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THE ROLE OF IRRATIONAL EXUBERANCE IN RISING TUITION PRICES

CLINTON MYRA
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Reviewed and approved* by the following:

Sajay Samuel
Clinical Associate Professor of Accounting
Thesis Supervisor

James Miles
Professor of Finance, Joseph F. Bradley Fellow of Finance
Honors Adviser

*Signatures are on file in the Schreyer Honors College

ABSTRACT

This paper explores the possibility that “irrational exuberance” on the part of students contribute to the large tuition increases in higher education over the last three decades. I examine this thesis by using a decision model to capture the costs and benefits to a student of obtaining a college degree. I use SAT scores as a proxy for future earnings to evaluate the alternatives and opportunity costs for students. Using a sensitivity analysis for select variables in the decision model helps provide further indication of what factors have the greatest impact on the decision presented to students.

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Chapter 1 Introduction

The cost of a college education has skyrocketed in the United States since 1982. Tuition and academic fees have risen by approximately 439% in constant dollars (Measuring up, 2008) while room and board expenses have doubled in actual dollars (Hacker and Dreifus, 2011). During this same time period the consumer price index rose by only 106%, median family income grew by 147%, and housing costs increased by approximately 107%. Medical care is the only major expense category in the United States that rose at a rate remotely close to that of a college education, rising by 251%, though still trailing the rise in tuition and fees by 188% (Measuring up, 2008).

The method of financing an education has also greatly shifted over the last two decades. The rapidly increasing costs have almost fully eliminated the possibility of funding an education without the use of debt for most Americans. The total amount of outstanding student loans in the United States has grown to nearly $1 trillion, surpassing the amount of total credit card debt of Americans (Cauchon 2011).This cumulative balance is a rise of approximately 1011% since 1999, when the amount of outstanding student debt stood at roughly $90 billion (Jaffe 2011). Students are graduating with twice the amount of student debt than they were in 2001 (Cauchon 2011) and approximately 10% of all students graduating owed more than $40,000 in student loans, a nine-fold increase since 1996 (TICAS, 2010).

These dramatic increases over the last thirty years could be easily explained if the quality and benefits of an education have substantially risen over the same time period, but they have not. The Social Science Research Council recently set out to measure the academic benefits gained by students attending college and published the results in a book titled, *Academically Adrift.* The results of this study suggest that a college education does little if anything to increase

learning. The study tracked the progress and academic gains of 2,300 college students throughout their college career. Of these students, forty-give percent "did not demonstrate any significant improvement in learning" during the first two years of college and thirty-six percent had still not demonstrated any significant improvement after four years. Those students who did show improvement only demonstrated slight improvements over four years of college. The essay also documents that over the last twenty years a greater amount of students' attention and time have turned to non-academic activities while the amount of study time has decreased substantially (Jaschik, 2011).

The benefits gained after college graduation have also been spooty, with minimal meaningful improvements. As reported in Wall Street Journal, "Workers between 20 and 24 years old have a 14.6 percent unemployment rate, compared to the national average of 9.1 percent recorded in July [of 2011]." (Jaffe 2011) A Rutgers University study found that only 56% of college graduates were successful in finding jobs in their field of study upon graduation and of those who were able to find a job, only 71.1% of the graduates were in jobs that required a college degree (Rampell, 2011).

As colleges struggle to provide quality education at a reasonable price, government funding for these institutions has decreased from year to year. From 2010 to 2011, overall state funding for college intuitions decreased by 7.6%, reflective of the same decreases seen over the last decade (Lederman, 2012). Decreasing state funding has taken much of the blame for hefty tuition increases over the last decade, but what about when state funding was constant? Endowments at colleges and universities grew at a rapid pace throughout much of the 1990's, yet increased tuition prices were commonplace from year to year (Ehrenberg, 2002). The increasing size of these endowments, large tuition increases, and the complicated nature of educational

finance has prompted many experts to conduct research aimed at finding an explanation for these large tuition increases.

Chapter 2 Literature Review

Early research focused primarily on the tuition increases during the 1980's and found that "market segmentation" played a significant role in the tuition setting and cost allocation behavior of universities and colleges. Between 1978 and 1985, private four year colleges with the largest endowments increased net tuition at a rate three times faster than that of schools with smaller endowments. During the same time period, the larger endowed schools increased capital spending on physical plant by 266% in real terms compared to a modest 4% increase of schools with the smaller endowments (McPherson, Scapiro, & Winston, 1989). Another important observation made was that increases during this time period could not be explained by federal grant aid because the universities experiencing the most rapid increases were the elite private college and universities, whereas only 5% of total revenue is accounted for by federal aid and remained flat during the study period (McPherson et al, 1989).

