts II variable is negatively

correlated with salary, suggesting that attending a less selective liberal arts school will significantly detract from future earnings.

Current salary was then regressed against the predicted Liberal Arts II accepted student variable and college and post-collegiate variables. Gender, GPA, engineering and social science majors, business and management occupations, computer science occupations, human/protective service/legal professional occupations, medical professional occupations and highest degree obtained were significant and positively correlated with salary. Education, humanities, and psychology major variables were also significant, but negatively correlated with salary.

Model IV, as shown in Table 3, executed an instrumental variable regression with the Research I variable starting as the dependent variable and was regressed against ethnicity, gender, need-based aid, parent's highest education, high school type, SAT score, and total cost of college variables. SAT score and parent's highest education were significant and positively correlated with Research I schools. Total college cost, ethnicity, and need-based aid were significant and negatively correlated with Research I schools.

The predicted Research I attendee variable, shown in Table 4, was insignificant and positively correlated. This supports the research hypothesis because it suggests that attendance at a selective research school doesn't have a major positive impact on future earnings.

Current salary was then regressed against the predicted accepted Research I variable and college and post-collegiate variables. Gender, GPA, engineering major, business and management occupations, computer science occupations, human/protective

service/legal professional occupations, medical professional occupations, and highest degree obtained were significant and positively correlated with salary. Education, humanities, and psychology major variables were also significant, but negatively correlated with salary.

Model V, as shown in Table 3, executed an instrumental variable regression with the Research II variable starting as the dependent variable and was regressed against ethnicity, gender, need-based aid, parent's highest education, high school type, SAT score, and total cost of college variables. SAT scores were significant and positively correlated with Research II schools while total cost was significant and negatively correlated with salary.

The predicted Research II attendee variable, found in Table 4, was insignificant and negatively correlated with salary. This finding supports the research hypothesis indicating that attendance at a less selective research institution won't significantly boost graduates' workforce earnings.

Current salary was then regressed against the predicted accepted Research II variable and college and post-collegiate variables. Gender, GPA, engineering and social science majors, business and management occupations, computer science occupations, editors/writers/performers occupations, human/protective service/legal professional occupations, medical professional occupations and highest degree obtained were significant and positively correlated with salary. Education, humanities, and psychology major variables were also significant, but negatively correlated with salary.

CHAPTER V

CONCLUSIONS

The purpose of this study was to answer the question: Do students with a liberal arts undergraduate degree receive higher annual salaries than non-liberal arts private or public college graduates? Data analysis, conducted with results from the 1993/2003 Baccalaureate and Beyond Longitudinal Study (B&B: 93/03), contains findings that both support and refute that liberal arts graduates receive higher wages. Model I, which regressed salary against socio-demographic, individual ability, pre-collegiate academic characteristics, college quality, collegiate experience, and post-collegiate experience, found only Liberal Arts II and Research I schools significant. Liberal Arts II schools detracted \$7,253 from earnings while Research I colleges added \$4,258. Model I suggests Liberal Arts II schools may not employ High-Impact Practices in their academic curriculums or the High-Impact Practices utilized don't add value to student's post-graduation life. It also posits that Liberal Arts II colleges, or less selective liberal arts schools, may not be viewed as positively in the workforce as selective research institutions.

Model II, on the other hand, shows in Table 4 that Liberal Arts I schools are significant and positively correlated with earnings. Liberal Arts I graduates receive an extra \$20,000 from attending a selective liberal arts school. This suggests that High-

Impact Practices employed may in fact improve graduate's skill-sets and promote greater upward mobility in the workforce. Better workforce mobility should boost wages.

The discrepancy between results in Model I and Model II can be explained by analyzing the different methods exercised. Model I used an OLS Regression equation, regressing salary versus against socio-demographic, individual ability, pre-collegiate academic characteristics, college quality, college experience and post-collegiate experience variable sets. When assuming socio-demographic and pre-collegiate variables have a direct impact on earnings, the Liberal Arts I variable was negatively correlated with salary and insignificant while the Liberal Arts II coefficient was negatively correlated and significant. If socio-demographic and pre-collegiate variables are assumed to have a simultaneous and direct impact on earnings, then liberal arts institutions prove to detract from earnings.