Mcpherson and Winston later argued that rapid increases in spending and prices at elite universities was a function of competition over input quality and a result of the surge in demand for the elite education earned at the highest quality schools (Mcpherson & Winston, 1988). This demand was also found to be true by Robert H. Frank, when he stated, "between 1979 and 1989, the percentage of students who scored above 700 on the SAT verbal section and matriculated at one of the 33 'most competitive' schools on the Barron's list rose from 32 percent to 43 percent (Frank, 1999)." Enhrenberg titled this driving force a "winner-take all" mentality, which captures the strategy of selective universities which, in a constant race against competitors, have identified outspending the competition as the most effective method of appearing superior. These institutions "have chosen to maintain and increase quality largely by spending more, not by increasing efficiency, reducing costs, or reallocating funds" (Ehrenberg, 2002).

Kantrowitz developed a quantitative linear model that used relationships between the dependent variable (tuition) and independent variables (expenses, state revenue, gifts) to explain tuition increases between 1980 and 1997. His primary findings indicated that, at public universities, over 50% of the tuition increases could be explained by increased costs of instruction and decreased state support. At private colleges, slightly less than 50% of the tuition increases were correlated with increased costs of instruction and decreased revenue from private gifts and grants (Kantrowitz, 2002). Kantrowitz also concluded that performance of the stock market, private gifts, and tuition rates are all strongly correlated, thereby ruling out the possibility that stock market decreases could be an explanation for these tuition increases (Kantrowitz, 2002).

Ehrenberg completed a study in the early 2000's that explored the forces leading to the rapid increases in tuition during the 1980's and 1990's. One of the primary drivers of tuition hikes identified by Ehrenberg was the system of shared governance between trustees, administration, and faculty. He noted that many university presidents are hesitant to attempt to balance the budget because they fear the risk of losing faculty support if department's budgets were cut dramatically. He concluded that because of these conflicts of interests, administration is likely to recommend to the trustees that increased spending is the only way to strengthen the university and attract more students (Ehrenberg, 2002).

Multiple academic papers have been written about the effects of an institution's ranking in *U.S. News & World Report.* Monks and Ehrenberg provided conclusive evidence that a more favorable ranking for an institution leads to a lower acceptance rate of its applicants, a higher quality freshmen class (measured by SAT scores), and an increase in yield (Monks & Ehrenberg, 1999). In confirming these findings, Meredith added that the greatest effects were seen at public

universities. In addition, both found that institutions adjusted net tuition levels in response to changes to rankings (Meredith, 2002). The weighting configuration of these rankings encourages high institution spending on each student as a positive factor, therefore encouraging university administration to raise spending levels, solely for the purposes of achieving higher rankings (Ehrenberg, 2002). A 2002 Pennsylvania State University task force with a charge of evaluating different tuition pricing methods highlighted this counterintuitive relationship; "These large gaps between Penn State's high academic ranking and poor rank in resources (spending) are strong indicators of efficiency...Indeed, Penn State will probably have difficulty sustaining its current ranking with existing levels of resources (spending)." (Report of the Tuition Task Force, 2002)

Chapter 3 Hypothesis

Most papers written on the causes of the significant tuition increases includes admissions that not all factors driving tuition increases have been understood and that as a consequence the phenomenon is not fully understood. “Even university presidents are hard-pressed to explain the opaque relationship between college’s finances and the price it charges for a higher education” (Kantrowitz 1). While there have been numerous papers written on the institutional and industry pressures that could explain these tuition increases, few papers have explored how the student decisions may inadvertently fuel these large tuition increases.

This paper examines the hypothesis that “irrational exuberance” from prospective students could be driving tuition prices upwards. Thus, unlike most of the previous studies of the supply factors affecting college tuition, this paper examines a demand side factor. High school seniors are often advised by parents, guidance counselors, and society that attending college after high school graduation will lead to a better life with greater job prospects and the ability to make more money. Prospective college students are typically informed of the tremendous costs but simultaneously convinced that they will be able to borrow as much money as they need to help pay for school and that college loans are a “good type of debt”. It is these forms of encouragement and reassurances that often influence students to pursue a college degree without fully weighing alternative options, and the full opportunity costs of a college education. If the decision to enter college was evaluated solely from a monetary cost/benefit standpoint, would it be concluded that these students are making rational decisions? The remaining portion of this paper attempts to answer that question.

Chapter 4 Model

To determine whether high school graduates are making rational decisions to attend college and delay entering the workforce, a decision model was formulated to capture the central parameters and variables of their decision. This model describes the mutually exclusive options that are presented to a high school graduate. The first option is choosing to attend college and therefore delaying entrance into the workforce in the hopes of securing a higher paying job in the future. The second option is for the high school graduate to immediately enter the workforce at the highest paying job available. The model evaluates which decision provides the student with the highest present value earnings, after the cost of education is accounted for.