Model II exercised an instrumental variable regression equation with the Liberal Arts I variable starting as the dependent variable and being regressed against ethnicity, gender, need-based aid, parent's highest education, high school type, SAT score, and total cost of college variables. Model II assumed that socio-demographic and pre-collegiate variables had a direct effect on which college a student was able to attend, not future wages. Liberal Arts I students that were predicted "accepted" to Liberal Arts I colleges were included with their individual ability, college experience, and post-collegiate experience variable values, as shown in Table 4. Salary was regressed against

the predicted accepted Liberal Arts I students and their college and post-college variables.

The Liberal Arts I variable was significant and positively correlated with salary. Model II's results give strong evidence in support of a Liberal Arts I education. Controlling for pre-collegiate variables, selective liberal arts schools significantly improve wages. If students are accepted to Liberal Arts I colleges, they can expect increased earnings in comparison to Liberal Arts II, Research I and Research II schools, which all garnered insignificant coefficient values in Model's III, IV and V.

Model II supports the research hypothesis that liberal arts schools that employ High-Impact Practices produce higher-earning graduates. Liberal Arts I schools have the resources that Liberal Arts II schools don't, and are therefore able to employ a greater number of High-Impact Practices more effectively. However, Stephen Lewis Jr. brings up a valid claim against the idea that one type of college is the right fit for all students. He claimed that, "The question should not be, what are the best colleges? The real question should be, best for whom?"¹ Lewis' statement suggests that not all Liberal Arts I colleges may be the best fit for student's learning needs. High-Impact Practices used at Liberal Arts I schools may not be worth the high cost of attendance. A large research university may improve a student's future earnings more than if he or she attended a selective liberal arts school. Model II indicates that attendees of Liberal Arts I schools tend to earn higher wages than graduates of Liberal Arts II, Research I or Research II colleges.

¹ Quoted in Alex Kuczynski, " 'Best' List For Colleges By *U. S. News* Is Under Fire," *The New York Times*, August 20, 2001, p. C1.

However, it's difficult to estimate whether Liberal Arts I schools truly maximize wages because individual needs vary across students.

There is also some controversy surrounding President Obama's initiative for "collecting earnings and employment information for colleges and universities, so that students can have an even better sense of the life they'll be able to build once they graduate."² This ideology promotes the idea that students should only be concerned with what they will earn post-college, not the education they receive while in college. The results of this thesis indicate that students who attend Liberal Arts I schools will earn higher future wages, but not necessarily that selective liberal arts schools are the best fit for everyone. A Wall Street Journal article entitled, "Should Colleges Be Factories for the 1%," states that students should "choose their college based on the best fit for their particular capabilities and personalities- a place where they will thrive and emerge with the greatest set of life choices appropriate to them."³ Model II of the thesis suggests that Liberal Arts I schools has been successful with certain types of students that respond positively to High-Impact Practices employed.

Future researchers should measure college fit for a number of different college types. The goal wouldn't be to determine which students earn the most, but which schools are the best fits for different types of people. This would give students significantly better advice on where they should attend college rather than the types of schools that produce the highest earning graduates.

² "Robin Mamlet and Christine VanDeVelde: Should Colleges Be Factories for the 1%?" *Wall Street Journal*, February 21, 2012, A17.