The formulation of the decision model required the identification of several key data elements. Assuming that the net present value (NPV) of all future earnings that a student receives after successful completion of the degree, less the cost of education, is greater than the NPV of all future earnings without a college degree, the following equation is formed:

$$\pi - f \geq w$$

where:

π is the NPV of a lifetime earnings with a college degree

f is the NPV (cost) of an education and

w is the NPV of a lifetime earnings without a college degree

Now suppose that a student's SAT score serve as a proxy to predict their future earnings for each major field of study a student can choose.

$$f - \pi(z^*, \alpha) - w = 0$$

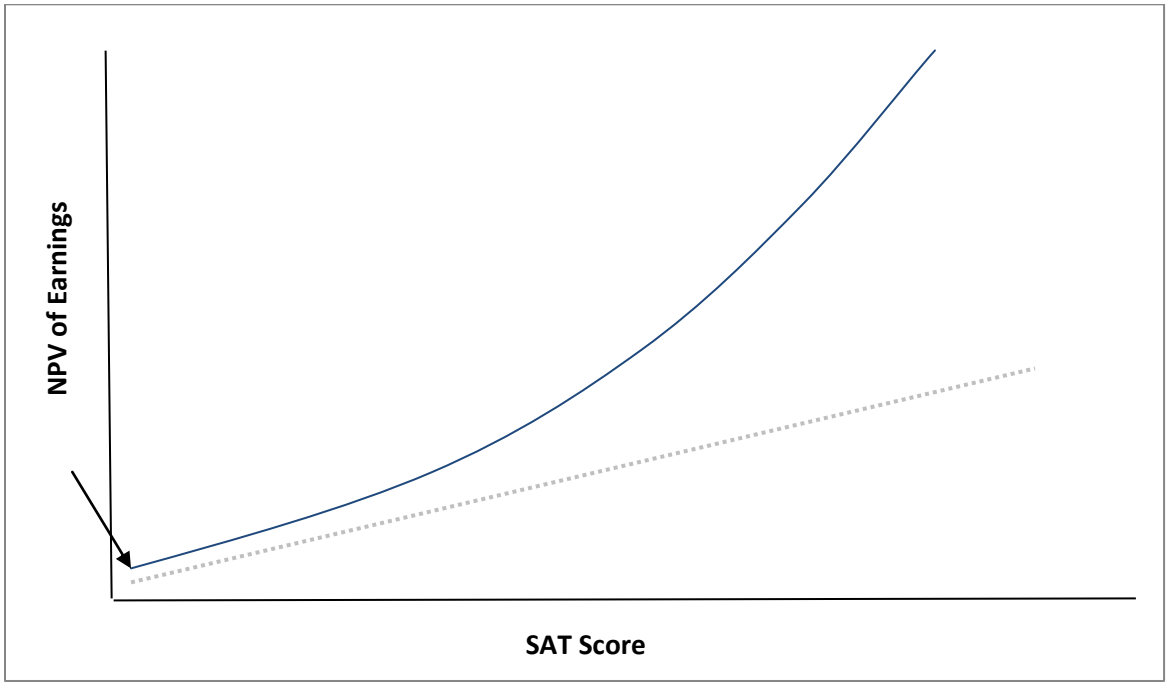
where:

z^* is the optimal choice of major proxied by the SAT score z and

α represents a positive correlation between SAT score and NPV of earnings

Figure 1 represents the relationship presumed between SAT scores and NPV of future earnings. The dashed line represents a student's NPV of earnings at a given SAT score if he/she chooses not to attend college and the solid line represents a student's NPV of earnings at a given SAT score if he/she earns a college degree. I formulate the decision problem as whether to enter college or not. At that point, the student which gains the least from a college education will be the one with the lowest post-graduation wages. Accordingly, I focus on the students with the lowest SAT scores to determine the presence of irrational exuberance or optimism in his/her decision model. If students are willing to pay more for an education than they would gain in earnings NPV, then it may be concluded that such irrational optimism might be an additional factor leading to tuition increases beyond the rate of inflation. If contrarily, the lowest level of postgraduate earnings is greater than the cost of education, then one could rule out irrational exuberance as a demand-side factor driving observed tuition hikes.