³ *Ibid.*

TABLE 1. CORRELATIONS AMONG THE VARIABLES

	Salary	Gender	Ethnicity	Need-Based Aid	Parent's Highest Education	SAT Score	High School Type	Total College Cost	Liberal Arts I	Liberal Arts II	Research I	Research II
Salary	1.000											
Gender	0.254	1.000										
Ethnicity	-0.008	0.023	1.000									
Need-Based Aid	0.007	0.014	-0.065	1.000								
Parent's Highest Education	0.055	0.026	0.052	-0.081	1.000							
SAT Score	0.128	0.162	0.131	0.054	0.205	1.000						
High School Type	0.006	0.008	-0.007	-0.025	0.063	0.036	1.000					
Total College Cost	0.089	0.008	0.030	0.347	0.156	0.205	0.118	1.000				
Liberal Arts I	0.015	0.022	0.052	0.235	0.133	0.184	0.068	0.356	1.000			
Liberal Arts II	-0.070	-0.008	-0.005	0.048	-0.061	-0.133	0.010	0.041	-0.088	1.000		
Research I	0.111	0.073	-0.086	-0.103	0.062	0.216	-0.009	-0.088	-0.192	-0.177	1.000	
Research II	-0.011	0.015	0.028	-0.017	0.012	0.038	-0.011	-0.060	-0.092	-0.084	-0.183	1.000
GPA	0.025	-0.127	0.109	0.040	0.060	0.285	0.002	0.097	0.041	0.038	-0.001	-0.030
Major												
Biology Sciences	0.015	0.027	-0.050	0.063	0.037	0.089	-0.001	0.051	0.065	-0.008	0.036	-0.005
Business and Management	0.066	0.069	0.005	-0.047	-0.052	-0.078	-0.010	-0.053	-0.072	0.028	-0.054	0.015
Education	-0.170	-0.200	0.066	-0.024	-0.046	-0.129	0.008	-0.053	-0.030	0.060	-0.096	0.012
Engineering	0.132	0.240	-0.044	0.017	0.008	0.166	-0.028	-0.012	-0.069	-0.050	0.123	0.028
Health Professions	0.007	-0.094	-0.001	-0.021	-0.030	-0.061	-0.023	0.008	-0.073	-0.033	-0.024	0.009
History	0.009	0.028	0.022	0.004	0.025	0.039	0.039	0.031	0.030	-0.002	0.010	-0.028
Humanities	-0.066	-0.044	0.003	0.052	0.063	0.069	0.024	0.055	0.132	-0.036	-0.012	-0.048
Math & Science	0.043	0.090	-0.021	0.036	0.035	0.119	-0.034	-0.001	0.047	0.007	-0.005	-0.016
Psychology	-0.053	-0.083	0.018	-0.023	-0.011	-0.039	-0.020	0.001	-0.004	0.038	0.006	0.006
Public Affairs/Social Services	-0.024	-0.011	-0.026	-0.007	-0.040	-0.106	-0.010	-0.017	-0.032	0.051	-0.044	0.000
Social Science	0.064	0.039	-0.010	-0.001	0.029	0.024	0.030	0.048	0.056	-0.020	0.060	0.020
Occupation												
Administrative/Clerical/Legal Support	-0.092	-0.076	-0.016	-0.002	-0.027	-0.040	-0.022	-0.058	-0.009	-0.002	-0.026	0.010
Business and Management	0.153	0.084	0.019	-0.042	-0.016	-0.017	0.017	0.023	0.012	-0.023	0.052	-0.011
Computer Science	0.067	0.127	-0.034	0.013	-0.006	0.056	-0.023	-0.021	-0.015	0.015	0.004	0.006
Editors/Writers/Performers	-0.009	-0.046	0.026	0.007	0.019	0.065	0.027	0.043	0.038	-0.030	0.005	0.008
Educators	-0.241	-0.231	0.021	0.016	-0.011	-0.109	0.004	-0.035	-0.007	0.029	-0.099	-0.012
Engineering/Architecture	0.076	0.188	-0.007	0.013	0.007	0.120	-0.014	-0.023	-0.036	-0.034	0.070	0.028
Human/Protective Service/Legal Professional	0.023	0.002	-0.035	0.019	-0.002	-0.008	0.020	0.021	0.005	0.036	-0.015	0.010
Mechanics, Laborers	-0.016	0.117	0.023	-0.026	0.005	-0.055	-0.002	-0.031	-0.020	0.056	-0.012	0.004
Medical Professionals	0.064	-0.087	-0.029	0.022	0.036	0.031	-0.001	0.057	0.009	-0.025	0.041	-0.017
Research, Scientists, Technical	-0.007	0.055	-0.013	0.019	0.009	0.083	-0.025	0.010	0.019	0.002	0.046	0.006
Service Industries	-0.019	0.000	0.031	-0.029	0.003	-0.068	-0.001	-0.021	-0.012	-0.005	-0.049	0.008
Highest Degree	0.068	-0.026	0.001	0.049	0.112	0.195	0.053	0.146	0.093	0.049	0.067	0.002

+ p < 0.1

* p < .05

** p < .01

*** p < .001

TABLE 1 - CONTINUED

	GPA	Major	Biology Sciences	Business and Management	Education	Engineering	Health Professions	History	Humanities	Math & Science	Psychology	Public Affairs/Social Services	Social Science
GPA	1.000												
Major		1.000											
Biology Sciences	0.029		1.000										
Business and Management	-0.040		-0.094	1.000									
Education	0.059		-0.105	-0.145	1.000								
Engineering	-0.022		-0.079	-0.109	-0.122	1.000							
Health Professions	0.071		-0.069	-0.096	-0.107	-0.081	1.000						
History	-0.008		-0.040	-0.056	-0.062	-0.045	-0.041	1.000					
Humanities	0.069		-0.089	-0.124	0.138	-0.104	-0.092	-0.053	1.000				
Math & Science	0.002		-0.071	-0.099	-0.111	-0.083	-0.073	-0.042	-0.094	1.000			
Psychology	-0.007		-0.052	-0.071	-0.080	-0.060	-0.053	-0.031	-0.068	-0.054	1.000		
Public Affairs/Social Services	-0.023		-0.040	-0.056	-0.063	-0.047	-0.042	0.024	-0.053	-0.043	-0.031	1.000	
Social Science	-0.067		-0.096	-0.133	-0.149	-0.112	-0.099	-0.057	-0.127	-0.102	-0.073	-0.058	1.000
Occupation													
Administrative/Clerical/Legal Support	-0.009		-0.040	0.008	-0.009	-0.053	-0.041	0.038	0.023	-0.026	0.017	0.038	0.013
Business and Management	-0.069		-0.074	0.237	-0.129	-0.036	-0.064	0.006	-0.023	-0.062	-0.004	-0.009	0.084
Computer Science	-0.048		-0.041	0.023	-0.053	0.096	-0.038	-0.020	-0.024	0.194	-0.039	-0.028	-0.036
Editors/Writers/Performers	0.062		-0.044	-0.038	-0.006	-0.059	-0.060	0.003	0.157	-0.048	-0.027	-0.020	-0.007
Educators	0.071		-0.049	-0.112	0.421	-0.134	-0.090	0.014	0.042	-0.030	0.019	-0.054	-0.075
Engineering/Architecture	-0.003		-0.049	-0.072	-0.093	0.507	0.001	-0.039	-0.051	0.045	-0.045	-0.039	-0.072
Human/Protective Service/Legal Professional	0.004		-0.058	-0.072	-0.034	-0.080	-0.051	0.023	0.008	-0.057	0.077	0.164	0.118
Mechanics, Laborers	-0.071		-0.010	0.019	-0.024	-0.018	-0.019	0.005	-0.007	0.009	-0.006	0.030	-0.002
Medical Professionals	0.097		0.301	-0.097	-0.100	-0.083	0.435	-0.026	-0.076	-0.019	-0.006	-0.037	-0.084
Research, Scientists, Technical	0.016		0.112	-0.042	-0.066	0.045	-0.044	-0.020	0.046	0.155	-0.014	-0.033	-0.006
Service Industries	-0.083		-0.041	0.066	-0.054	-0.052	-0.037	-0.005	0.020	-0.054	0.001	0.023	0.040
Highest Degree	0.183		0.100	-0.070	0.024	0.017	-0.050	0.028	0.009	0.027	0.025	-0.023	0.017

+ p < 0.1

* p < .05

** p < .01

*** p < .001

TABLE 1 - CONTINUED

Occupation	Admin./Clerical/Legal Support	Business and Management	Computer Science	Editors/Writers/Performers	Educators	Engineering/Architecture	Hum.	Mech., Laborers	Medical Prof.	Res., Sci., Tech.	Serv.	Highest Degree
Occupation	1.000											
Administrative/Clerical/Legal Support	1.000											
Business and Management	-0.100	1.000										
Computer Science	-0.039	-0.130	1.000									
Editors/Writers/Performers	-0.039	-0.128	-0.050	1.000								
Educators	-0.087	-0.287	-0.113	-0.112	1.000							
Engineering/Architecture	-0.044	-0.145	-0.057	-0.056	-0.126	1.000						
Human/Protective Service/Legal Professional	-0.055	-0.181	-0.071	-0.070	-0.158	-0.080	1.000					
Mechanics, Laborers	-0.022	-0.074	-0.029	-0.029	-0.064	-0.032	-0.041	1.000				
Medical Professionals	-0.059	-0.194	-0.077	-0.076	-0.169	-0.086	-0.107	-0.043	1.000			
Research, Scientists, Technical	-0.045	-0.147	-0.058	-0.057	-0.128	-0.065	-0.081	-0.033	-0.087	1.000		
Service Industries	-0.052	-0.170	-0.067	-0.066	-0.148	-0.075	-0.094	-0.038	-0.100	-0.076	1.000	
Highest Degree	-0.058	-0.109	-0.073	-0.062	0.153	-0.018	0.128	-0.089	0.088	0.011	-0.099	1.000