Figure 1 Relationship of SAT Scores and NPV of Earnings



Chapter 5 Data & Analysis

The first step of the analysis was to construct a table that included the following data elements: college majors, corresponding SAT scores, and corresponding salary information. Data used for the mean SAT scores by major was found in the *College Board 2010 Total Group Profile Report on College-Bound Seniors* (The College Board, 2010). This data provided average SAT scores by majors for more than 1.3 million students and represented more than thirty-five different majors. Starting and median salaries for each respective major was gathered from the - *2011-2012 Payscale College Salary Report* and included salaries for over 120 college majors (Payscale, 2012).

The first step was to create a consistent data set that could be easily used for the analysis of correlation. The Payscale report provided a more detailed selection of majors, containing over 120 majors, compared to the thirty-five majors provided by the College Board report. To accurately consolidate these two data sets, each major provided by the payscale report that did not identically match a college board major was researched and matched with the most appropriate major. If it was determined that the payscale major did not accurately match with any college board major, then it was stricken from the dataset. *Appendix A* provides a listing of the consolidated majors and the calculated figures that were used as a final data set.

Next, a calculation of the correlation between SAT scores and earnings was performed to verify a positive correlation between the two data sets. This calculation yielded a correlation of .53, indicating a significant correlation between the data sets. *Appendix B* provides a graphical representation of this correlation between the SAT scores and median earnings. Once a positive correlation between SAT scores and earnings was verified, I began the calculations for each data point presented in the decision model.

The first calculation was to find the present value of the total cost of an education (variable *f).* To calculate the yearly cost of education, I started with the average tuition price for public and private four year institutions as published by the U.S. Department of Education (Fall Enrollment, 2010). This average is enrollment weighted, meaning that schools with a higher number of full time students are given a higher weighting and schools with a lower amount of full time students are given a lower weighting. The decision to use the average for only four year institutions and exclude two year institutions was made primarily because the salary information used for the decision model is directly related to obtaining a four year, bachelors degree, and therefore would require attendance at a four year university. Next, this yearly cost of education was increased by 2.5% per year of attendance, calculated as the average growth rate after inflation of tuition increases over the last twenty years (Fall Enrollment, 2010). The yearly cost of education was projected to be incurred for five total years, the average time it takes for graduates to complete a four year program (U.S. Department of Education, 2000). The cost of education was assumed to be financed by debt for the student's five years of attendance. This assumption was thought reasonable given the hypothesis aims to capture the opportunity cost of a college education. Thus, even if the funds were obtained from parents, the calculation of debt burden captures the fact that the use of private funds carries the opportunity cost of not using them elsewhere. The financing was assumed to come from two separate sources: the first portion of educational expenses was financed by the maximum amount of allowable government loans and any remaining portion was financed by private student loans. The loan data for allowable government loans and interest rates was found on the U.S. Department of Education's website for student aid (U.S. Department of Education, 2012). The interest rate used for the loans would be 6.8% and 12%, respectively, and the term of both loans would be twenty-five years (Randall,

2009). All interest incurred during the time period as a student would be capitalized directly into the loan, as allowable by both government and private lenders. The calculation of loan balances after the five years of education are shown in table 1 below:

Table 1 Calculation of Annual Cost of Education

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Cost of Education	21,189	21,719	22,262	22,818	23,389	
Government Loan Allowable	2,000	2,000	2,000	2,000	2,000	10,000
Private Loan Required	19,189	19,719	20,262	20,818	21,389	101,376
Government Loan Accrued Interest	136	272	408	544	680	2,040
Private Accrued Interest	2,303	4,605	6,908	9,211	11,513	34,540

With this information I was able to calculate the total principal balances of both loans after the five years of education was completed. Using these principal balances, I calculated a monthly loan repayment for both loans using the appropriate interest rates and the length of the loans. These payments were then multiplied by twelve to arrive at a yearly repayment. The final step of this calculation was to find the net present value of these loan repayments. The interest rate used for this calculation was 3.19%, the current interest rate of a thirty year treasury bond (U.S. Department of Treasury).

The next step was to use the dataset that was previously created to identify the major with the lowest SAT score and to compute the present value of lifetime earnings at this SAT level. I identified the college degree with the lowest SAT score as “Family and Consumer/Human Sciences”, which had a beginning salary of $29,600 and median salary of $40,500. To

appropriately account for the increases from starting to median salary, it was necessary to calculate a yearly pay increase. According to the payscale report methodology, the average age of survey participants used for the "median salary" figure was forty-two years old. Therefore, I calculated the growth rate necessary to begin at a salary of $29,600 at age twenty-three and reach a salary of $40,500 by age forty-two to be 1.75%. The student's working career would begin immediately after completion of education at age twenty-three and would reach retirement at age sixty-five. The student's salary would begin at the $29,600 and grow at the calculated growth rate of 1.75% per year to reach $40,500 by age forty-two.