+ p < 0.1

* p < .05

** p < .01

*** p < .001

TABLE 2. OLS REGRESSION RESULTS
 (Dependent variable is Salary; t-statistics reported in parenthesis)

Intercept	22029.9	**	-(3.27)
Gender	15114.6	***	-(11.69)
Ethnicity	-974.4		-(0.59)
Need Based Aid	-0.1		-(0.64)
Parent's Highest Education	1666.4		(1.28)
SAT Score	1.3		(0.36)
High School Type	-11.0		-(0.61)
Total College Cost	0.4	***	(4.23)
Liberal Arts I	-1999.8		-(0.85)
Liberal Arts II	-7253.7	**	-(3.15)
Research I	4258.1	**	(2.9)
Research II	-1316.3		-(0.59)
College GPA	43.8	**	(3.15)
Undergraduate Major			
Biology Sciences	-3976.1		-(1.34)
Business and Management	3735.8		(1.61)
Education	-5443.8	*	-(2.38)
Engineering	7845.6	**	(2.69)
Health Professions	-2978.1		-(0.99)
History	1063.8		(0.26)
Humanities	-6878.7	**	-(2.91)
Math & Science	2951.0		(1.06)
Psychology	-7429.3	*	-(2.22)
Public Affairs/Social Services	-4873.5		-(1.18)
Social Science	3779.1	+	(1.67)
Occupation			
Administrative/Clerical/Legal Support	-7694.7		-(1.33)
Business and Management	16392.3	**	(3.38)
Computer Science	14058.8	**	(2.59)
Editors/Writers/Performers	8604.2		(1.58)
Educators	-6512.2		-(1.32)
Engineering/Architecture	8064.5		(1.49)
Human/Protective Service/Legal Professional	10098.1	*	(1.98)
Mechanics, Laborers	-141.3		-(0.02)
Medical Professionals	16647.7	**	(3.2)
Research, Scientists, Technical	2639.4		(0.5)
Service Industries	6562.3		(1.28)
Highest Degree	6003.9	***	(4.52)
Adjusted R-Squared	0.15		
F Statistic	22.03		

+ p < 0.1

* p < .05

** p < .01

*** p < .001

TABLE 3. TSLS STAGE I
 (Dependent variable is each Carnegie code; t-statistics reported in parenthesis)

	<u>Model II:</u> <u>Liberal Arts I</u>			<u>Model III:</u> <u>Liberal Arts II</u>			<u>Model IV:</u> <u>Research I</u>			<u>Model V:</u> <u>Research II</u>		
Ethnicity	0.029	*	(2.89)	0.016		(1.56)	-0.135	***	-(8.28)	0.016		(1.56)
Need Based Aid	0.000	***	(10.78)	0.000	+	(1.91)	0.000	***	-(5.68)	0.000		(0.38)
Parent's Highest Education	0.05	***	(6.18)	-0.023	**	-(2.76)	0.027	*	(2)	0.014	+	(1.7)
SAT Score	0.000	***	(7.93)	0.000	***	-(9.88)	0.000	***	(17.7)	0.000	**	(2.83)
High School Type	0.042	***	(3.74)	0.013		(1.18)	-0.019		-(1.04)	-0.008		-(0.66)
Total College Cost	0.000	***	(19.6)	0.000	***	(4.12)	0.000	***	-(8.04)	0.000	***	-(5.33)

+ p < 0.1

* p < .05

** p < .01

*** p < .001

TABLE 4. TSLS STAGE II
(Dependent variable is Salary; t-statistics reported in parenthesis)

	<u>Model II</u>			<u>Model III</u>			<u>Model IV</u>			<u>Model V</u>		
Intercept	26000.1	***	(4.03)	25900.8	***	(4.06)	25663.7	***	(3.96)	29141.1	***	(4.16)
Gender	14867.4	***	(11.45)	15269.3	***	(11.91)	15207.1	***	(11.82)	15362.2	***	(11.71)
Liberal Arts I	19693.4	***	(3.52)									
Liberal Arts II				-7653.4		(-0.54)						
Research I							1119.6		(0.22)			
Research II										-30461.9		(-1.27)
College GPA	44	**	(3.3)	49.3	***	(3.54)	46.9	***	(3.55)	41.8	**	(2.97)
Undergraduate Major												
Biology Sciences	-5215.2	+	(-1.73)	-3642.2		(-1.24)	-3676.6		(-1.25)	-3369.7		(-1.12)
Business and Management	3506.5		(1.5)	3052.9		(1.3)	2928.8		(1.24)	3364.7		(1.4)
Education	-6727.4	**	(-2.91)	-6099.2	*	(-2.59)	-6336.7	**	(-2.73)	-5883.7	*	(-2.48)
Engineering	9962.2	**	(3.39)	8720.4	**	(2.98)	8838.5	**	(2.98)	9579.3	**	(3.2)
Health Professions	-2015.0		(-0.66)	-3317.7		(-1.1)	-3005.0		(-0.99)	-2199.2		(-0.7)
History	281.7		(0.07)	1810.4		(0.44)	1754.3		(0.43)	390.1		(0.09)
Humanities	-8984.8	***	(-3.63)	-6537.7	**	(-2.78)	-6364.4	**	(-2.72)	-7400.4	**	(-2.94)
Math & Science	1536.8		(0.54)	2963.5		(1.07)	2946.4		(1.06)	2557.4		(0.9)
Psychology	-8175.3	*	(-2.42)	-7295.9	*	(-2.12)	-7745.4	*	(-2.31)	-7294.2	*	(-2.12)
Public Affairs/Social Services	-5733.8		(-1.38)	-5567.6		(-1.31)	-6065		(-1.46)	-6155.9		(-1.47)
Social Science	3189.2		(1.39)	4435.2	*	(1.97)	4409.1	+	(1.95)	5006.9	*	(2.15)
Occupation												
Administrative/Clerical/Legal Support	-7605.5		(-1.3)	-8147.3		(-1.4)	-7874.0		(-1.36)	-6656.4		(-1.11)
Business and Management	17414.6	***	(3.56)	17407.4	***	(3.58)	17583.8	***	(3.61)	17973.0	***	(3.63)
Computer Science	14693.4	**	(2.73)	14666.6	**	(2.71)	14632.7	**	(2.7)	15437.4	*	(2.77)
Editors/Writers/Performers	9771.5		(1.78)	9764.6	+	(1.77)	10158.5	+	(1.86)	11510.6	*	(2.04)
Educators	-5989.1		(-1.2)	-6512.7		(-1.32)	-6364.6		(-1.29)	-6045.0		(-1.2)
Engineering/Architecture	8888.4		(1.62)	8575.9		(1.58)	8731.5		(1.61)	9990.4	+	(1.78)
Human/Protective Service/Legal Professional	10770.3	*	(2.09)	10501.6	*	(2.06)	10444.3	*	(2.05)	11248.9	*	(2.14)
Mechanics, Laborers	160.2		(0.02)	157.2		(0.02)	-507.0		(-0.08)	211.3		(0.03)
Medical Professionals	17901.9	**	(3.4)	17920.6	**	(3.44)	18010.7	**	(3.44)	18027.3	**	(3.39)
Research, Scientists, Technical	3603.7		(0.68)	3578.6		(0.68)	3583.8		(0.68)	4027.5		(0.75)
Service Industries	7198.9		(1.39)	6895.2		(1.34)	7146.0		(1.39)	7872.4		(1.49)
Highest Degree	6485.8	***	(4.84)	7127.8	***	(5.11)	7327.3	***	(5.46)	7631.6	***	(5.69)
R-Squared	0.13			0.15			0.15			0.11		
Wald Statistic	720.56			724.58			723.15			695.24		

+ p < 0.1

* p < .05

** p < .01

*** p < .001

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