In order to provide consistency within the model, all figures used in the final formula had to be expressed as after-tax values. The first step in accounting for these taxes was to find payroll tax rates. These tax rates were found to be a total of 7.65%; 6.2% for Social Security tax and 1.45% for Medicare tax (Social Security Administration, 2012). The combined 7.65% was multiplied by the gross earnings each year to find a "payroll tax liability". The next step was to appropriately account for income taxes. Since income taxes are set at progressive rates, it was necessary to appropriately account for the multiple tax rates that an individual could be taxed. The amount of each income within each tax bracket and the respective rates were taken directly from the IRS website. The following tax rates were used in each year of earnings: $9,350 was not subject to tax, the subsequent $8,700 was taxed at 10%, the next $26,800 was taxed at 15%, and any remaining portion was taxed at 25%. These calculations combined would yield the "income tax liability" for each respective year. No inflation adjustments were necessary because all values expressed within the model are in real dollars and are not adjusted for inflation. Each year, the income tax liability and payroll tax liability would be subtracted from the gross

earnings to arrive at net earnings. The final step in this calculation was to find the net present value of all forty-three years of net earnings.

The next step was to identify the wage rate of a student at the same SAT level that chose not to attend college. Since the lowest point in the model is being measured and SAT scores are used as a proxy for earnings, it is assumed that this wage rate would be the hourly minimum wage; found to be $7.25 as of January 1, 2012. To convert this hourly rate into an annual salary, it was assumed that the worker would be paid for fifty-two weeks a year at forty hours a week, arriving at an annual pay of $15,080. This annual pay was projected to begin at age eighteen and continue until retirement at age sixty-five. To determine whether a growth rate should be applied to this annual salary it was necessary to calculate the average historical growth rate of the minimum wage. This growth rate was determined to be 4.54% before inflation and a mere -.01% after inflation. Consistent with these calculations, it was determined that no growth rate should be applied to the minimum wage annual pay. The same tax brackets and rates as discussed earlier were also applied to these earnings to arrive at a net earnings amount. The net present value of these earnings would provide the final data point. *Appendix C* shows the final results of the decision model.

The formulation and selection of original data elements of the decision model are based primarily on averages of each variable. In testing the hypothesis, it would be naïve to ignore the effects of a change to each variable. For this reason, I completed a sensitivity analysis for each of the key variables in the decision model. The results indicate that the model is sensitive to a change in discount rate, with almost the entire college wage premium eliminated if the discount rate was to be 9%. *Appendix D* displays the full results for the sensitivity analysis of this variable. The model also showed sensitivity to any yearly changes in the minimum wage salary

level. A slight raise in these yearly wages would significantly erode the wage premium, as shown in *Appendix E*. The most sensitive variable tested was the degree completion status of a student. *Appendix F* shows the results of the decision model if a student was unable to graduate with a degree.

In addition to the sensitivity analysis, there were multiple observations made throughout the experiment that are not fully captured in the decision model. First, the model presumes that a student who finishes a college degree would automatically be capable of finding a job within the chosen major. A student's inability to find a job in this area of study would decisively affect the size of the expected premium of a college education. Next, the yearly repayment of student loans projected in this model was $18,175 and lasted until the graduate reached age 48. This amount represented 61% of the graduate's gross starting salary and nearly 45% of the graduate's gross median salary. A loan repayment of this proportion could cause serious financial hardship and prevent a graduate from pursuing other life goals.

Chapter 6 Conclusion

Determining the causes of faster than inflation tuition increases is certainly a difficult task. This experiment aimed at examining the primary demand side factor for college tuition, student decision making, and determining whether irrationality by prospective students could have driven tuition upwards. The decision model was designed to evaluate the options of a graduating high school student, strictly from a monetary viewpoint. The results indicate that on average, students may in fact be making rational decisions in attending college. However, the sensitivity analysis performed shows that a change in select variables could significantly erode the benefit gained from college. For example, with elevated unemployment levels for recent college graduates, the inability to find a job after graduation is a growing concern. *Appendix G* provides a sensitivity analysis performed for the possibility of a graduate experiencing an unemployed time period after completion of their degree. The results from these sensitivity analyses help provide greater understanding of all educational output possible within the decision model.

While this experiment provides valuable insight into student decision making and its relationship to rising tuition prices, it is clearly evident that there remains further research to be performed. The relationship between student demand, rising tuition prices, and declining educational quality is something that demands understanding. Another area that I believe could provide increased knowledge is a segmentation of the "college wage premium" by SAT score. This type of research would help provide greater understanding of which students are benefiting the greatest from attending college and could offer valuable assistance to future high school graduates.

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Appendix A Calculation of Salary Information for Specified Majors

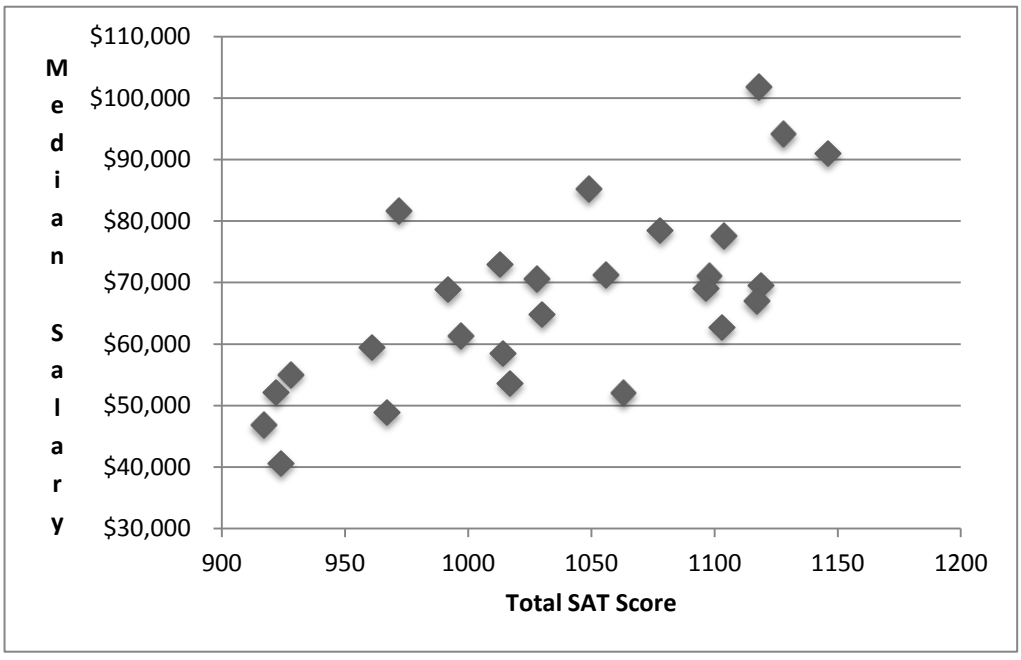
Horticulture	$39,600	$57,300
Agriculture	$38,600	$61,500
Average Agriculture	$39,100	$59,400
Landscape Architecture	$41,900	$66,700
Architecture	$41,500	$74,400
Average Architecture	$41,700	$70,550
Global & International Studies	$37,800	$72,000
International Business	$41,600	$83,700
International Relations	$40,500	$79,400
American Studies	$43,400	$78,600
Average Area, Ethnic, Cultural, and General Studies	$40,825	$78,425
~~Animal Science~~	~~$33,800~~	~~$53,700~~
Biochemistry (BCH)	$41,700	$84,700
Microbiology	$38,500	$70,100
Molecular Biology	$40,500	$81,200
Biology	$37,900	$71,900
Biotechnology	$40,800	$79,900
Average Biological & Biomedical Science	$39,880	$77,560
Business	$41,000	$70,500
Accounting	$44,700	$75,700
Finance	$46,500	$87,300
Marketing & Communications	$38,200	$73,500
Fashion Design	$36,300	$72,400
Fashion Merchandising	$36,800	$56,300
Advertising	$37,700	$74,700
Average Business Management, Marketing, and Related	$40,171	$72,914
Communications	$38,000	$66,900
Radio & Television	$35,000	$60,000
Public Relations (PR)	$35,500	$65,700
Journalism	$36,100	$66,400
Average Communication, Journalism, and Related	$36,150	$64,750
Computer Information Systems (CIS)	$47,900	$83,100
Information Systems (IS)	$48,300	$78,100
Management Information Systems (MIS)	$51,000	$88,200
Information Technology (IT)	$48,300	$78,500
Computer Science (CS)	$56,600	$97,900
Average Computer and Information Sciences	$50,420	$85,160
~~Construction Management~~	~~$50,200~~	~~$85,200~~

~~Dietetics~~	~~$41,500~~	~~$56,100~~
Education	$36,800	$54,700
Special Education	$34,300	$47,800
Elementary Education	$32,400	$44,000
Average Education	$34,500	$48,833
Aerospace Engineering	$60,700	$102,000
Biomedical Engineering (BME)	$53,800	$97,800
Chemical Engineering	$64,500	$109,000
Computer Engineering (CE)	$61,800	$101,000
Electrical Engineering (EE)	$61,300	$103,000
Environmental Engineering	$51,700	$88,600
Industrial Engineering (IE)	$57,400	$93,100
Software Engineering	$54,900	$87,800
Materials Science & Engineering	$60,400	$103,000
Civil Engineering (CE)	$53,100	$90,200
Mechanical Engineering (ME)	$58,400	$94,500
Nuclear Engineering	$65,100	$97,800
Petroleum Engineering	$97,900	$155,000
Average Engineering	$61,615	$101,754
Civil Engineering Technology (CET)	$46,600	$83,300
Electrical Engineering Technology (EET)	$55,100	$84,300
Industrial Design (ID)	$44,400	$84,400
Industrial Technology (IT)	$48,100	$78,400
Telecommunications	$37,300	$78,100
Mechanical Engineering Technology (MET)	$51,600	$81,200
Average Engineering Technology	$47,183	$81,617
English	$37,100	$65,800
Literature	$39,100	$73,200
Average English Language and Literature	$38,100	$69,500
Child and Family Studies	$29,600	$40,500
French	$38,400	$65,500
Literature	$39,100	$73,200
Linguistics	$39,800	$70,700
Spanish	$36,400	$58,400
Average Foreign Lanuages	$38,425	$66,950
Health Care Administration	$36,700	$60,900
Health Sciences	$35,800	$66,200
Nursing	$52,700	$69,300
Occupational Health and Safety	$46,400	$79,000
Average Health Professions	$42,900	$68,850
Paralegal/Law	$35,300	$53,500

~~Hospitality & Tourism~~	~~$35,900~~	~~$59,500~~
~~Hotel Management~~	~~$36,100~~	~~$68,700~~
~~Human Resources (HR)~~	~~$37,900~~	~~$62,600~~
Liberal Arts	$37,800	$63,200
Geography	$39,600	$66,700
Forestry	$41,500	$67,200
Food Science	$43,300	$83,700
Zoology	$38,000	$75,200
Geology	$45,300	$83,300
Humanities	$34,900	$57,800
Average Liberal Arts & Sciences, General Studies, and Humanities	$40,057	$71,014
Mathematics	$47,000	$89,900
Applied Mathematics	$52,600	$98,600
Statistics	$49,000	$93,800
Average Math and Statistics	$49,533	$94,100
~~Medical Technology~~	~~$45,100~~	~~$60,900~~
Environmental Science	$40,200	$71,200
Natural Resources and Conservation	$40,200	$71,200
~~Nutrition~~	~~$38,600~~	~~$54,400~~
~~Organizational Management (OM)~~	~~$42,300~~	~~$61,900~~
Recreation & Leisure Studies	$34,500	$49,100
Athletic Training	$34,600	$50,200
Exercise Science	$33,100	$54,400
Kinesiology	$34,200	$54,600
Average Parks, Recreation…	$34,100	$52,075
Culinary Arts	$29,900	$46,800
Philosophy	$39,800	$75,600
Religious Studies	$32,900	$49,700
Average Philosophy and Religious Studies	$36,350	$62,650
Physics	$49,800	$101,000
Chemistry	$42,000	$80,900
Average Physical Sciences	$45,900	$90,950
Psychology	$35,000	$61,300
Public Administration	$40,400	$68,900
Public Health (PH)	$35,500	$51,700
Social Work (SW)	$32,200	$44,300
Average Public Admin & Social Services	$36,033	$54,967
Social Science	$36,600	$54,300
Anthropology	$35,600	$63,200
Sociology	$36,100	$60,500
Criminal Justice	$35,300	$58,900

Economics	$47,300	$94,700
Art History	$38,300	$53,300
History	$37,800	$69,000
Government	$41,400	$87,300
Political Science (PolySci)	$39,900	$80,100
Average Social Sciences and History	$38,700	$69,033
~~Sports Management~~	~~$35,400~~	~~$65,100~~
~~Supply Chain Management~~	~~$50,200~~	~~$84,700~~
Theology	$35,600	$52,000
~~Urban Planning~~	~~$41,500~~	~~$78,000~~
Visual Communication	$35,600	$59,000
Theater	$34,700	$57,300
Fine Arts	$35,900	$58,600
Multimedia and Web Design	$40,400	$53,900
Photography	$32,900	$54,500
Graphic Design	$35,600	$56,500
Interior Design	$34,300	$58,200
Drama	$37,800	$54,200
Art	$35,300	$52,400
Film Production	$41,600	$80,700
Music	$36,800	$57,200
Average Visual & Performing Arts	$36,445	$58,409

Appendix B Correlation between SAT Score and Median Salary



Appendix C NPV Calculations of Decision Model

	NPV
Minimum Wage	376,153
Payroll Tax Liability	(28,776)
10% Income Tax Liability	(14,293)
15% Income Tax Liability	0
Net Earnings	333,084
College Salary	868,111
Payroll Tax Liability	(56,751)
10% Income Tax Liability	(17,612)
15% Income Tax Liability	(56,466)
Net Earnings	737,281
Cost of Education	
Government Loan	(14,651)
Private Loan	(305,054)
Total Cost of Education	(319,705)
College Wage Premium	84,492

Appendix D Discount Rate Sensitivity Analysis with Decision Model

Discount Rate	f	π	w	College Wage Premium
2.00%	$358,622	$897,604	$412,400	$126,582
4.00%	$292,556	$652,036	$292,096	$67,385
5.00%	$266,465	$566,791	$251,976	$48,349
6.00%	$243,980	$498,598	$220,525	$34,093
7.00%	$224,509	$443,437	$195,503	$23,425
8.00%	$207,569	$398,331	$175,312	$15,450
9.00%	$192,763	$361,056	$158,797	$9,495

Appendix E Minimum Wage Increase Sensitivity Analysis with Decision Model

Minimum Wage Increase	*f*	π	*w*	College Wage Premium
-.5%	$316,825	$737,281	$312,219	$108,237
.5%	$316,825	$737,281	$355,907	$64,550
1%	$316,825	$737,281	$380,456	$40,000
1.5%	$316,825	$737,281	$406,466	$13,990
2.0%	$316,825	$737,281	$434,761	($14,305)
2.5%	$316,825	$737,281	$465,664	($45,207)
3.0%	$316,825	$737,281	$499,471	($79,015)

Appendix F Dropout Possibility Sensitivity Analysis with Decision Model

Dropout of College After x # of years	*f*	π	*w*	College Wage Premium
1	$50,711	$320,666	$333,084	($63,130)
2	$139,001	$308,632	$333,084	($163,453)
3	$203,194	$296,971	$333,084	($239,308)
4	$263,517	$285,670	$333,084	($310,931)

Appendix G Unemployment Possibility Sensitivity Analysis with Decision Model

Unemployment After College Graduation (In years)	*f*	π	*w*	College Wage Premium
1.00	$316,825	$731,819	$333,084	$81,910
2.00	$316,825	$725,823	$333,084	$75,913
3.00	$316,825	$719,305	$333,084	$69,396
4.00	$316,825	$712,243	$333,084	$62,333

Academic Vita of Clinton J. Myra

Email: cjm5344@psu.edu Clinton J. Myra Cell: 570-856-6556
440 White Birch St, East Stroudsburg, PA 18301

Education

THE PENNSYLVANIA STATE UNIVERSITY | Smeal College of Business | Schreyer Honors College
Bachelor of Science in Finance, Expected Graduation May 2012
Bachelor of Science in Accounting, Expected Graduation May 2012
Master of Accounting, Expected Graduation May 2012

- Received Freshman President's Award for highest GPA in Division of Undergraduate Studies
- Dean's List: Fall 2008-Fall 2011

Relevant Experience

KPMG, LLP Philadelphia, PA
Tax Intern, Corporate Tax June 2011-Aug. 2011

- Reviewed clients' prior years information and records to find missed tax credits that would lead to increased tax savings
- Gathered documents and collaboratively worked on multiple client tax returns with the assistance of senior staff

PPL CORPORATION Allentown, PA
Business Systems Analyst Intern May 2010-Aug. 2010

- Created and reviewed documents that were used to design and develop a business computer application
- Received requirements of the Treasury Department and communicated these requirements to computer developers in the Information Services Department
- Worked collaboratively with other members of the team, recognizing the needs of others and assisting when possible

H&R BLOCK Blakeslee, PA
Tax Preparer Dec. 2008-Present (Seasonal)

- Interview clients to gain a comprehensive understanding of their financial situation and help maximize their tax savings
- Review tax returns prepared by other tax preparers to ensure accuracy
- Research tax questions that arise and work with other tax preparers to find the most accurate solutions

Leadership & Activities

BETA ALPHA PSI University Park, PA
Member Aug. 2010- Dec. 2010

- Attended events that were designed to help students become more educated in the accounting field
- Required to complete a rigorous set of requirements that included attending various professional events, community service events, and tutoring accounting students

STUDENT FUND ALLOCATION COMMITTEE Lehigh Valley, PA
Student Representative Dec. 2009- May 2010

- Committee consisting of seven members that is charged with reviewing fund requests from Penn State Lehigh Valley(PSU LV) activity programs and responsible for allocating the appropriate amounts

PENN STATE LEHIGH VALLEY GOLF TEAM Lehigh Valley, PA
Team Member Aug. 2008- Nov.2009

- Traveled to various locations across Pennsylvania to compete in golf matches against other Penn State branch campuses and colleges